U.S. Department of the Interior
Bureau of Land Management

November 2024

Greater Sage-Grouse Rangewide Planning

Proposed Resource Management Plan Amendment and Final Environmental Impact Statement









The Bureau of Land Management's mission is to sustain the health, diversity, and productivity of public lands for the use and enjoyment of present and future generations.

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Final Environmental Impact Statement

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Responsible Agency: United States Department of the Interior,
Bureau of Land Management

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Abstract: This Greater Sage-Grouse Rangewide Planning (GRSG) Proposed Resource Management Pan Amendment and Final Environmental Impact Statement (Proposed RMP Amendment /Final EIS) has been prepared by the United States Department of the Interior, Bureau of Land Management (BLM) with input from cooperating agencies and in response to public comment. This document considers amendments to 77 BLM RMPs across the range of greater sage-grouse (GRSG) to respond to updated scientific information and changing land uses and provide for consistent and effective rangewide conservation based on biological information that is responsive to locally relevant habitat variability. The Final EIS describes and analyzes seven alternatives, including the Proposed RMP Amendment, for management of GRSG habitat on BLM-administered lands, including areas where BLM administers subsurface minerals.

Alternative 1 includes the applicable elements (goals, objectives, and management direction) from BLM's 2015 GRSG Amendment. Alternative 2, the No Action Alternative, includes the applicable RMP elements from BLM's 2019 GRSG Amendment. Alternative 3 emphasizes GRSG conservation and protection and has the highest amount of preservation measures of the alternatives and includes the identification of Areas of Critical Environmental Concern (ACECs). Alternative 4 emphasizes conservation while providing more allowances for public land uses than Alternative 3 and adjusts GRSG habitat management areas based on new information and science available since the previous planning efforts. Alternative 5, identified as the Preferred Alternative in the Draft RMPA/EIS, balances conservation with increased levels of site-specific allowances for public land uses and aligns habitat management areas with new information and science. Alternative 6 applies all the habitat management areas and associated management as Alternative 5 and includes the identification of ACECs.

In response to public and cooperating agency comments and internal review of the alternatives and effects described in the Draft RMPA/EIS, BLM developed the Proposed RMP Amendment alternative, which increases protections for GRSG from the Preferred Alternative in the Draft RMPA/EIS, while maintaining an appropriate balance of public land uses. The Proposed RMP Amendment incorporates management direction approaches from all of the alternatives analyzed in the Draft RMPA/EIS. Specifically, priority habitat management areas (PHMA) are identified as exclusion for solar and wind energy and no surface occupancy for fluid minerals. PHMA remains an avoidance area for major rights of way but the exceptions for allowing development are strengthened. Areas within PHMA requiring additional protections have been identified as PHMA with limited exceptions, to be managed as exclusion areas for major rights-of-way, and with no exceptions to the solar and wind exclusion allocation or to the no surface occupancy allocation for fluid minerals. Since the changes in management were consistent across the range, the areas were less suited to being identified as proposed ACECs, which are generally tailored to different values and locations. These additional protections will provide the necessary protections for GRSG habitat given

anticipated development threats and negative impacts from climate change, while ensuring an appropriate balance of public land uses.

Protest Period: Protests on the GRSG Proposed RMP Amendment/Final EIS must be in writing and filed with the BLM Director, either as a hard copy or electronically via BLM's National NEPA Register, by the close of the protest period (for instructions refer to: Filing a Plan Protest). The protest period closes 30 days from the date the United States Environmental Protection Agency publishes the Notice of Availability in the *Federal Register*.

For further information, contact:

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5353 Yellowstone Road,
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Project Website: https://eplanning.blm.gov/eplanning-ui/project/2016719/510

United States Department of the Interior

BUREAU OF LAND MANAGEMENT
National Office
1849 C Street NW
Washington, DC 20240

Dear Reader:

Enclosed is the Greater Sage-Grouse Rangewide Planning Proposed Resource Management Plan Amendment and Final Environmental Impact Statement (Proposed RMPA/Final EIS) for greater sage-grouse (GRSG) habitat management. Building on previous BLM plans, this planning effort is proposing to amend to 77 BLM RMPs to update management of approximately 65 million acres of greater sage-grouse habitat management areas in response to updated scientific information and changing land uses and to provide for consistent and effective rangewide conservation based on biological information that is responsive to locally relevant habitat variability. All actions analyzed in the Proposed RMPA/Final EIS would apply to BLM-administered lands, including areas where BLM administers subsurface minerals, in portions of California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming.

The Proposed RMP Amendment/Final EIS was prepared by the BLM in consultation with cooperating agencies and in response to public comments received. The Proposed RMPA increases protections for GRSG from the Preferred Alternative identified in the Draft RMPA/Draft EIS, while maintaining an appropriate balance of public land uses. The Proposed RMPA incorporates management direction approaches from all of the alternatives analyzed in the Draft RMPA/Draft EIS. Specifically, priority habitat management areas (PHMA) are identified as exclusion for solar and wind energy and as no surface occupancy for fluid minerals. PHMA remains an avoidance area for major rights-of-way, but the exceptions for allowing development are more restrictive. Areas within PHMA requiring additional protections have been identified as PHMA with limited exceptions, to be managed as exclusion areas for major rights-of-way, and with no exceptions to the solar and wind energy exclusion allocation or to the no surface occupancy allocation for fluid minerals. These additional protections will provide the necessary conservation measures for GRSG habitat, given anticipated development threats and negative impacts from climate change, while ensuring an appropriate balance of public land uses.

There are numerous values and concerns associated with the management of greater sage-grouse habitat across the West. We remain committed to implementing the policies and conservation measures that will meet the BLM's multiple-use and sustained yield mandate, provide for the habitat needs to conserve GRSG, avoid the need to list under the Endangered Species Act, and minimize long-term regulatory burdens. Thank you for your interest in the Greater Sage-Grouse Rangewide Planning RMPA.

Protests

Release of the Proposed RMP Amendment/Final EIS initiates a 30-day protest period for any person who previously participated in the planning process and has an interest that is (or may be)

adversely affected by the Proposed RMP Amendment. The protest regulations specify the required elements for filing a valid protest. To help guide you through this process, there is a critical item checklist available at https://www.blm.gov/programs/planning-and-nepa/public-participation/filing-a-plan-protest. As much as possible, cite specific planning documents or available planning records (such as summaries, correspondence, etc.) in your protest. All protests must be in writing and filed with the BLM Director, either as a hard copy or electronically via the BLM's ePlanning website, by the close of the protest period. The protest period closes 30 days from the date the United States Environmental Protection Agency publishes the Notice of Availability in the *Federal Register*.

The only electronic protests the BLM will accept are those filed through the National NEPA Register at https://eplanning.blm.gov/eplanning-ui/project/2016719/510. All protest letters sent to the BLM via fax or email will be considered invalid unless a properly filed protest is also submitted. If you do not have the ability to file your protest electronically, hard-copy protests must be mailed to the following address (regular or overnight mail), postmarked by the close of the protest period:

USPS Mail:
BLM Director
Attention: Protest Coordinator (HQ210)
P.O. Box 151029
Lakewood, CO 80215

Overnight Mail:
BLM Director
Attention: Protest Coordinator (HQ210)
Denver Federal Center, Building 40
Lakewood, CO 80215

Before including your address, phone number, email address, or other personal, identifying information in your protest, be advised that your entire protest—including your personal, identifying information—may be made publicly available at any time. While you can ask the BLM in your protest to withhold from public review your personal, identifying information, the BLM cannot guarantee that it will be able to do so.

The BLM Director will make every attempt to promptly render a decision on each protest. The decision will be in writing and will be sent to the protesting party by certified mail, return receipt requested. The decision of the BLM Director shall be the final decision of the Department of the Interior on each protest. Responses to protest issues will be compiled and formalized in a Director's Protest Resolution Report made available following issuance of the decisions. Upon resolution of all land use plan protests, the BLM will issue state specific Approved RMP Amendments and Records of Decision (ROD). The Approved RMP Amendments and RODs will be available to all parties online at the BLM's National NEPA Register, linked above.

Sincerely,

SHARIF BRANHAM Digitally signed by SHARIF BRANHAM
Date: 2024.10.30 16:15:49 -04'00'

Sharif Branham,
Assistant Director for Resources and Planning

Executive Summary

EXECUTIVE SUMMARY

The greater sage-grouse (GRSG) is a state-managed species that depends on intact functioning sagebrush ecosystems. This expansive sagebrush landscape is managed by a mix of federal, tribal, state, and local agencies (e.g., counties and conservation districts), as well as private landowners. The Bureau of Land Management (BLM) manages approximately half of GRSG habitat as part of the agency's multiple use and sustained yield mission.

State and Tribal-led efforts to conserve the species and its habitat date back to the 1950s. For the past three decades, state wildlife agencies, the BLM and other federal agencies, and many others in the range of the species have collaborated to conserve GRSG and its habitats. The BLM's land management plans (collectively referred to as resource management plans [RMP]) include goals, objectives, and management actions for managing GRSG habitat on BLM-administered public lands in ten Western states (California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah and Wyoming). These plans include management for GRSG Habitat Management Areas to provide for conservation, enhancement, and restoration of GRSG habitat. GRSG also occur in Washington but have limited distribution on BLM-administered lands and are primarily influenced by actions on private lands. Therefore, GRSG in Washington are not included as part of this plan amendment.

The U.S. Fish and Wildlife Service identified the threats to GRSG as part of evaluating whether GRSG warranted being listed as threatened or endangered in 2005, 2010, and 2015. Many of these threats have been addressed in the BLM's prior GRSG planning efforts in the 2014/2015 plan revisions and amendments, and again in all states except Montana and the Dakotas with a 2019 series of state-specific amendments. Despite years of management attention from multiple state and federal agencies GRSG habitat continues to be impacted and lost.

The BLM has prepared this Proposed Resource Management Plan Amendment (RMPA)/Final Environmental Impact Statement (EIS) to analyze potential amendments to specific GRSG goals, objectives, and management actions contained in 77 existing RMPs to enhance GRSG conservation through management of GRSG habitats on BLM-administered lands. These amendments seek to continue providing the BLM with locally relevant decisions that achieve rangewide GRSG conservation goals consistent with the agency's multiple use and sustained yield mission, and GRSG management efforts with federal, state, local, and Tribal partners. The ten-state planning area includes nearly 121 million acres of BLM-administered public land. GRSG habitat management areas occur on approximately 65 million acres and are the focus of this effort.

PURPOSE AND NEED

The BLM's purpose is to amend certain goals, objectives, allocations, and management direction for GRSG management in its RMPs to respond to updated scientific information and changing land uses and provide for consistent and effective rangewide conservation based on biological information that is responsive to locally relevant habitat variability. Following an internal review of the effectiveness of 2015 and 2019 RMP Amendment decisions, including the degree to which those decisions sufficiently addressed threats to greater sage-grouse habitats and continued population declines, while balancing the BLM's ability to manage public lands for other uses, and as informed by updated scientific findings and feedback received from Tribal, federal,

state, and local agencies and the public during the scoping period, the BLM proposes to amend the following RMP elements:

- Clarifying the existing GRSG RMP goal
- GRSG habitat management area alignments to incorporate new science and improve alignment along state boundaries along with the associated major land use allocations, including management for non-habitat within habitat management areas
- Adoption of the Western Association of Fish and Wildlife Agencies (WAFWA) definition of "lek" and "lek status"
- Mitigation
- GRSG habitat objectives
- Disturbance caps
- Fluid mineral development and leasing objectives
- Fluid mineral leasing waivers, exceptions, and modifications
- Renewable energy development
- Rights-of-Way
- Minimizing threats from predation
- Livestock grazing
- Wild horse and burro management
- Areas of Critical Environmental Concern
- Adaptive Management

Some management concerns are localized to circumstances in individual States and the ecological diversity across the sagebrush ecosystem. As such, the purpose of this planning effort also includes amending specific RMP management actions associated with state-specific circumstances to facilitate GRSG habitat conservation efforts. Beyond the rangewide considerations detailed above, states considered additional targeted amendments to existing management direction. Each state determined the need to amend management actions independently and based on a review of updated scientific information, changing land uses, and locally relevant habitat variability. Management actions targeted for amendment in some states include saleable minerals, fire and fuels, vegetation and invasives, lands and realty actions, project screening, lek buffers, and interagency coordination. Inclusion of a management category for amendment in one state does not necessitate consideration of this category in other states or the consideration of the category rangewide. See **Section 2.5**, State Specific Circumstances, for more information.

Section 102 of the FLPMA, as amended, requires the BLM to manage public lands "in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use;". BLM policy further directs the BLM to proactively initiate conservation measures and to minimize or avoid potential adverse effects to prevent decline of sensitive species. Specifically, the BLM's Wildlife and Fisheries Management Manual, M-6500, directs the BLM to "conserve rare, vulnerable, and representative habitats, plant communities, and ecosystems", with specific objectives to "develop and implement plans to ensure that the characteristics of rare, threatened, or representative habitat types are maintained." and to "collaborate with other agencies, the States, and private groups to ensure protection of the best representative habitats/ecosystem/plant communities for each area.". The BLM's Special Status Species Management Manual, M-6840, directs the

BLM to "to initiate proactive conservation measures that reduce or eliminate threats to Bureau sensitive species to minimize the likelihood of and need for listing of these species under the ESA."

The BLM is therefore considering amending RMPs to:

- Address continued GRSG habitat losses contributing to GRSG population declines. While GRSG populations experience natural fluctuations, monitoring indicates the most recent nadirs (low point of population cycles) are lower than the prior nadirs in most states. The U.S. Geological Survey[1] analyzed state-collected lek data and reported estimated rangewide population declines of nearly 80 percent from 1966-2021 and of 41 percent from 2002-2021. While some GRSG populations are stable to increasing, over 87 percent of areas throughout the range had declining populations since 2002. The quantity and quality of available habitat, as well as non-habitat factors such as disruptive activities and prolonged drought can affect the size and trend of GRSG populations. Analyses of satellite maps shows sagebrush availability across all land ownerships declined by approximately 3 percent (1.9 million acres) between 2012 and 2018. Nearly 60 percent of the sagebrush losses (approximately 1.1 million acres rangewide) occurred on BLM-administered lands. The BLM's 2021 *Greater Sage-Grouse Plan Implementation Rangewide Monitoring Report for 2015-2020*[2] identified 42 population triggers that had been tripped through 2020. Habitat triggers were tripped sixteen times, mostly the result of sagebrush loss to wildfires. The Monitoring Report also estimated habitat loss of less than one percent in GRSG priority habitat management areas (PHMA) rangewide and Important Habitat Management Areas (IHMA) in Idaho due to anthropogenic disturbance., although losses due to wildfire were more extensive. Thie anthropogenic loss on BLM lands is less than what scientific literature has identified as the threshold where GRSG abandon leks (Kirol et al., 2020). Disturbance from infrastructure in General Habitat Management Areas (GHMA) and other state-specific habitat management area designations averaged approximately 1.58 percent.
- Ensure habitat management areas and associated decisions incorporate recent relevant science to prioritize management where it will provide conservation benefit and durability when considering the effects of climate change. Since the 2015 and 2019 planning efforts, hundreds of peer-reviewed scientific publications on GRSG and management of their habitats have been published. Some of these new publications are consistent with science the BLM previously considered while others identify new information. Several provide new spatial information on important population and habitat parameters for GRSG. USGS also compiled and summarized peer-reviewed journal articles, data products, and formal technical reports related to GRSG since January 2015 (Teige, et. al. 2023). The BLM considered this new information and relevant science in developing and analyzing proposed management on BLM-administered lands.

ISSUES ANALYZED

In the November 2021 Notice of Intent initiating this planning effort, the BLM invited the public to identify issues, management questions, or concerns related to the preliminary purpose and need (refer to **Section 5.4.1** for more information on scoping) to guide development of the effects analysis. Public comments were

[1] Coates, P.S., Prochazka, B.G., Aldridge, C.L., O'Donnell, M.S., Edmunds, D.R., Monroe, A.P., Hanser, S.E., Wiechman, L.A., and Chenaille, M.P., 2023, Rangewide population trend analysis for greater sage-grouse (*Centrocercus urophasianus*)—Updated 1960–2022: U.S. Geological Survey Data Report 1175, 17 p., https://doi.org/10.3133/dr1175.

[2] Herren, V., E. Kachergis, A. Titolo, K. Mayne, S. Glazer, K. Lambert, B. Newman, and B. Franey. 2021. Greater sage-grouse plan implementation: Rangewide monitoring report for 2015–2020. U.S. Department of the Interior, Bureau of Land Management, Denver, CO.

evaluated to identify resources that could potentially be affected by the GRSG sagebrush habitat management. The BLM compiled comments received from members of the public and various governmental and non-governmental groups to describe the issues and analysis concerns that are discussed in this document. (Refer to Scoping Report at: https://eplanning.blm.gov/eplanning-ui/project/2016719/570).

On March 15, 2024, the BLM released the Draft RMPA/Draft EIS for a 90-day public comment period, which closed on June 13, 2024. The BLM held thirteen public meetings, including two virtual meetings and eleven in-person public meetings, across the planning area. The BLM revised the RMP Amendment and EIS based on issues, management questions, and concerns raised during the public comment period.

Issues Analyzed in this RMPA/EIS

Decision-makers and the public need to understand the impacts each alternative would have on specific resources and resource uses. The following resource issues/topics are analyzed in detail in this RMP Amendment/EIS are:

- Special status species (including GRSG)
- Fish and wildlife
- Air resources and climate
- Soil resources
- Water resources
- Vegetation
- Riparian areas and wetlands
- Wild horses and burros
- Cultural resources
- Lands with wilderness characteristics
- Wildland fire ecology
- Livestock grazing
- Recreation
- Travel and transportation
- Mineral resources
- Lands and realty
- Areas of Critical Environmental Concern (ACECs)
- Tribal interests
- Social and economic conditions, including environmental justice

ALTERNATIVES CONSIDERED

The development of alternatives was guided by the BLM's identified purpose and need, while remaining responsive to issues identified by the public and cooperating agencies,, in alignment with planning criteria, and compliant with Federal laws, regulations, policies, and standards, including the multiple-use mandates specified by FLPMA. This planning process considers seven alternatives (six alternatives analyzed in the Draft RMPA/Draft EIS and the Proposed RMP Amendment identified in the Proposed RMPA/Final EIS). These alternatives have been derived from scoping, interagency coordination, and internal discussions. The alternatives developed provide alternative strategies to meet the purpose and need and to identify the trade-offs and differing effects of alternative management approaches.

Alternative 1

Alternative 1 includes the applicable decisions from the 2015 Approved RMPAs (ARMPA) that are being analyzed for potential amendment as part of this planning effort. It does not include all the goals, objectives, and actions from the 2015 ARMPAs. Under Alternative 1, the BLM would re-adopt the applicable GRSG habitat management area (HMA) boundaries, goals, objectives, and actions from the 2015 Records of Decision (ROD)/ARMPAs (as updated through plan maintenance). Due to the U.S. District Court of Idaho's preliminary injunction preventing implementation of the 2019 amendments (see explanation in Alternative 2 summary below) this alternative reflects how the BLM is currently managing GRSG habitat on public lands. This includes designation of some areas of PHMA as Sagebrush Focal Areas (SFA) with a recommendation to withdraw them from mineral location and entry under the Mining Law of 1872.

Alternative 2

Alternative 2 is the No-Action Alternative and includes the applicable decisions from the 2019 Greater Sage-Grouse ROD/ARMPAs efforts except in Montana/Dakotas, which did not amend their RMPs in 2019. This is the No Action because it reflects the management language currently in the BLM's approved land use plans. The U.S. District Court for the District of Idaho has issued a preliminarily injunction, preventing the BLM from implementing the 2019 amendments, but not vacating them or their Records of Decision. Because the 2019 RODs/ARMPAs were not vacated, they are the existing management plans. Under this alternative the BLM would apply the management from the 2019 ARMPA. SFAs would be removed from the BLM RMPs in all states except Oregon and Montana; these areas would still be managed with all the protections of PHMA, but would no longer include a recommendation for withdrawal (including in the Oregon SFAs).

Alternative 3

Alternative 3 provides the most protective measures to preserve GRSG and its habitat of the alternatives analyzed. Alternative 3 would update the Habitat Management Area (HMA) boundaries based on new information and science that has become available since the 2015 and 2019 planning efforts. All HMAs would be managed as priority HMA (PHMA). The BLM would close PHMA to new fluid mineral leasing, saleable minerals/mineral materials permits, and nonenergy leasable minerals leasing (development associated with existing permits and leases would not be precluded). PHMA would be recommended for withdrawal from location and entry under the Mining Law of 1872 and unavailable for livestock grazing. PHMA would also be ROW exclusion areas. Where there are currently designated wild horse and burro herd management areas overlapping PHMA, the wild horse and burro herd management area would become a Herd Area that is not managed for wild horses and burros. Under Alternative 3, the BLM would designate 32 GRSG habitat ACECs.

Alternative 4

Alternative 4 would update the habitat management area boundaries and associated management based on new information and science that became available since the 2015 and 2019 efforts. While many of the allocations would be similar to Alternatives 1 and 2, the habitat management areas are updated to reflect new science. Under Alternative 4, in Wyoming, all PHMA would be managed with no surface occupancy stipulations for new oil and gas leases (all other states have this stipulation in PHMA in this and the other alternatives in the PRMPA). In addition, management associated with some of the major minimization measures (e.g., disturbance cap and adaptive management) is adjusted to address cross-boundary coordination of shared populations, rangewide biological and managerial concerns based on monitoring, and experience gained from implementing management for GRSG since 2015. Alternative 4 allows compensatory mitigation to be used under specific conditions. Additional compensatory mitigation may be required where habitat and/or population adaptive management thresholds have been met. Areas previously identified as SFAs are generally managed as PHMA. The primary difference between management of SFAs in the 2015 Plans and PHMAs in this planning effort is that PHMA would not include a recommendation for withdrawal or prioritization strategies for oil and gas leasing and grazing permit renewals.

Alternative 5

Alternative 5 was identified as the preferred alternative in the Draft EIS. Alternative 5 considers other potential alignments of habitat management areas and associated management to try to balance GRSG conservation with public land uses. If state governments updated the GRSG management area boundaries in their specific state plans, the BLM is considering those boundaries on public lands in Alternative 5. HMAs are similar to but refined from Alternative 4 and restrictions would generally be similar to Alternative 4; with the exception of Wyoming which would follow the oil and gas management direction in Alternative 2;

and the fact that Alternative 5 considered options with fewer restrictions on resource uses and provided more opportunities for considering compensatory mitigation to offset impacts on GRSG and its habitat than Alternative 4. Areas previously identified as SFAs are generally managed as PHMA. The primary difference between management of SFAs in the 2015 Plans and PHMAs in this planning effort is that PHMA would not include a recommendation for withdrawal or prioritization strategies for oil and gas leasing and grazing permit renewals.

Alternative 6

Under Alternative 6, management for all habitat management areas and the resource topics being considered in the range of alternatives would be the same as described for Alternative 5, but with the addition of the designation of 32 ACECs. The same ACECs proposed for designation under Alternative 3 would be considered but the management direction for these areas would be less restrictive compared to Alternative 3.

Proposed RMP Amendment

The Proposed RMP Amendment increases protections for greater sage-grouse and its habitat from the Preferred Alternative (Alternative 5) in the Draft EIS. The Proposed RMP Amendment, described in detail below in **Section 2.4** and **Section 2.5**, identifies PHMA as exclusion for solar and wind and NSO for fluid minerals with exceptions. PHMA remains an avoidance area for major rights of way but the exceptions for allowing development are more restrictive. Areas within PHMA requiring additional protections have also been identified. Within these areas referred to as PHMA with limited exceptions, there are no exceptions to the solar and wind exclusion allocation or for the NSO allocation for fluid minerals. PHMA with limited exceptions are also exclusion areas for major rights of way. These additional protections in the Proposed RMP Amendment are designed to provide the necessary protections for GRSG and its habitat in light of anticipated development threats and negative impacts from climate change such as drought.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

GRSG: All alternatives would apply some restrictions on resource uses within habitat management areas to reduce potential impacts on GRSG. The acreage and location of habitat management areas varies by alternative, and impacts on GRSG would similarly vary, with the BLM managing the most PHMA under Alternative 3, followed by Alternatives 4, the Proposed RMP Amendment, Alternative 1, and Alternatives 5/6 in descending order. The fewest acres of PHMA and General Habitat Management Areas (GHMA) would be managed under Alternative 2. However, the simple comparison of acreages does not reflect the incorporation of new science published since 2015 that more accurately identify important GRSG habitats. Under the Proposed RMP Amendment, areas within PHMA that require additional protection have also been identified as PHMA with limited exceptions, with appropriate management direction to provide the necessary conservation of these key areas of GRSG habitat, given anticipated development threats and negative impacts from climate change, while ensuring an appropriate balance of public land uses. Under Alternative 1, restrictions on development and avoidance/exclusion areas, would be focused in PHMA, while energy development, mining, ROWs, and other surface disturbing activities would be focused outside of PHMA. The BLM would incorporate adaptive management, mitigation, disturbance caps, habitat objectives, and monitoring, to reduce the total net impact on GRSG. Impacts from Alternative 2 would be similar to those under Alternative 1, with more flexibility incorporated in the management of activities that can impact GRSG, and the BLM would remove SFA in all states except OR and MT. Increased flexibility could increase potential impacts on GRSG habitat, including the potential for disturbance, degradation, and loss. The habitat management areas in Alternatives 1 and 2 do not reflect the most current data on important habitats that are contributing to the long-term persistence of GRSG, including potential habitat impacts resulting from

climate change. Therefore, management actions may be incongruent with long-term conservation where Habitat Management Areas overlap areas of little conservation value, or do not capture areas key to GRSG persistence.

The greatest protection for GRSG habitat is under Alternative 3, which has the largest PHMA acreage with the greatest restrictions. However, actions to implement the Alternative 3 allocation making public lands unavailable to grazing would require increased fencing to separate federal and nonfederal grazing lands, resulting in possible habitat fragmentation, increased GRSG collision risks, and increased opportunities for GRSG predators. Further, removal of grazing could allow for the buildup of fine fuels, which may increase the risk of a large-scale wildfire that would damage or destroy large areas of GRSG habitat.

Under Alternatives 4, 5, and 6, incorporation of new information and science that has become available since the 2015 and 2019 efforts would refine management for GRSG and associated habitats and improve cross-boundary coordination of shared populations compared with Alternatives 1 and 2, thus potentially improving management of GRSG across its range. These alternatives also retain components of the 2015 and 2019 amendments that continue to provide conservation to GRSG. Alternatives 5 and 6 may have more impacts than Alternative 4, given the fewer restrictions on resource uses and providing more opportunities for considering compensatory mitigation to offset impacts on GRSG and its habitat.

Natural, biological, and cultural resources: Protections for GRSG under the Proposed RMP Amendment and all alternatives would result in incidental protections for other natural, biological, and cultural resources, including vegetation, fish and wildlife, other special status species, soil resources, water resources, cultural resources, tribal interests, air quality, climate change, and wilderness characteristics. The location and magnitude of impacts would be similar to those summarized for GRSG, based on habitat management area acreages and particular restrictions under each alternative. As described for GRSG, the removal of livestock grazing under Alternative 3 could result in an increased risk of wildland fire that could destroy or damage natural, biological, or cultural resources. Removal of all horses and burros from herd management areas that overlap with PHMA under Alternative 3 would result in short-term disturbances from human presence and round up activities. In the long-term the combination of removing livestock grazing and wild horses and burros could have positive benefits for grazing wildlife due to removal of uses that compete for similar resources.

Resource uses: Impacts on resource uses, including mineral development, livestock grazing, lands and realty, and renewable energy, are typically inversely related to impacts on GRSG. Alternative 3 would have the greatest effects on resource uses by making PHMA unavailable for livestock grazing and closing PHMA to mineral, ROW, and renewable energy development. There would be less variability in the differences between Alternatives 1, 2, 4, 5, and 6, and the Proposed RMP Amendment would be based on HMAs acreages and resource management differences. For instance, management of PHMA as no surface occupancy (NSO) in Wyoming under Alternative 4 would increase restrictions on fluid mineral development compared to the other alternatives for that state. However, the NSO stipulations in areas of high development could limit flexibility of managers to locate disturbances in areas with the least potential for conflict with GRSG conservation. While SFAs under Alternative 1 and all PHMA under Alternative 3 would be recommended for withdrawal from location and entry under the Mining Law of 1872, the recommendation for withdrawal does not itself restrict any resource uses. As such, there would be no effects on locatable mineral claims or mine development. If, in the future, the Secretary of the Interior were to propose a withdrawal of the land from location and entry under the Mining Law of 1872, that proposal would be subject to appropriate NEPA

and other analysis and if the Secretary were to withdraw the land following such analysis, location and entry under the Mining Law of 1872 would no longer be allowable, subject to valid existing rights.

Social and economic conditions: Impacts on social and economic conditions vary across regions and alternatives. Under Alternative 3, the BLM would no longer manage PHMA for livestock grazing, mineral, and renewable and non-renewable energy development, supporting lower levels of these activities across the analysis area. Additionally, this reduced economic activity in public land-dependent sectors, such as mining, livestock production, and renewable energy development, will have a ripple effect which causes economic activity in other sectors of the economy to slow. The large changes in economic conditions, under Alternative 3, could affect rural quality of life and lead to higher levels of unemployment and underemployment in some mineral dependent economies. Displaced workers in more diversified economies are likely to have an easier time finding new employment while rural residents may have to commute further for work or may have to consider re-locating out of the area. Those lacking financial resources to either commute further or relocate will be especially impacted. The scale of closures under Alternative 3 would have adverse impacts on social and economic conditions in a large number of communities and could affect fiscal budgets at both the local and state level of government, especially in states like Wyoming where taxes on mineral production serve as the largest source of tax revenue for multiple levels of government. However, Alternative 3 would provide the greatest protection of nonmarket values for GRSG and sagebrush ecosystems. The adverse economic impacts of PHMA closures under Alt 3 would be compounded in communities where a significant portion of residents either work in the oil and gas and mining sector or operate small family-owned ranches with affected grazing permits and ranching is their sole source of income, or where rural residents work in mineral extraction as a way to support a family while operating a small family-owned ranch.

Alternatives 1, 2, 4, 5, 6, and the Proposed RMP Amendment would support higher levels of economic activity in natural resource-dependent economies across the planning area relative to Alternative 3. Management actions that lead to a change oil and gas activity, under alternatives 4, 5, 6, and the Proposed RMP Amendment, could result in the same economic conditions as Alternative 1 in some areas (Montana, Nevada, North Dakota, South Dakota, and Utah), could support an increase in jobs, labor income, economic output, and tax revenue in some areas (Colorado and Idaho), or could lead to a reduction in jobs, labor income, economic output, and tax revenue in other areas (Wyoming). The management actions, under alternatives 4, 5, 6 and the Proposed RMP Amendment could affect social conditions and quality of life in some communities.

SUMMARY OF CHANGES TO THE PROPOSED RMP AMENDMENT/FINAL EIS

The Proposed RMP Amendment/Final EIS incorporates changes based on public comments, cooperating agency input, and internal BLM reviews of the Draft RMPA/EIS. Additional detail has been added and editorial changes have been made throughout the document to improve clarity.

The Proposed RMPA increases protections for GRSG from the Preferred Alternative while balancing public land uses by incorporating management direction approaches from all of the alternatives analyzed in the Draft RMPA and EIS. Specifically, priority habitat management areas (PHMAs) are identified as exclusion for solar and wind energy. PHMA remains an avoidance area for major rights-of-way but the exceptions for allowing development are strengthened. Areas within PHMA that require additional protection have been identified as PHMA with limited exceptions, to be managed as exclusion areas for major rights-of-way, and with no exceptions to the solar and wind energy exclusion allocation or to the no surface occupancy allocation for fluid minerals. These additional protections will provide the necessary conservation of these

key areas of GRSG habitat given anticipated development threats and negative impacts from climate change, while ensuring an appropriate balance of public land uses.

In addition, between Draft RMPA/EIS and the Proposed RMPA/Final EIS, the BLM has clarified how the management direction from the 2015 and 2019 planning efforts is being amended by this Proposed RMPA (refer to **Appendix 2**). The management direction for renewable energy, rights-of-way, fluid minerals, livestock grazing, predation, wild horses and burros, adaptive management, mitigation, disturbance cap, saleable minerals, and leasable minerals has been refined and clarified in response to public and cooperating agency comments and internal review. The BLM also made updates throughout the document to clarify the ACECs being considered by the Proposed RMPA and the effects of the alternatives and Proposed RMPA on the ACECs identified for designation in Alternatives 3 and 6. Between the Draft and Final EIS, the BLM also updated the Habitat Management Areas for the states of Oregon, California, and Nevada based on updated science and input from State wildlife agencies and federal partners. Four new appendices were added, detailing (1) changes between Draft RMP Amendment/EIS and Proposed RMP Amendment/Final EIS (**Appendix 20**), (2) description of the six alternatives analyzed in the Draft EIS in the same manner they were presented in the Draft EIS (**Appendix 21**), (3) public outreach conducted on the Draft RMPA/EIS, comments received, and responses to substantive comments (**Appendix 22**), and (4) known inconsistencies between the Proposed RMP Amendment and federal, state, local, and Tribal plans (**Appendix 23**).

NEXT STEPS

The publication of the Notice of Availability in the Federal Register by the US Environmental Protection Agency for the Proposed RMP/Final EIS initiates a 30-day protest period and a 60-day Governor's consistency review. Protests must be postmarked or received no later than 30 calendar days following publication of the Notice of Availability. Please refer to the instructions in the "Dear Reader Letter" at the beginning of this document for additional information on how to submit a protest. The close of the protest period will be 30 days after the publication of the Federal Register Notice of Availability and announced on the BLM's National NEPA Register at: https://eplanning.blm.gov/eplanning-ui/project/2016719/510). Following resolution of any protests and the completion of the consistency review, the Approved RMP Amendments and Records of Decision will be announced via news release and made available electronically on the National NEPA Register.

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ACRONYMS AND ABBREVIATIONS

	Full Phrase
°F	degrees Fahrenheit
ACEC	area of critical environmental concern
ADH	all designated habitat
AIM	assessment, inventory, and monitoring
AML	appropriate management level
AMP	allotment management plans
AO	authorized officer
APD	application for permit to drill
ARMPA	approved resource management plan amendment
AUM	animal unit month
BCC 2021	Birds of Conservation Concern 2021
BFO	Butte Field Office
BLM	United States Department of the Interior, Bureau of Land Management
BMP	best management practices
BSU	biologically significant unit
CA	California
CBNG	coalbed natural gas
CEQ	Council on Environmental Quality
CFA	causal factor analysis
CFR	code of federal regulations
CHMA	Connectivity Habitat Management Area
CO	Colorado
COA	conditions of approval
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
COT	Conservation Objectives Team
CRVFO	Colorado River Valley Field Office
CSU	controlled surface use
CWA	Clean Water Act
DDT	dichlorodiphenyltrichloroethane
DDCT	density and disturbance calculation tool
DK	North and South Dakota
DOI	United States Department of the Interior
EGS	Enhanced Geothermal Systems
EIS	environmental impact statement
EOI	Expression of Interest
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESD	Ecological Site Description
ESR	emergency stabilization and rehabilitation
EVT	existing vegetation type
ES&R	Emergency Stabilization and Rehabilitation

FLPMA	Federal Land Policy and Management Act of 1976
FR	federal regulation
GBBO	Great Basin Bird Observatory
GHG	greenhouse gas
GHMAs	general habitat management areas
GIS	geographic information system
GJFO	Grand Junction Field Office
GPS	global positioning system
GRSG	greater sage-grouse
HAs	herd areas
HAF	habitat assessment framework
HAP	hazardous air pollutant
HBP	held by production
HMAs	habitat management areas
ID	Idaho
IHMAs	important habitat management areas
IM	instruction memorandum
IPaC	Information for Planning and Consultation
IPCC	Intergovernmental Panel on Climate Change
KPLA	known phosphate lease areas
kV	kilovolt
LCHMA	linkage and connectivity habitat management area
LCT	Lahontan cutthroat trout
LMA	linkage management area
LUP	land use plan
LUPA	land use plan amendment
LWC	lands with wilderness characteristics
MA	management area
MD	management direction
MLB	management of land boundary
MR	mineral resources
MSHA	Mine Safety and Health Administration
MT	Montana
MW	megawatt
MZ	management zone
NAAQS	national ambient air quality standards
NEPA	National Environmental Policy Act
ND	North Dakota
NDOW	Nevada Department of Wildlife
NHPA	National Historic Preservation Act of 1966, as amended
NIFC	National Interagency Fire Center
NOx	nitrogen oxides
NRHP	National Register of Historic Places
NSO	no surface occupancy

NTT	National Technical Team
NV	Nevada
OHMA	other habitat management areas
OHV	off-highway vehicle
OR	Oregon
PAC	priority area of conservation
PEIS	programmatic environmental impact statement
PHMAs	priority habitat management areas
PM_{10}	particulate matter with a diameter less than or equal to 10 microns
$PM_{2.5}$	particulate matter with a diameter less than or equal to 2.5 microns
RA	Restoration Area
RDF	required design feature
RFD	reasonably foreseeable development
RHMA	restoration habitat management area
RIPS	Rangeland Improvement Project System
RMP	resource management plan
RMPA	resource management plan amendment
RNA	research natural area
ROD	record of decision
ROW	right-of-way
SD	South Dakota
SDWA	Safe Drinking Water Act
SFAs	sagebrush focal areas
SHPO	State Historic Preservation Office
SMA	Surface Management Agency
SO	Secretarial Order
SO2	sulfur dioxide
SRP	special recreation permit
SSS	special status species
STM	State and Transition Model
TAWS	targeted annual warning system
T&C	terms and conditions
TL	timing limitation
TUP	temporary use permit
UMRBNM	Upper Missouri River Breaks National Monument
US	United States
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UT	Utah
VOC	volatile organic compound

WEM	waivers, exceptions, and modifications
WO	Washington Office
WSA	wilderness study area
WY	Wyoming

Chapter 1. Introduction

1.1 INTRODUCTION

The BLM prepared this Proposed Resource Management Plan Amendment (RMPA)/Final Environmental Impact Statement (FEIS) to analyze potential amendments to a subset of greater sage-grouse (GRSG) goals, objectives, and management allocations and actions to 77 existing land use plans across ten Western states (California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming). Please refer to **Appendix 2** for a list of land use plans being amended (including Resource Management Plans (RMPs) and Management Framework Plans (MFPs)), a description of the existing GRSG management proposed for amendment and existing management not being proposed for amendment. This Proposed RMPA seeks to provide the BLM with locally relevant management actions and allocations that achieve rangewide GRSG conservation goals consistent with the agency's multiple use and sustained yield mission and in support of coordinated GRSG management efforts with federal, state, local, and Tribal partners.

The Federal Land Policy and Management Act of 1976 (FLPMA) directs the BLM to develop and periodically revise or amend its RMPs, which guide management of BLM-administered public lands. The planning process follows BLM planning regulations codified in 43 Code of Federal Regulations (CFR) Part 1600. BLM RMPs identify allowable and restricted uses of public land resources and include overall goals and objectives to manage, protect, and provide for the appropriate use of resources. RMPs also establish systems to monitor and evaluate resources and assess effectiveness of management practices. Consistent with the National Environmental Policy Act of 1969, as amended, (NEPA), the Proposed RMPA is supported by an EIS, which analyzes and discloses potential associated environmental impacts. The FEIS was developed in accordance with the Council on Environmental Quality (CEQ) NEPA implementing regulations at 40 CFR Part 1500, and the Department of the Interior NEPA implementing regulations at 43 CFR Part 46[1].

1.2 GRSG PLANNING BACKGROUND

The greater sage-grouse (*Centrocercus urophasianus*) is a state-managed species dependent on intact functioning sagebrush ecosystems. This expansive sagebrush ecosystem habitat is managed by a mix of federal, Tribal, state, and local agencies, as well as private landowners. State and Tribal-led efforts to conserve the species and its habitat date back at least to the 1950s (Connelly et al., 2004). For the past three decades, state wildlife agencies, the BLM and other federal agencies, and many others in the range of the species have collaborated collaborating to conserve GRSG and its habitats. Approximately half of the existing GRSG habitat is managed by the BLM.

In 2010, the U.S. Fish and Wildlife Service (USFWS) determined that listing the GRSG under the Endangered Species Act of 1973 (ESA) was "warranted but precluded" by other priorities (USFWS, 2010c). USFWS made this determination based on two factors identified in section 4(a)(1) of the ESA: continued decline of GRSG habitats, and inadequacy of regulatory mechanisms guiding habitat management. In response, the BLM developed a management strategy, in coordination with the U.S. Forest Service (USFS) resulting in the adoption of the 2015 land use plan amendments. In September 2015, the BLM and USFS signed three Records of Decision and Approved RMPA/Land Management Plan Amendments, which amended 98 BLM and USFS

[1] Recent revisions to the CEQ's NEPA implementing regulations apply to any NEPA process begun after July 1, 2024 (40 CFR 1506.12). Since this EIS was initiated in November 2021, the BLM has utilized the requirements in place at the time of Project initiation. All references to the CEQ NEPA implementing regulations in this document are those effective in November 2021.

land use plans to include goals, objectives, and management allocations and actions for managing GRSG habitat on BLM-administered Public Lands and USFS lands in ten Western states (California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming) (BLM, 2015a and 2015b; USFS, 2015). Subsequently, USFWS determined that the GRSG did not warrant listing under the ESA based in part on the regulatory mechanisms included in the RMP Amendments (USFWS, 2015b).

On March 31, 2017, the US District Court for the District of Nevada held that the BLM violated NEPA by failing to prepare a supplemental Environmental Impact Statement for the designation of sagebrush focal areas (SFAs) and other changes in habitat management areas in the 2015 Nevada and Northeastern California Greater Sage-Grouse Resource Management Plan Amendment. However, the court did not vacate or enjoin implementation of the 2015 Great Basin ROD, which also included Oregon, Idaho, Utah, and Southwestern Montana.

In October 2017, the BLM initiated another GRSG plan amendment process in all states except Montana, North Dakota, and South Dakota to consider specific changes to some GRSG management actions from the 2015 amendments, and to address the concerns identified by the US District Court for the District of Nevada. The planning process also sought to increase alignment with recently completed or updated state GRSG management plans. The purpose and need for the amendments built on the 2015 effort but focused specifically on modifying GRSG management to enhance cooperation and coordination with states and Tribes where applicable, aligning with updated Department of the Interior (DOI) and BLM policy directives and incorporating new or updated local science, research, and information. In 2019, the BLM signed six state-specific Records of Decision and Approved RMP Amendments which adjusted some, but not all of the goals, objectives, and management allocations and actions for managing GRSG habitat on BLM administered lands in seven of the ten Western states (California, Colorado, Idaho, Nevada, Oregon, Utah, and Wyoming) (BLM 2019d-i). Changes to GRSG management actions varied by state.

In October 2019, the US District Court for the District of Idaho issued an order preliminarily enjoining BLM from implementing the 2019 RODs but did not vacate the amendments or their RODs. In 2020, in response to the US District Court for the District of Idaho's order, the BLM prepared supplemental EISs for each state that participated in the 2019 amendments to address and clarify issues identified in the Court's injunction. BLM concluded that no further planning was necessary and the existing NEPA analyses supported the original 2019 RODs. RODs for those supplemental EISs were signed in January 2021 and made no further management decisions. Until the court makes a final ruling in the case or otherwise lifts the preliminary injunction, the BLM is enjoined from implementing the 2019 RODs, and the actions contained in the 2015 RODs remain in effect. However, since the 2019 RODs were not vacated, the associated management actions are being considered for amendment in this planning process.

Please refer to **Appendix 2** for a full description of the management direction from the 2015 and 2019 Approved RMP Amendments and RODs. The full set of 2015 and 2019 planning documents and the 2021 Supplemental EIS documents can be accessed through links on the BLM's GRSG website: https://www.blm.gov/programs/fish-and-wildlife/sagegrouse/blm-sagegrouse-plans.

1.3 Planning Area and Decision Area

The planning area is the geographic area within which the BLM will make decisions. A planning area boundary includes all lands regardless of ownership, but the BLM can only make decisions on public lands and federal mineral estate within the agency's jurisdiction. This rangewide amendment planning area includes all lands within the boundaries of BLM field offices that contain GRSG habitat, excluding the Bi-state distinct population segment (DPS) and the Columbia Basin DPS, which are addressed in other planning efforts. The

planning area includes much of the western United States, comprising portions of California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming, as shown on **Map 1.1a**, Surface Management Agencies in the Planning Area.

Within each of these states, the BLM applies its GRSG management direction to GRSG habitat in what are referred to as "Habitat Management Areas" or HMAs. These areas comprise only a portion of the planning area (**Map 1.1b**, Greater Sage-Grouse Habitat Management Areas). Every state includes priority habitat management areas (PHMA) and general habitat management areas (GHMA). BLM Idaho, Montana/Dakotas, Nevada, and Wyoming State Offices have also identified additional habitat management area designations within their states (please refer to **Chapter 2**, **Section 2.5** for a full description and **Appendix 3** for a description of the strategies applied by each state to identify HMAs).

For this Proposed RMPA/Final EIS, the decision area applies to areas within GRSG habitat management areas where BLM administers the lands, including areas where BLM administers subsurface minerals (**Map 1.1c**, Greater Sage-Grouse Habitat Management Areas on BLM Surface Administered Lands). The BLM decision area for some alternatives may also include areas near to, but outside the habitat management areas to address potential indirect impacts to habitat within the habitat management areas (identified in specific management alternatives). The decision area varies by alternative due to GRSG HMA boundary changes based on management strategies in various alternatives. The decision area does not include either the National Forest System surface lands or the federal mineral estate underlying National Forest System lands. For non-federal surface lands with underlying split federal mineral estate, only decisions associated with management/development of the underlying federal minerals are applicable.

1.4 RANGEWIDE RESOURCE MANAGEMENT PLAN AMENDMENTS

1.4.1 Planning Criteria

Planning criteria are the standards, rules, and guidelines that "guide development of the resource management plan to ensure it is tailored to the issues previously identified" and "that BLM avoids unnecessary data collection and analysis" (43 CFR Part 1610.4-2). In conjunction with the planning issues, planning criteria ensure the process is focused. The criteria also help guide final plan selection and provide a basis for judging responsiveness of the planning options. The BLM developed preliminary planning criteria before public scoping meetings to set sideboards for focused planning and guide decision-making by topic. Preliminary planning criteria were included in the November 2021 Notice of Intent (86 FR 66331) and the BLM encouraged the public to comment on, and suggest additions to, the preliminary criteria through the scoping period. The BLM refined the preliminary planning criteria based on public input. The following criteria guide this RMPA effort:

- The RMPA and associated environmental analyses developed will be completed in compliance with FLPMA, as amended, and NEPA, as amended;
- The RMPA will be completed in compliance with all relevant federal laws and regulations, Executive Orders, and management policies of the BLM;
- Where existing planning decisions are still valid, those decisions may remain unchanged by this RMPA effort and would remain effective
- The RMPA will be limited to making RMP decisions specific to conservation of GRSG habitats, with consideration of impacts from climate change;
- The BLM will consider adequacy of conservation measures for GRSG habitats in existing RMPs;
- The RMPA takes into account climate change and the accelerating effects that climate change has on GRSG habitats;

- BLM RMPs shall be consistent with officially approved or adopted resource related plans, policies, and programs of other federal agencies, State agencies, local governments, and Native American Tribes to the maximum extent consistent with federal law and the purposes of FLPMA (FLPMA Section 202(c)(9) and 43 CFR Subpart 1610-.3-2);
- The BLM will use current scientific information, research, technologies, and results of inventory, monitoring, and coordination to determine appropriate management strategies that will enhance or restore GRSG habitats;
- Lands addressed in the RMPA will be BLM-managed public lands (including surface and sub-surface estate and split estate), for conservation of GRSG habitats; and
- The RMPA will recognize valid existing rights.

1.4.2 Purpose and Need

The BLM's purpose is to amend certain goals, objectives, allocations, and management direction for GRSG management in its RMPs to respond to updated scientific information and changing land uses and provide for consistent and effective rangewide conservation based on biological information that is responsive to locally relevant habitat variability. Following an internal review of the effectiveness of 2015 and 2019 RMP Amendment decisions, including the degree to which those decisions sufficiently addressed threats to greater sage-grouse habitats and continued population declines, while balancing the BLM's ability to manage public lands for other uses, and as informed by updated scientific findings and feedback received from Tribal, federal, state, and local agencies and the public during the scoping period, the BLM proposes to amend the following RMP elements:

- Clarifying the existing GRSG RMP goal
- GRSG habitat management area alignments to incorporate new science and improve alignment along state boundaries along with the associated major land use allocations, including management for non-habitat within habitat management areas
- Adoption of the Western Association of Fish and Wildlife Agencies (WAFWA) definition of "lek" and "lek status"
- Mitigation
- GRSG habitat objectives
- Disturbance caps
- Fluid mineral development and leasing objectives
- Fluid mineral leasing waivers, exceptions, and modifications
- Renewable energy development
- Rights-of-Way
- Minimizing threats from predation
- Livestock grazing
- Wild horse and burro management
- Areas of Critical Environmental Concern
- Adaptive Management

Some management concerns are localized to circumstances in individual States and the ecological diversity across the sagebrush ecosystem. As such, the purpose of this planning effort also includes amending specific RMP management actions associated with state-specific circumstances to facilitate GRSG habitat conservation efforts. Beyond the rangewide considerations detailed above, states considered additional targeted amendments to existing management direction. Each state determined the need to amend

management actions independently and based on a review of updated scientific information, changing land uses, and locally relevant habitat variability. Management actions targeted for amendment in some states include saleable minerals, fire and fuels, vegetation and invasives, lands and realty actions, project screening, lek buffers, and interagency coordination. Inclusion of a management category for amendment in one state does not necessitate consideration of this category in other states or the consideration of the category rangewide. See **Section 2.5**, State Specific Circumstances, for more information.

Section 102 of the FLPMA, as amended, requires the BLM to manage public lands "in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values; that, where appropriate, will preserve and protect certain public lands in their natural condition; that will provide food and habitat for fish and wildlife and domestic animals; and that will provide for outdoor recreation and human occupancy and use;". BLM policy further directs the BLM to proactively initiate conservation measures and to minimize or avoid potential adverse effects to prevent decline of sensitive species. Specifically, the BLM's Wildlife and Fisheries Management Manual, M-6500, directs the BLM to "conserve rare, vulnerable, and representative habitats, plant communities, and ecosystems", with specific objectives to "develop and implement plans to ensure that the characteristics of rare, threatened, or representative habitat types are maintained." and to "collaborate with other agencies, the States, and private groups to ensure protection of the best representative habitats/ecosystem/plant communities for each area.". The BLM's Special Status Species Management Manual, M-6840, directs the BLM to "to initiate proactive conservation measures that reduce or eliminate threats to Bureau sensitive species to minimize the likelihood of and need for listing of these species under the ESA."

The BLM is therefore considering amending RMPs to:

- Address continued GRSG habitat losses contributing to GRSG population declines. While GRSG populations experience natural fluctuations, monitoring indicates the most recent nadirs (low point of population cycles) are lower than the prior nadirs in most states. The U.S. Geological Survey[2] analyzed state-collected lek data and reported estimated rangewide population declines of nearly 80 percent from 1966-2021 and of 41 percent from 2002-2021. While some GRSG populations are stable to increasing, over 87 percent of areas throughout the range had declining populations since 2002. The quantity and quality of available habitat, as well as non-habitat factors such as disruptive activities and prolonged drought can affect the size and trend of GRSG populations. Analyses of satellite maps shows sagebrush availability across all land ownerships declined by approximately 3 percent (1.9 million acres) between 2012 and 2018. Nearly 60 percent of the sagebrush losses (approximately 1.1 million acres rangewide) occurred on BLM-administered lands. The BLM's 2021 *Greater Sage-Grouse Plan Implementation Rangewide Monitoring Report for 2015-2020*[3] identified 42 population triggers that had been tripped through 2020. Habitat triggers were tripped sixteen times, mostly the result of sagebrush loss to wildfires. The Monitoring Report also estimated habitat loss of less than one percent in GRSG priority habitat management areas (PHMA) rangewide due to anthropogenic disturbance, although losses due to wildfire were more extensive. The anthropogenic

[2] Coates, P.S., Prochazka, B.G., Aldridge, C.L., O'Donnell, M.S., Edmunds, D.R., Monroe, A.P., Hanser, S.E., Wiechman, L.A., and Chenaille, M.P., 2023, Rangewide population trend analysis for greater sage-grouse (*Centrocercus urophasianus*)—Updated 1960–2022: U.S. Geological Survey Data Report 1175, 17 p., https://doi.org/10.3133/dr1175.

[3] Herren, V., E. Kachergis, A. Titolo, K. Mayne, S. Glazer, K. Lambert, B. Newman, and B. Franey. 2021. Greater sage-grouse plan implementation: Rangewide monitoring report for 2015–2020. U.S. Department of the Interior, Bureau of Land Management, Denver, CO.

loss on BLM lands is less than what scientific literature has identified as the threshold where GRSG abandon leks (Kirol et al., 2020). Disturbance from infrastructure in General Habitat Management Areas (GHMA) and other state-specific habitat management area designations averaged approximately 1.58 percent.

- Ensure habitat management areas and associated decisions incorporate recent relevant science to prioritize management where it will provide conservation benefit and durability when considering the effects of climate change. Since the 2015 and 2019 planning efforts, hundreds of peer-reviewed scientific publications on GRSG and management of their habitats have been published. Some of these new publications are consistent with science the BLM previously considered while others identify new information. Several provide new spatial information on important population and habitat parameters for GRSG. USGS also compiled and summarized peer-reviewed journal articles, data products, and formal technical reports related to GRSG since January 2015 (Teige, et. al. 2023). The BLM considered this new information and relevant science in developing and analyzing proposed management on BLM-administered lands.

1.4.3 GRSG Management Not Considered for Rangewide Amendment

This RMPA is not reconsidering all existing GRSG management actions in the 2015 and 2019 RMP Amendments. Consistent with the planning criteria and purpose and need, management actions in the existing RMPs that do not need to be changed to meet the purpose and need will not be considered for amendment and will remain unaltered in the existing RMPs (see **Appendix 2** for the list of existing GRSG RMP goals, objectives, and management actions from each state, and which are being considered for amendment). **Table 2-1**, Alternatives Considered but Not Analyzed in Detail, identifies the GRSG management that relate to goals, objectives, and management actions from the 2015 and 2019 RMP Amendments that are not being considered for amendment as rangewide changes in this RMPA/EIS and associated rationale. Existing RMP management decisions related to these issues/management will continue to be applicable, unchanged by this effort.

1.5 Issues (Resource Topics) Analyzed in Detail

In the November 2021 Notice of Intent initiating this planning effort, the BLM invited the public to identify issues, management questions, or concerns related to the preliminary purpose and need (refer to **Section 5.4.1** for more information on scoping) to guide development of the impact analysis. Public comments were evaluated to identify resources that could potentially be affected by the GRSG sagebrush habitat management. The BLM compiled comments received from members of the public and various governmental and non-governmental groups to describe the issues and analysis concerns that are discussed in this document. (Refer to Scoping Report at: https://eplanning.blm.gov/eplanning-ui/project/2016719/570).

On March 15, 2024, the BLM released the Draft RMPA/Draft EIS for a 90-day public comment period, which closed on June 13, 2024. The BLM held thirteen public meetings, including two virtual meetings and eleven in-person public meetings, across the planning area. The BLM revised the EIS based on issues, management questions, and concerns raised during the public comment period.

When reviewing comments provided during scoping and the public comment period in context of the purpose and need, the BLM considered points of disagreement, debate, or dispute regarding anticipated environmental effects from the proposed management goal, management allocations, and management direction being considered in the alternatives and the Proposed RMP Amendment. When determining

whether to retain a resource topic for more detailed consideration or analysis in this RMPA/EIS, the interdisciplinary team considered several questions, including:

- Is analysis of the issue necessary to make a reasoned choice between alternatives? That is, does it relate to how the proposed action or alternatives respond to the purpose and need?
- Is the resource issue/topic associated with a significant direct, indirect, or cumulative impact, or where analysis is necessary to determine the significance of impacts?

1.5.1 Issues/Resource Topics Considered/Analyzed

Decision-makers and the public need to understand the impacts each alternative would have on specific resources and resource uses. The following resource issues/topics are analyzed in detail in this RMP Amendment/EIS are:

- Special status species (including GRSG)
- Fish and wildlife
- Air resources and climate
- Soil resources
- Water resources
- Vegetation
- Riparian areas and wetlands
- Wild horses and burros
- Cultural resources
- Lands with wilderness characteristics
- Wildland fire ecology
- Livestock grazing
- Recreation
- Travel and transportation
- Mineral resources
- Lands and realty
- Areas of Critical Environmental Concern (ACECs)
- Tribal interests
- Social and economic conditions, including environmental justice

1.5.2 Issues/Resource Topics Considered but Not Analyzed in Detail

This Proposed RMPA and Final EIS consider the effects of the management goal, management allocations, and management actions on most public land resources and uses (see bulleted list in **Section 1.5** above). The following are issues/resource topics that were considered but not analyzed in detail and the supporting rationale:

- ***Paleontology:*** RMP-level management of GRSG would not substantially affect paleontological resources. There are no proposed disturbances that would adversely affect these resources, nor would any management for GRSG provide benefits to paleontological resources. Implementation could result in impacts, but analyses and mitigation would be better identified at the project level. Any impacts would be required to conform to existing paleontology law, policies, and RMP decisions.
- ***Visual Resources (VRM):*** Neither this RMPA effort nor existing GRSG management actions address VRM decisions. There are no proposed disturbances or alteration of the visual settings proposed in any of the alternatives. Implementation actions could result in impacts, but analysis and mitigation would be better identified at the project level, and any impacts would be required to conform to existing law, policies, and RMP decisions.
- ***Cave/Karst:*** RMP-level management of GRSG would not substantially affect cave and karst resources. There are no proposed disturbances, nor would any management for GRSG provide benefits to cave/karst resources.
- ***Forestry:*** There are no management actions specific to forestry in the GRSG amendments. GRSG habitat is not congruent to forestry resources.

- **Existing Special Designations other than new potential ACECs specifically for GRSG and Research Natural Areas in Oregon:** There are a variety of special designations that occur throughout the west that may overlap with GRSG habitat management areas. This includes the following:
  - Existing designated ACECs (whether for GRSG or other resources/values)
  - Wild and Scenic Rivers (suitable or eligible)
  - National Trails
  - National Monuments
  - National Conservation Areas
  - Congressionally-designated Wilderness Areas
  - Wilderness Study Areas

  These areas are identified and/or designated under a variety of statutory authorities, policies, and/or legislation. They include management specific to protect the values for which they were established. Decisions made through this RMPA would not supersede existing laws, regulations, policies, or existing RMP decisions directing management of any resources or values in these areas other than GRSG habitat. Existing management from those various sources is designed to manage/protect the associated values/resources for which these areas were identified/designated, which may include GRSG habitat. For example, GRSG essential winter range is listed in the Monument Proclamation, for the Upper Missouri River Breaks National Monument in Montana, and therefore requires special management attention that is complementary to other underlying management for which the Monument was established. Those GRSG values are considered in this RMPA. For all management associated with other non-GRSG resources and values in these areas, any authorized activities would need to be consistent with protection of those resources and values. This RMPA effort would only alter the existing management associated with GRSG habitat. All other existing management that is already designed to protect/manage the non-GRSG resources and values would remain unchanged. Because of existing management there would be no substantial impacts to the non-GRSG resources and values in these areas from the changes considered in this amendment.

1.6 STATUTORY AND REGULATORY CONTEXT

The BLM develops land use plans through a planning and NEPA process that includes public involvement. Section 202 of FLPMA and its implementing regulations direct the BLM to develop and periodically revise or amend its RMPs, which guide management of BLM-administered public lands (43 U.S.C. 1712, 43 CFR Part 1600). FLPMA further provides that the BLM "shall manage the public lands under principles of multiple use and sustained yield … except that where a tract of such public land has been dedicated to specific uses according to any other provisions of law it shall be managed in accordance with such law" (43 U.S.C. 1732(a)). FLPMA also directs the BLM to coordinate with other federal departments and agencies, state and local governments, and Tribal Nations to seek to promote consistency among land use plans across jurisdictions (43 CFR Subpart 1610.3-2).

NEPA directs "all agencies of the Federal Government…[to]…utilize a systematic, interdisciplinary approach which will ensure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision making which may have an impact on man's environment" (42 U.S.C. 4332(A)). This Proposed RMPA and Final EIS examine a range of alternatives to resolve the issues in question. Alternatives represent complete but different means of satisfying the agency's identified purposes and needs.

1.7 CHANGES BETWEEN DRAFT RMPA/EIS AND PROPOSED RMPA/FINAL EIS

The Proposed RMP/Final EIS incorporates changes based on public comments, cooperating agency input, and internal BLM reviews of the Draft RMPA and EIS. Additional detail has been added and editorial changes have been made throughout the document to improve clarity. Refer to Appendix 20 for a document section by section (chapters and appendices) summary of the changes made between the Draft and Final EIS.

The Proposed RMPA increases protections for GRSG from the Preferred Alternative while balancing public land uses by incorporating management direction approaches from all of the alternatives analyzed in the Draft RMPA and EIS. Specifically, priority habitat management areas (PHMAs) are identified as exclusion for solar and wind energy. PHMA remains an avoidance area for major rights-of-way but the exceptions for allowing development are strengthened. Areas within PHMA that require additional protection have been identified as PHMA with limited exceptions, to be managed as exclusion areas for major rights-of-way, and with no exceptions to the solar and wind energy exclusion allocation or to the no surface occupancy allocation for fluid minerals. Since the changes in management were consistent across the range, the areas were less suited to ACECs, which are generally tailored to different values and locations. These additional protections will provide the necessary conservation of these key areas of GRSG habitat given anticipated development threats and negative impacts from climate change, while ensuring an appropriate balance of public land uses.

In addition, between Draft and Final EIS, the BLM has clarified how the management direction from the 2015 and 2019 planning efforts is being amended by this Proposed RMPA. The management direction for renewable energy, rights-of-way, fluid minerals, livestock grazing, predation, wild horses and burros, adaptive management, mitigation, disturbance cap, saleable minerals, and leasable minerals has been refined and clarified in response to public and cooperating agency comments and internal review. The BLM also made updates throughout the document to clarify the ACECs being considered by the Proposed RMPA and the effects of the alternatives and Proposed RMPA on ACECs. Between the Draft and Final EIS, the BLM also updated the Habitat Management Areas for the states of Oregon, California, and Nevada based on updated science and input from State wildlife agencies and federal partners.

1.8 CONSISTENCY WITH STATE AND LOCAL LAND USE PLANS AND PROGRAMS AND POLICIES THEREIN

Section 202 of FLPMA and BLM's resource management planning regulations (43 CFR Subpart 1610.3-2) directs the BLM to coordinate planning efforts with Native American Tribes, federal agencies, and state and local governments. The BLM is directed to keep apprised of state, local, and Tribal plans; assure consideration is given to such plans; and assist in resolving inconsistencies between such plans and BLM plans. Subsection (c)(9) states, "Land use plans of the Secretary [of the Interior] under this section shall be consistent with state and local plans to the maximum extent he [or she] finds consistent with federal law and the purposes of this Act."

To the maximum extent practicable, the BLM will ensure consistency with officially approved or adopted resource-related plans of other federal, state, local, and Tribal governments and policies and programs contained therein, to the extent that they are consistent with the purposes, policies, and programs of federal laws and regulations applicable to public lands. The BLM follows the procedures set forth in the regulations to address any potential inconsistency. Where State and local government policies, plans, and programs differ, those of the higher authority will normally be followed, consistent with 43 CFR Subpart 1610.3-2(d).

Consistent with 43 CFR Subpart 1610.4-7 of the BLM Resource Management Planning regulations, the BLM made the Draft RMPA/EIS available to Governors, other federal agencies, state and local governments, and Native American Tribes for comment. State and local officials reviewed and provided input on the alternatives as cooperating agencies. All of the states have proposed suggested management approaches and adjustments to management direction specific to their state. Many counties also identified their preferences for specific management actions and their displeasure with others. As detailed in the Draft RMPA/EIS, several counties and some states asserted inconsistencies between State and local plans and specific components considered across the range of alternatives. Several of the specific inconsistencies raised were relevant to management direction considered for livestock grazing, closures to minerals and lands and realty actions, no surface occupancy stipulations for fluid minerals, disturbance caps, designation of Areas of Critical Environmental Concern, and the development of a single-species focused plan. Inconsistencies between State and local plans and Alternative 3, which provides the most protective measures to preserve GRSG and its habitat, were identified by multiple state and local governments.

The BLM has worked extensively with the ten State Governments within the planning area to promote consistency with each of the States' GRSG plans and with the GRSG plans of the many cooperating local and county governments. The feedback and input of State fish and wildlife agencies and local governments significantly shaped the Draft RMPA/EIS and the Proposed RMPA/Final EIS. Each BLM State Office has held numerous meetings with State wildlife agencies and county cooperating agencies to seek consistency with their respective plans. Additionally, the BLM and the States have coordinated on this planning effort through the Western Governor's Sage-grouse Task Force which has met frequently and consistently throughout this planning process.

Through input provided by Tribal, federal, state, and local agencies on the Draft RMPA/EIS, the BLM has identified known inconsistencies between the Proposed RMPA and state, local, and Tribal land use plans in **Appendix 23**. **Appendix 14**, **Section 14.1** also provides a cumulative effects analysis that addresses State and local conservation plans and efforts. The formal 60-day consistency review by the Governors occurs when the Proposed RMPA/Final EIS is submitted to the Governor of the states involved, as outlined in 43 CFR 1610.3-2(e) of BLM planning regulations. Information from these consistency review efforts will help inform BLM state-specific Approved RMPA and RODs.

1.9 ONGOING ACTIONS

The BLM has numerous ongoing reviews of proposed projects, ranging from proposals for which the BLM has just received an application to those where the BLM is nearing a decision. The extent to which the GRSG Approved RMP Amendments and Records of Decision (RODs) will apply to these ongoing projects will depend on the stage of the project in the National Environmental Policy Act (NEPA) review and decision-making process. To maintain the orderly administration and management of the public lands, the BLM will be consistent with the GRSG Approved RMP Amendments/RODs unless the BLM issues a Draft EIS or Environmental Assessment for the project before the publication of the GRSG Approved RMP Amendments/RODs. The decision for such projects and any subsequent authorizations associated with the approval (such as the issuance of a right-of-way authorized by a decision) will be exempted from the requirements of this effort's approved GRSG planning decision. The BLM has the discretion to apply the GRSG Approved RMP Amendments/RODs to these exempted projects and will seek input from the project proponent prior to exercising such discretion.

In addition, the following projects will not be subject to the decisions made in the GRSG Approved RMP Amendment/RODs:

- Caldwell Canyon Revised Mine and Reclamation Plan (DOI-BLM-I000-2024-00041-EIS)
- Dodge Flatt II Solar Project (DOI-BLM-NV-C020-2024-0001-RMP-EA)
- Bridge Creek Area Allotment Management Plans (DOI-BLM-ORWA-B060-2021-0004-EIS)
- HiTech Lithium Exploration Plan of Operation (DOI-BLM-ORWA-V000-2023-0045-EA)
- BLM Wyoming June 2022 Competitive Oil and Gas Lease Sale (DOI-BLM-WY-0000-2024-0007-EA)
- BLM Wyoming 2025 First Quarter Competitive Oil and Gas Lease Sale (DOI-BLM-WY-0000-2024-0006-EA)
- BLM Wyoming 2025 Second Quarter Competitive Oil and Gas Lease Sale (DOI-BLM-WY-0000-2024-0008-EA)

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Chapter 2. Alternatives

2.1 Introduction

This chapter provides a summary of the six alternatives considered in the Draft Environmental Impact Statement (EIS) and a complete description of the Proposed RMP Amendment (**Section 2.4**). The Proposed RMP Amendment was developed in response to public, cooperating agency, and Tribal comments on the Draft EIS and represents the seventh alternative being considered in this Final EIS. The Proposed RMP Amendment includes a combination of management direction identified in several of the alternatives analyzed in the Draft EIS. The Proposed RMP Amendment, detailed in **Section 2.4**, identifies rangewide management allocations and management direction that are applicable to all states (**Table 2-2**, **Table 2-3**, **Table 2-4**, and **Table 2-5**). The rangewide direction is followed by additional state specific management direction, organized by state in **Section 2.5**.

A detailed description of the Draft EIS alternatives can be found in **Appendix 21**, Alternatives. **Appendix 2**, Existing GRSG Management in BLM RMPs, identifies all existing GRSG management (inclusive of both 2015 and 2019 ARMPAs) for each state and identifies whether the existing management direction is being proposed for amendment by this plan amendment effort. Alternative 1 represents the management direction from the 2015 RMPA and Alternative 2, the No Action Alternative, represents the management direction from the 2019 RMPA. Only a subset of management actions from the 2015 and 2019 efforts are being considered for amendment and the proposed changes in that management are described in Alternatives 3, 4, 5, 6, and the Proposed RMP Amendment. The existing decisions from the 2015 and 2019 planning efforts that are not identified in the Proposed RMP Amendment (or in the alternatives analyzed in the Draft EIS) will remain in place and are described in **Appendix 2**.

This chapter also describes alternatives considered but eliminated from detailed analysis in **Section 2.3, Table 2-1**.

2.2 Alternatives

The RMPA and EIS consider a range of alternatives designed to meet the BLM's Purpose and Need (**Section 1.4.2**). The alternatives respond to updated scientific information and changing land uses and provide for consistent and effective rangewide conservation based on biological information that is responsive to locally relevant habitat variability.

Following is a summary of the alternatives analyzed in the Final EIS. A detailed description of the Alternatives 1-6 and introductory information on the resource topics addressed in the management direction can be found in **Appendix 21**. A summary comparison of the alternatives and the Proposed RMP Amendment is provided in **Table 2-14**.

Alternative 1 (Applicable Decisions from the 2015 ARMPA)

Alternative 1 includes the applicable decisions from the 2015 Approved RMPAs (ARMPA) that are being analyzed for potential amendment as part of this planning effort. It does not include all the goals, objectives, and actions from the 2015 ARMPAs. Under Alternative 1, the BLM would re-adopt the applicable GRSG habitat management area (HMA) boundaries, goals, objectives, and actions from the 2015 Records of Decision (ROD)/ARMPAs (as updated through plan maintenance). Due to the U.S. District Court of Idaho's preliminary injunction preventing implementation of the 2019 amendments (see explanation in Alternative 2

summary below) this alternative reflects how the BLM is currently managing GRSG habitat on public lands. This includes designation of some areas of PHMA as Sagebrush Focal Areas (SFA) with a recommendation to withdraw them from mineral location and entry under the Mining Law of 1872.

Alternative 2 – No Action (Applicable Decisions from the 2019 ARMPA)

Alternative 2 is the No-Action Alternative and includes the applicable decisions from the 2019 Greater Sage-Grouse ROD/ARMPAs efforts except in Montana/Dakotas, which did not amend their RMPs in 2019. This is the No Action because it reflects the management language currently in the BLM's approved land use plans. The U.S. District Court for the District of Idaho has issued a preliminarily injunction, preventing the BLM from implementing the 2019 amendments, but not vacating them or their Records of Decision. Because the 2019 RODs/ARMPAs were not vacated, they are the existing management plans. Under this alternative the BLM would apply the management from the 2019 ARMPA. SFAs would be removed from the BLM RMPs in all states except Oregon and Montana; these areas would still be managed with all the protections of PHMA but would no longer include a recommendation for withdrawal (including in the Oregon SFAs).

Alternative 3

Alternative 3 provides the most protective measures to preserve GRSG and its habitat of the alternatives analyzed. Alternative 3 would update the Habitat Management Area (HMA) boundaries based on new information and science that has become available since the 2015 and 2019 planning efforts. All HMAs would be managed as priority HMA (PHMA). The BLM would close PHMA to new fluid mineral leasing, saleable minerals/mineral materials permits, and nonenergy leasable minerals leasing (development associated with existing permits and leases would not be precluded). PHMA would be recommended for withdrawal from location and entry under the Mining Law of 1872 and unavailable for livestock grazing. PHMA would also be ROW exclusion areas. Where there are currently designated wild horse and burro herd management areas overlapping PHMA, the wild horse and burro herd management area would become a Herd Area that is not managed for wild horses and burros. Under Alternative 3, the BLM would designate 32 GRSG habitat ACECs.

Alternative 4

Alternative 4 would update the habitat management area boundaries and associated management based on new information and science that became available since the 2015 and 2019 efforts. While many of the allocations would be similar to Alternatives 1 and 2, the habitat management areas are updated to reflect new science. Under Alternative 4, in Wyoming, all PHMA would be managed with no surface occupancy stipulations for new oil and gas leases (all other states have this stipulation in PHMA in this and the other alternatives in the Proposed RMP Amendment). In addition, management associated with some of the major minimization measures (e.g., disturbance cap and adaptive management) is adjusted to address cross-boundary coordination of shared populations, rangewide biological and managerial concerns based on monitoring, and experience gained from implementing management for GRSG since 2015. Alternative 4 allows compensatory mitigation to be used under specific conditions. Additional compensatory mitigation may be required where habitat and/or population adaptive management thresholds have been met. Areas previously identified as SFAs are generally managed as PHMA. The primary difference between management of SFAs in the 2015 Plans and PHMAs in this planning effort is that PHMA would not include a recommendation for withdrawal or prioritization strategies for oil and gas leasing and grazing permit renewals.

Alternative 5

Alternative 5 was identified as the preferred alternative in the Draft EIS. Alternative 5 considers other potential alignments of habitat management areas and associated management to try to balance GRSG

conservation with public land uses. If state governments updated the GRSG management area boundaries in their specific state plans, the BLM is considering those boundaries on public lands in Alternative 5. HMAs are similar to but refined from Alternative 4 and restrictions would generally be similar to Alternative 4; with the exception of Wyoming which would follow the oil and gas management direction in Alternative 2; and the fact that Alternative 5 considered options with fewer restrictions on resource uses and provided more opportunities for considering compensatory mitigation to offset impacts on GRSG and its habitat than Alternative 4. Areas previously identified as SFAs are generally managed as PHMA. The primary difference between management of SFAs in the 2015 Plans and PHMAs in this planning effort is that PHMA would not include a recommendation for withdrawal or prioritization strategies for oil and gas leasing and grazing permit renewals.

Alternative 6

Under Alternative 6, management for all habitat management areas and the resource topics being considered in the range of alternatives would be the same as described for Alternative 5 except that under Alternative 6, 32 ACECs are proposed for designation. The same ACECs proposed for designation under Alternative 3 would be considered but the management direction for these areas would be less restrictive compared to Alternative 3.

Proposed RMP Amendment

The Proposed RMP Amendment increases protections for GRSG and its habitat from the Preferred Alternative (Alternative 5) in the Draft EIS. The Proposed RMP Amendment, described in detail below in **Section 2.4** and **Section 2.5**, identifies PHMA as exclusion for solar and wind and NSO for fluid minerals with exceptions. PHMA remains an avoidance area for major rights of way but the exceptions for allowing development are more restrictive. Areas within PHMA requiring additional protections have also been identified. Within these areas referred to as PHMA with limited exceptions, there are no exceptions to the solar and wind exclusion allocation or for the NSO allocation for fluid minerals. PHMA with limited exceptions are also exclusion areas for major rights of way. These additional protections in the Proposed RMP Amendment are designed to provide the necessary protections for GRSG and its habitat in light of anticipated development threats and negative impacts from climate change such as drought.

2.3 Alternatives Considered but Not Analyzed in Detail

The BLM considered several alternatives and components of alternatives that were subsequently dismissed from detailed analysis. These are summarized in **Table 2-1** below. Consistent with the BLM's NEPA Handbook H-1790-1, alternatives were eliminated from detailed analysis for the following reasons:

- It is ineffective (it would not respond to the purpose and need).
- It is technically or economically infeasible.
- It is inconsistent with the basic policy objectives for the management of the area.
- Its implementation is remote or speculative.
- It is substantially similar in design to an alternative that is analyzed.
- It would have substantially similar effects to an alternative that is analyzed.

Additional details on alternatives proposed by the public during scoping can be found on the BLM's National NEPA Register website: https://eplanning.blm.gov/eplanning-ui/project/2016719/570 and additional detail on alternatives proposed during the public comment period on the Draft RMPA and EIS can be found in **Appendix 22**, Responses to Substantive Public Comments on the Draft EIS.

Table 2-1. Alternatives Considered but Not Analyzed in Detail

Alternative	Rationale for Dismissal From Detailed Analysis
2015 and 2019 Alternatives Considered but Not Analyzed in Detail The BLM reviewed all the alternatives considered but not analyzed in detail in the separate 2015 and 2019 planning processes. Such dismissed alternatives include a USFWS-listing alternative; managing all designated habitats as ACECs; eliminating recreational hunting; closing GRSG habitat to OHV use; adopting county-specific plans to BLM-administered lands; increased grazing alternative; and leasing GRSG habitat for oil shale and tar sands development or including stipulations for such development.	The rationale provided in those documents for dismissing them from detailed analysis still apply. The prior alternatives dismissed from detailed analysis are, therefore, dismissed from detailed analysis for the same reasons as described previously. Detailed descriptions of these alternatives and the rationales for dismissal are provided in Section 2.2 of the November 2018 Northwest Colorado Greater Sage-Grouse PRMPA and FEIS, Section 1.5.2 of the November 2018 Idaho Greater Sage-Grouse PRMPA and FEIS, Sections 1.5.3 and 2.2 of the November 2018 Nevada and Northeastern Greater Sage-Grouse PRMPA and FEIS, Sections 1.5.3 and 2.2 of the November 2018 Oregon Greater Sage-Grouse PRMPA and FEIS, Sections 1.5.3 and 2.2 of the November 2018 Utah Greater Sage-Grouse PRMPA and FEIS, Section 1.6.3 of the November 2018 Wyoming Greater Sage-Grouse PRMPA and FEIS. Section 1.6.4 and 2.11 of the June 2015 Lewistown FO Greater Sage-Grouse PRMPA and FEIS, Section 2.4 of the June 2015 Billings and Pompeys Pillar National Monument PRMP and FEIS, Chapter 2 from the June 2015 HiLine PRMP and FEIS, Chapters 1 and 2 of the June 2015 Miles City FO PRMP and FEIS, Chapter 2 from the June 2015 South Dakota Proposed RMP/Final EIS, and Sections 1.6 and 2.11 of the June 2015 North Dakota Greater Sage-Grouse PRMPA and FEIS. These sections are hereby incorporated by reference into this EIS.
A COT and NTT Specific Alternative The BLM, the USFWS, states and other federal agency partners prepared the NTT (2011) and the Greater Sage-grouse Conservation Objectives: Final Report (COT Report–2013) reports to identify rangewide GRSG conservation objectives and conservation measures that would inform the USFWS 2015 decision under the Endangered Species Act and inform partners and provide guidance for the BLM to consider through land use planning. The BLM considered developing an alternative that would establish the NTT and COT reports' conservation objectives and conservation measures as land use planning direction.	**Alternative would not respond to the purpose and need** The NTT and COT reports, published in 2011 and 2013, do not address how the implementation of their GRSG conservation measures would relate to other uses of the public lands—such as fluid mineral development and livestock grazing. Moreover, the NTT and COT reports do not quantify the GRSG conservation benefits of each respective conservation measure. They are not compendiums that, standing alone, represent best available or most current science and, therefore, they do not meet the purpose and need. The BLM utilized the reports to inform development of alternatives, consistent with the BLM's previous planning efforts in 2015 and 2019. Additional context related to the COT and NTT reports and rationale why they were not included as specific alternatives in this effort is provided in **Appendix 6.**

Alternative	Rationale for Dismissal From Detailed Analysis
State Specific Alternatives During the alternative development process, the States of Idaho and Wyoming each suggested a "state alternative."	**Alternative would have substantially similar effects to an alternative that is analyzed; Alternative is ineffective/would not respond to the purpose and need; Alternative is inconsistent with the basic policy objectives for the management of the area** The BLM determined that most of the actions included in each subject alternative were already evaluated among other alternatives the BLM analyzed in detail. In some instances, the exact language was already in the range of alternatives or was incorporated in Alternative 5. In other instances, the proposed language was substantially similar to language already being considered, or that would result in substantially similar effects. In very few instances, the BLM determined the proposed language was not consistent with the purpose and need (e.g., removing the disturbance cap), and included recommendations that were not consistent with BLM policies. Because the RMP-level actions in the submissions are considered in the range of alternatives, developing a stand-alone state alternative is not necessary for consideration of effects.
Alternative that establishes rangewide protection measures to minimize disturbance to GRSG habitat given other BLM management responsibilities. Such measures could include design features, disturbance and density caps, and buffers around important GRSG habitat types.	**Alternative would not respond to the purpose and need** The BLM included several management tools in the 2015 amendment efforts to avoid and minimize disturbance of GRSG habitats. A primary tool was identifying HMAs and making land use allocations associated with the different land uses and HMA priorities. Another was disturbance and density caps to limit infrastructure at or below levels of GRSG tolerance as indicated by research. Other management tools included required design features (RDFs), application of lek buffers, seasonal limitations, and constraints on noise and tall structures, all of which would be considered and applied when analyzing a proposal. As part of the current effort, the BLM is considering amending HMAs, allocations, and disturbance caps. However, after reviewing existing plans, available literature, and habitat and population trends, changes to existing language on RFDs and lek buffers, as well as the other minimization measures, would not be proposed for amendment during this plan amendment because such a change would not be consistent with updated scientific information, nor would it allow the BLM to be responsive to biological information that considers locally relevant habitat variability. • There is no single buffer distance that would be appropriate for all populations and habitats across the range of GRSG (Manier et al. 2014). Lek buffers are generally used to conserve breeding and nesting habitats and are developed and applied as a uniform tool used in the lack of more accurate local information. As more specific data are collected on nesting habitats the applicability of generalized buffers across GRSG range will become less important to identifying and managing seasonal habitats. As described above, lek buffers are not the only or final conservation tool to avoid or minimize disturbance. • GRSG habitats vary across the species' range, with topography and vegetation influencing GRSG use of an area within a given buffer. These differences influenced state management decisions in the prior efforts. Application of buffers, and subsequent consideration of departures (either larger or smaller) from these buffers based on site-specific information, was adjusted to the landscape characteristics and management strategy applied in each state. A rangewide buffer standard would be inconsistent with both landscape characteristics and GRSG management strategies. Therefore, existing lek buffer language will remain in place unless state-specific circumstances warrant adjustments in that state (Idaho is addressing lek buffers in their state-specific, Additional Management Direction (refer to **Table 2-8**).

Alternative	Rationale for Dismissal From Detailed Analysis
	• Since the prior planning efforts, no publications reviewed research related to buffer sizes or provided broad recommendations for buffers to be applied throughout the range. In the absence of new literature, and because local conditions and strategies drive the role of lek buffers in avoiding and minimizing disturbance, there is no rationale to reconsider use of lek buffers across the range. • Similarly, each prior amendment effort included an appendix with a series of required design features (RDFs) to be considered and applied when considering authorizations. These RDFs were developed in coordination with state partners and cooperating agencies and were adjusted to the major issues associated with each BLM State Office's amendment effort. These RDFs have been considered as tools to avoid or minimize the effects of specific projects in each state.
Alternative that amends existing rangewide management actions that may have unintended effects, such as additional surface disturbance associated with burying power lines or co-locating powerlines	**Alternative would have substantially similar effects to an alternative that is analyzed** Under the Proposed RMP Amendment, and in the alternatives, any disturbance occurring in PHMA would need to meet disturbance cap requirements. Similarly, major rights of way in PHMA are avoidance with specific criteria that must be met in order to allow a major right of way and avoidance in GHMA. In PHMA with limited exception areas, major rights of way are excluded with stringent criteria that must be met in order to allow a major right of way. In GHMA major and minor rights must apply appropriate state minimization measures to maintain habitat. The mitigation direction also requires that in all GRSG habitat management areas, consistent with valid existing rights, that the BLM will apply the mitigation hierarchy when authorizing third-party actions resulting in GRSG habitat loss and degradation to achieve a minimum standard of no net habitat loss. Thus, while the Proposed RMP Amendment does not specifically develop design criteria for the burying or co-locating of power lines, the management direction certainly anticipates threats from disturbance associated with rights of way and addresses them not only in the PHMA disturbance cap management direction but throughout the proposed management direction within PHMA and GHMA. Impacts associated with burying and collocating powerlines would be considered during project planning-level and impacts documented as part of the NEPA process.
Alternative that considers land tenure adjustments as a conservation tool to consolidate land ownership into more manageable areas	**Alternative would not respond to the purpose and need** Existing language in the 2015 and 2019 GRSG RMPAs regarding land tenure adjustments allow for potential ownership adjustments that could be beneficial to GRSG conservation and so the topic is not addressed by this amendment effort. The BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use.
Alternative that amends vegetation/habitat management strategies to sustain resilient and resistant GRSG and sagebrush habitat while avoiding unintended consequences to other species that occupy these habitats	**Alternative would not respond to the purpose and need** The 2015 GRSG RMPA included substantial vegetation/habitat management strategies in GRSG habitat. This included documentation before using sagebrush reduction treatment types and prescribed fire. Where pinyon/juniper encroachment is a concern management actions focused where treatments should be prioritized. Existing management also includes the critical need to coordinate treatments with partners, incorporate GRSG habitat objectives in monitoring treatments, and considers an array of treatment types to achieve GRSG habitat

Alternative	Rationale for Dismissal From Detailed Analysis
	objectives, including the ability to consider the use of targeted livestock grazing. These actions were presented in the context of managing for GSRG habitat considering biological and ecological resistance and resilience when planning and applying treatments. Because the 2015 management actions provided these sideboards, considerations, and desired conditions, few, if any changes to these actions were made in the 2019 RMPA effort. Similarly, after reviewing existing management actions, in context of new science, existing RMP management actions for vegetation/habitat management strategies are sufficient, and no changes need to be considered. The BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use. The 2015 and 2019 vegetation/habitat management decisions were not identified as needing amendment.
Alternative that considers management strategies that could limit the vast acreages of GRSG and sagebrush habitat lost to wildland fire and invasive species	**Alternative would not respond to the purpose and need** The 2015 GRSG Plans included many management actions addressing the threat of wildland fire in GRSG habitat management areas. This included prioritizing suppression efforts to limit loss of GRSG habitat, guidance for suppression efforts, the need for proactive efforts such as fuel breaks and fuel reduction projects, and considerations and commitments associated with reclamation and restoration after wildland fires in GRSG habitat management areas. The management included requirements for use of prescribed fire in GRSG habitat management areas, as well as the importance of coordinating all levels of fire management (suppression, pre-suppression, and restoration) with partners across the landscape. There were few changes to these wildland fire management actions in the 2019 Plans as they were already consistent with state strategies. Reviewing existing wildland fire and invasive species RMP management action shows existing wildland fire and invasive species management action are sufficient for RMP-level decision-making, and no changes need to be considered. Any management changes necessary in wildland fire management to reduce wildland fire risk to GRSG would be made at the project/implementation level. While changes to existing wildland and invasive species management actions will not be considered, changes to other management actions will be considered based on the threats from wildland fire and invasive species. Management actions that could limit the potential for ignition sources or the prevalence of or spread of fine fuels and invasives that contribute to uncharacteristically large and intense wildfires will be considered. The effect of wildland fire on GRSG habitat quantity and quality will also be considered when evaluating habitat management areas. This includes the potential for habitat management areas to be durable in the face of changing conditions associated with climate change. The potential effects of the alternatives on the number, size and intensity of wildfires and the spread of invasive species and their impacts on GRSG habitat quality and quantity are considered in this EIS.

Alternative	Rationale for Dismissal From Detailed Analysis
Alternative that considers amendments to recreation and travel and transportation management direction to protect GRSG and sagebrush habitat	**Alternative would not respond to the purpose and need** Recommendations for recreation and travel management received during public scoping are either already in the existing RMP language from 2015 and 2019 or are not RMP-level decisions. Such actions would be consistent with existing management or are not applicable at the RMP-level so no changes in RMP management actions need to be considered. The BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use. The 2015 and 2019 travel and transportation management decisions were not identified as needing amendment. As noted, the travel and transportation allocations of open, limited, and closed are not being addressed by this RMPA. Nor does the RMPA make any implementation level travel and transportation decisions and, as such, is not addressing any existing travel and transportation plans. However, changes in HMA boundaries in the alternatives and the Proposed RMP Amendment could potentially change areas where the 2015 and 2019 RMP Amendment allocations are applied. For example, an area that is currently open (and not designated as an open off-highway vehicle area) could become limited due to an area that was not previously identified as habitat (in 2015 or 2019) and is identified as either GHMA or PHMA in an alternative (including the Proposed RMP Amendment) in this RMPA. Areas that are identified as GHMA and PHMA follow the limited allocation and management direction identified in the 2015 and 2019 Amendments. The effects of the HMA boundaries on travel and transportation allocations, by state, are described in the Transportation and Travel Management sections in **Appendix 10** and **Chapter 4**, and in **Appendix 9**, **Tables 4-4** – **4-7**.
Alternative where AUMs in GRSG habitat are based on prolonged drought, warmer temperatures, and reduced grass production. Alternative that conducts a capability and suitability-type analysis of grazing conflicts with GRSG needs; apply mandatory, measurable conservative use periods; and avoid the breeding period, hot season, and winter use in GRSG habitats in any lands where grazing might continue. Alternatives that specify acceptable livestock grazing utilization, trampling levels, and shrub structural protections and other mandatory and enforceable	**Alternative would have substantially similar effects to an alternative that is analyzed** Under Alternatives 4 and 5 and Proposed RMP Amendment the BLM will consider adjustments to active AUMs, timing, intensity, duration, and frequency of grazing are completed at the allotment scale based on site-specific conditions to meet or make progress towards meeting Land Health Standards for special status species (including greater sage-grouse). In **Appendix 15**, Livestock Grazing Management Best Practices and Design Features and Supplemental Information, drought response and addressing vegetation recovery is specifically addressed. For these reasons, the BLM feels the alternatives considered in this EIS are substantially similar to the proposed alternative. Adjustments to the existing number of AUMs are completed at the allotment scale based on site-specific conditions to meet management objectives during grazing authorization renewals, AMP development, or other appropriate implementation-level planning consistent with the BLM's Land Health Standards and livestock grazing regulations (43 CFR Part 4180.2(e)(9)). Additionally, temporary adjustments can be made annually to livestock numbers, the number of AUMs, and season of use within the range of the terms and conditions and in accordance with applicable regulations. The BLM is better suited to make adjustments that respond to drought and to develop terms and conditions for how grazing in specific areas should be conducted during implementation-level decisions related to allotment management plans or term permit renewals through activity- and implementation-level decision making at the allotment level. While the RMPA does not specify exactly how AUMs should be adjusted or provide methods for identifying appropriate utilization in the

Alternative	Rationale for Dismissal From Detailed Analysis
terms and conditions for both upland and riparian vegetation. Alternative relative to livestock grazing management to facilitate sagebrush recruitment and survival. That alternative should develop allotment management plans, cooperatively with willing permittees, with objective utilization levels sufficient to facilitate sagebrush recruitment and survival.	management direction, existing BLM grazing policy allows the BLM to consider a wide spectrum of management responses and the consideration of GRSG habitat objectives in meeting the BLM's Land Health Standards.
Alternatives for constructing exclosures to use as ungrazed reference areas: identify that during land health evaluations, small (10 acres or less) reference areas would be considered in priority sage-grouse habitat to exclude livestock use for the purposes in aiding the BLM's ability to establish control areas when analyzing impacts to permitted activities such as livestock grazing and better inform management decisions.	**Alternative would not respond to the purpose and need** The BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use. Ungrazed livestock controls was not identified as a need for amendment at the rangewide scale but is addressed as a state specific circumstance in Oregon. As part of the state-specific management direction for Oregon, the BLM has an objective to manage "Key RNAs" as baseline reference areas for sagebrush plant communities and would make all or portions of some of the Key RNAs unavailable to livestock grazing; providing ungrazed comparison areas for research (refer to **Appendix 17**).
Alternative that follows the same approach used by the Ely District that implements sagebrush habitat restoration in a systematic fashion at a watershed scale.	**Alternative would not respond to the purpose and need** The 2015 GRSG RMPA included substantial vegetation/habitat management strategies in GRSG habitat. This included documentation before using sagebrush reduction treatment types and prescribed fire. Where pinyon/juniper encroachment is a concern management actions focused where treatments should be prioritized. Existing management also includes the critical need to coordinate treatments with partners, incorporate GRSG habitat objectives in monitoring treatments, and considers an array of treatment types to achieve GRSG habitat objectives, including the ability to consider the use of targeted livestock grazing. These actions were presented in the context of managing for GSRG habitat considering biological and ecological resistance and resilience when planning and applying treatments. Because the 2015 management actions provided these sideboards, considerations, and desired conditions, few, if any changes to these actions were made in the 2019 RMPA effort. Similarly, after reviewing existing management actions, in context of new science, existing RMP management actions for vegetation/habitat management strategies are sufficient, and no changes need to be considered. The BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently

Alternative	Rationale for Dismissal From Detailed Analysis
	and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use. The 2015 and 2019 vegetation/habitat management decisions were not identified as needing amendment.
Alternative that includes close coordination with local and state fire managers for coordinated fire suppression in GRSG habitat and for aggressive fuels reduction projects and postfire rehabilitation.	**Alternative would not respond to the purpose and need** While not a planning level decision, the 2015 ARMPAs speak to coordination across ownerships and managerial responsibilities. In addition, while specific fire suppression efforts, identification and implementation of fuels reduction projects, and postfire rehabilitation, including coordination across multiple agencies and jurisdictions, are critical to successfully reducing wildfire risks, they are conducted at the site-specific scale.
Alternative that defers SFA designation to states.	**Inconsistent with the basic policy objectives for the management of the area** The BLM coordinates closely with states in the identification of habitat areas but cannot defer the designation of such areas on BLM-administered lands to the states. The management needed for public lands, whether PHMA, GHMA, or other designations, needs to occur in the BLM's land use plans to comply with FLPMA. However, states can recommend management of certain areas through this process. The BLM would not identify SFAs under Alternatives 2,3,4,5,6, and the Proposed RMP Amendment.
A deferral alternative of federal land and minerals in southwestern Montana from oil and gas leasing pending revision of the Dillon RMP. The BLM should also evaluate a deferral alternative that would commit to not lease in the Beaverhead, Big Hole, and Centennial valleys until it revises the 2006 Dillon RMP.	**Alternative is substantially similar in design to an alternative that is analyzed; Alternative is ineffective/would not respond to the purpose and need** An alternative that defers leasing in a given area would be substantially similar in effect to an alternative that considers closing an area to leasing. The BLM has developed a range of alternatives related to areas available or not available for oil and gas leasing, as well as stipulations for leasing activities to address the continued GRSG habitat losses and declines in GRSG populations. Alternative 3 considers closing PHMA to oil and gas leasing.
Alternative that focuses on increasing development, including additional mineral leasing and development, wind and solar, or rights-of-way.	**Alternative would not respond to the purpose and need** An alternative that decreases stipulations/restrictions in an effort to encourage more development would not be consistent with the purpose and need to address the continued GRSG habitat losses and declines in GRSG populations. In addition, mineral leasing and granting rights-of-way are implementation-level decisions. The RMP identifies areas available or not available for such uses as mineral and any stipulations required for protection of GRSG. The RMP does not include any implementation decisions such as leasing areas or granting rights-of-way.
Alternative that considers removing the disturbance cap.	**Alternative would not respond to the purpose and need** As explained in the BLM's Purpose and Need, this planning effort addresses the continuing losses of GRSG habitat and the associated population declines. Research across the species' range has identified relationships between various anthropogenic developments and GRSG avoidance behavior or lek abandonment. An alternative that considers removing a tool that addresses a threat to GRSG would not be consistent with the

Alternative	Rationale for Dismissal From Detailed Analysis
	purpose and need. The BLM's purpose is to amend a subset of the 2015 and 2019 GRSG RMP Amendment goals, objectives, allocations and management actions to respond to updated scientific information and changing land uses and provide for consistent and effective rangewide conservation based on biological information that is responsive to locally relevant habitat variability. The BLM does not believe removing the disturbance cap would serve to provide for consistent and effective rangewide conservation given updated biological scientific information.
Alternative that is a climate action plan/multiple-use alternative that considers policies that require optimizing the domestic development of minerals.	**Alternative would not respond to the purpose and need** The purpose and need of this planning process is to address the continued GRSG habitat losses and declines in GRSG populations. Considering an alternative that focuses on increasing activities that are known to impact GRSG would not be consistent with the purpose and need. In Alternative 1, which reflects the 2015 RMP Amendment, Sagebrush Focal Areas were recommended to be withdrawn from location and entry under the 1872 Mining Law. Alternatives 2,4, 5, and 6 do not identify Sagebrush Focal Areas and do not recommend any areas for mineral withdrawal. BLM-administered lands in the planning area are open to mineral development as per the 1872 Mining Law unless otherwise withdrawn.
Alternative that balances economic, social, and conservation considerations.	**Alternative's implementation is remote or speculative; Alternative is substantially similar in design to an alternative that is analyzed** Some scoping comments recommended consideration of an alternative that balances considerations for conservation with economic and social needs. As a concept without more specific suggestions the recommendation was too general to develop a specific alternative around. However, many of the alternatives considered in detail address differing levels of management constraints within GRSG habitat and their associated effects on public land uses.
Alternative focused on multiple use: avoid public lands that are off limits to use; instead provide active management and appropriate mitigation measures that can be implemented based on site-specific information.	**Alternative would not respond to the purpose and need; Alternative is substantially similar in design to an alternative that is analyzed** All the BLM's alternatives comply with the direction in FLPMA that public lands be managed "under principles of multiple use and sustained yield…except that where a tract of such public land has been dedicated to specific uses according to any other provisions of law it shall be managed in accordance with such law" (43 USC 1732(a)). Beyond that, an alternative that does not avoid disturbance eliminates the primary tool research has shown protects GRSG and their habitat, and therefore would not be consistent with the purpose and need. In addition, all the alternatives considered in detail apply the full mitigation spectrum of avoiding impacts, then minimizing effects if avoidance is not possible, and then providing compensatory mitigation for residual effects. Alternative 3 focuses on avoidance whereas alternatives 2 and 5 provide more consideration for compensatory mitigation and consideration of local circumstances. Given the general nature of the alternative proposed, the current range of alternatives include actions that are similar in both content and effect.

Alternative	Rationale for Dismissal From Detailed Analysis
Alternative that is consistent with the October 5, 2020, Humboldt County approved Policy on Rangeland Management and Health and with other policies on livestock grazing. The BLM should also consider the references cited within the county's policy as part of the overall body of science used to inform any new BLM RMPA.	**Alternative would not respond to the purpose and need; Alternative is inconsistent with the basic policy objectives for management of the area** The BLM must comply with its grazing regulations which require managing for land health standards, including providing habitat for special status species, including GRSG. In addition, as a rangewide conservation effort, a county-focused plan for a species that uses large landscapes that may include multiple counties is too narrow. As part of this planning process, we have coordinated and sought input from many cooperating local and county governments. The BLM works to find a balance among uses and needs as reflected in these local government plans, and has done so in the preparation of the Draft RMPA/EIS. The BLM is aware that there are specific state or local laws relevant to aspects of public land management that are discrete from, and independent of, federal law. However, the BLM is bound by federal law. Therefore, there may be inconsistencies that cannot be reconciled. The FLPMA requires that the BLM's land use plans be consistent with state and local plans "to the extent…practical." In a situation where state and local plans conflict with federal law, the BLM must follow federal law. Thus, while state, county and federal planning processes, under FLPMA, are required to be as integrated and consistent as practical, the federal agency planning process is not bound by or subject to county plans, planning processes, or planning stipulations. An alternative that adopts a county policy would also be too narrowly focused and inconsistent with the purpose and need because it would not address the conservation of GRSG habitat and would likely conflict with BLM grazing policy/management.
Alternative that establishes management direction to address threats from wildfire and invasive plants	**Alternative would not respond to the purpose and need** The BLM recognizes and agrees that wildfire and invasive vegetation are threats to greater sage-grouse and its habitat. Although the BLM recognizes the threats of wildfire and invasive vegetation to GRSG and its habitat, the BLM, in this RMP amendment is not amending the management direction from the 2015 and 2019 RMPA RODs that relate to wildfire and invasive vegetation because the direction provided by these existing RODs sufficiently and appropriately addresses these threats. Based on the internal review of the effectiveness of 2015 and 2019 RMP Amendment decisions and the degree to which those existing decisions sufficiently and appropriately addressed existing threats, continued population decline, and updated scientific findings; and informed by public and state partner input; the BLM determined that the existing wildfire and invasive vegetation management direction from the 2015 and 2019 amendments did not warrant amending. Although the BLM determined these topics were outside the purpose and need of this amendment effort, the BLM will continue to address the threats of wildfire and invasive vegetation through the continued implementation of the management direction that addresses these topics in the 2015 and 2019 Amendments (refer to existing management direction described in **Appendix 2**).
Alternative in which land disposal is permitted where compensatory mitigation offsets any net impacts.	**Alternative would not respond to the purpose and need; Alternative is substantially similar in design to an alternative that is analyzed** The BLM did not address land tenure adjustments in GRSG habitat in this planning effort. The existing GRSG management direction from the 2015 and 2019 RMP Amendments would remain in place which identify Priority Habitat Management Areas as land tenure zone 1, where the objective is to retain the lands in public ownership.

Alternative	Rationale for Dismissal From Detailed Analysis
	Addressing an alternative that would allow for the adjustment of these land tenure allocations does not meet the purpose and need of this amendment. The BLM did not address land tenure because as noted in the Purpose and Need, the BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use. The 2015 and 2019 land tenure decisions were not identified as needing amendment.
Alternative using oil & gas potential as criteria for addressing fluid mineral leases in GRSG habitat.	**Alternative is substantially similar in design to an alternative that is analyzed; Alternative would have substantially similar effects to an alternative that is analyzed** The Proposed RMP Amendment revises the fluid mineral Objective. The Objective, described in **Table 2-4** calls for the BLM to manage fluid mineral leasing and development (including geothermal) in GRSG habitat management areas to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction. Draft EIS Alternatives 1, 2 (in some states), and 4 consider language to guide leasing. Under the Proposed RMP Amendment, no specific objective or management action would specify a fluid mineral leasing strategy. However, its absence does not remove the objective to manage public lands to provide suitable GRSG habitat at the HAF mid-, fine- and site-scales. Fluid mineral leasing would be considered in GRSG habitat management areas consistent with the Secretary's discretion under the Mineral Leasing Act (as amended), as well as applicable BLM regulations and policies, and in conformance with RMP goals, objectives, stipulations, and required design features to avoid, minimize, and compensate impacts to GRSG.
Alternative that utilizes a set of 17, interrelated conservation measures to address greater sage-grouse decline that are organized into 7 primary categories: brood rearing habitat, winter habitat, climate change, drought, livestock grazing, rights of way, travel, and sagebrush reserves.	**Alternative is substantially similar in design to an alternative that is analyzed; Alternative would have substantially similar effects to an alternative that is analyzed; Portions of the Alternative would not respond to the purpose and need** The BLM did not develop an alternative that identified the exact combination of 17 measures identified by the commenting organization because the conservation measures proposed were substantially similar to those proposed by the BLM in Alternatives 1, 3, 4, 5, and 6 and in the Proposed RMP Amendment and would have substantially similar effects as the alternatives analyzed. Additionally, portions of the proposal did not meet the purpose and need for the RMP Amendment. The BLM's identification of Habitat Management Areas are on key population (e.g., Doherty et al. 2016, Coates et al., 2021b), genetic (e.g., Cross et al., 2018, Oyler-McCance et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021c) and coordinated with state authorities (such as wildlife agencies) to identify and update GRSG habitat management areas (HMA). These HMAs account for and include seasonal habitats (nesting, brood-rearing habitat and winter) and the effects of climate change including drought. In the RMPA, the BLM analyzed six alternatives and developed a Proposed RMP Amendment that proposes varied management approaches to address the threats to GRSG habitat and specifically propose approaches for livestock grazing, rights of way, and conservation of habitats through the identification of potential ACECs, Priority HMAs, and Priority HMAs where limited exceptions should apply. While the BLM did not use the terminology "sagebrush reserves", the management approaches

Alternative	Rationale for Dismissal From Detailed Analysis
	proposed for ACECs, Priority HMAs, and Priority HMAs with limited exceptions provide the types of conservation approaches commonly associated with a "reserve". The BLM did not address travel and transportation because as noted in the Purpose and Need, the BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use. The 2015 and 2019 travel and transportation decision were not identified as needing amendment.
Alternative that includes the Strategic Areas identified for Oregon in 2015 Draft and Final EIS.	**Alternative is substantially similar in design to an alternative that is analyzed; Alternative would have substantially similar effects to an alternative that is analyzed; Portions of the Alternative would not respond to the purpose and need** The BLM is not identifying Strategic Areas in Oregon. Strategic areas were discussed in the BLM's Draft and Final EIS for the 2015 Oregon RMP Amendment. They were not identified in the BLM's ROD for the 2015 RMP Amendment. In this RMP Amendment effort, the BLM is choosing to focus management direction that protects and conserves GRSG in Priority and General GRSG Habitat Management Areas (PHMA and GHMA). The BLM reviewed new scientific publications since our previous planning efforts on key population (e.g., Doherty et al. 2016, Coates et al., 2021b), genetic (e.g., Cross et al., 2018, Oyler-McCance et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021c) and coordinated with state authorities (such as wildlife agencies) to identify and update GRSG habitat management areas (HMA). The HMAs are identified using inventory data on habitat use and occupancy and reflect the dynamic nature of the vegetation communities that make-up GRSG habitat. Within the HMA types identified rangewide: PHMA, PHMA with limited exceptions, and GHMA, the BLM has proposed management direction focused on preserving and maintaining these habitats through limitations on public land uses, creating a disturbance cap, and through implementation of a mitigation and adaptive management strategy. This management direction complements existing management actions that the BLM takes to identify priority restoration areas and consider GRSG habitat as part of that prioritization process. Addressing a prioritization process through the identification of Strategic Areas in Oregon is outside the purpose and need and scope of this amendment. The BLM did not address a restoration prioritization process because as noted in the Purpose and Need, the BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use. The 2015 and 2019 restoration decision were not identified as needing amendment.
Alternative that establishes sagebrush reserves that encompasses centers of sage-grouse abundance on the landscape and protect a sufficiently large proportion of habitat to sustain biological processes.	**Alternative is substantially similar in design to an alternative that is analyzed; Alternative would have substantially similar effects to an alternative that is analyzed** Although the BLM is not referring to areas where GRSG habitat conservation will be applied as "reserves", the BLM is proposing conservation in the types of habitat areas proposed and they are similar in size and expanse as suggested. The BLM is proposing GRSG conservation based on population abundance and ensuring an adequate amount of area to sustain biological processes. In this RMP Amendment effort, the BLM is choosing to focus

Alternative	Rationale for Dismissal From Detailed Analysis
	management direction that protects and conserves GRSG in Priority and General GRSG Habitat Management Areas (PHMA and GHMA). The BLM reviewed new scientific publications since our previous planning efforts on key population (e.g., Doherty et al. 2016, Coates et al., 2021b), genetic (e.g., Cross et al., 2018, Oyler-McCance et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021c) and coordinated with state authorities (such as wildlife agencies) to identify and update GRSG habitat management areas (HMA). The HMAs are identified using inventory data on habitat use and occupancy and reflect the dynamic nature of the vegetation communities that make-up GRSG habitat. Within the HMA types identified rangewide: PHMA, PHMA with limited exceptions, and GHMA, the BLM has proposed management direction focused on preserving and maintaining these habitats through limitations on public land uses, creating a disturbance cap, and through implementation of a mitigation and adaptive management strategy. The development of a "reserve" system is sufficiently similar to the conservation strategy that the BLM is currently proposing in Proposed RMP Amendment and in the alternatives in the Draft EIS including Alternative 3 that proposed the highest levels of protection across GRSG habitat. The effects of the proposed reserve system would be sufficiently similar to that of the Proposed RMP Amendment.
Alternative that includes the nominated Sagebrush Sea Area of Critical Environmental Concern (ACECs).	**Alternative is inconsistent with BLM policy objectives for management of the area; Alternative would not respond to the purpose and need** The BLM received the "Sagebrush Sea" ACEC nomination during scoping. This nomination includes approximately 48.2 million acres public land in the planning area. The nomination is based on sage-grouse priority areas of conservation referred to as PACs in the US Fish and Wildlife Service's (USFWS) 2013 Conservation Objectives Team Report (COT Report) as well as the 75% breeding density areas from Doherty, et. al 2010[1], as well as new Wyoming Core Area designations from 2015. From all those areas in Wyoming the nominators removed areas with a density of active oil and gas wells that exceeded five wells per square mile. For Nevada, the nominated area expanded beyond the PACs "to increase coverage of important seasonal habitats for [GRSG] and ensure connectivity between numerous patches of high-quality habitat that are separated by rocky mountain ranges, playas, and other expanses of marginal quality habitat." The BLM did not identify the Sagebrush Sea as potential ACEC in any of the Draft EIS alternatives because the area did not meet the ACEC relevance and importance criteria (1610.7-2 (d)) because the BLM believes the PAC criteria utilized in identifying the Sagebrush Sea nomination no longer reflects the most up to date science on habitat connectivity, populations, effects to habitat from climate change, and genetic information across the range of the species. In this RMP Amendment effort, the BLM is choosing to focus management direction that protects and conserves GRSG in Priority and General GRSG Habitat Management Areas (PHMA, PHMA with limited exceptions, and GHMA). The BLM reviewed new scientific publications since our previous planning efforts on key population (e.g., Doherty et al. 2016, Coates et al., 2021b), genetic (e.g., Cross et al., 2018, Oyler-McCance

[1] Doherty, K.E., J.D. Tack, J.S. Evans, J.SN. and D.E. Naugle. 2010. Mapping breeding densities of greater sage-grouse: a tool for range-wide conservation planning. BLM completion report: Agreement # L10PG00911.

Alternative	Rationale for Dismissal From Detailed Analysis
	et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021c) and coordinated with state authorities (such as wildlife agencies) to identify and update GRSG habitat management areas (HMA). The HMAs are identified using inventory data on habitat use and occupancy and reflect the dynamic nature of the vegetation communities that make-up GRSG habitat. Analyzing the Sagebrush Sea would not meet the BLM's purpose and need to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions based on new scientific information or changes in land use.
Alternative that includes the following Oregon ACEC nominations received during either scoping or the comment period on the Draft EIS: All areas within PHMA McDermitt Caldera Firestone Basin Ibex Butte Packsaddle Draw-Horseshoe Ridge Coyote Hills Irish Hill-Big Lake Catlow Valley Beatys Butte Riddle Creek West Steens Grassy Ridge Oregon Canyon Mountains Hog Creek Ridge Star Mountain Louse Canyon Table Mountain Juniper Ridge aa-Tiipi Flat Nominations for ACECs in Oregon previously evaluated in the 2015 Oregon RMP Amendment: Willow Virtue Flat Trout Creek	**Alternative is inconsistent with BLM policy objective for management of the area;** The BLM reviewed all of the nominations received for Oregon during the scoping and Draft EIS comment period and only found two areas that could potentially meet the ACEC relevance and importance criteria for greater sage-grouse: Louse Canyon and Soldier Creek. The BLM considered areas identified as PHMA in Oregon as well previously identified Oregon Sagebrush Focal Areas and Priority Areas of Conservation in light of updated scientific information in order to determine if any areas within Oregon that were either newly nominated or previously nominated and evaluated in the 2015 RMP Amendment met the relevance and importance criteria. BLM Oregon's ACEC review, assessment, and evaluation process focused on the new GRSG scientific information on key population (e.g., Doherty et al. 2016, Coates et al., 2021b), genetic (e.g., Cross et al., 2018, Oyler-McCance et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021c) and coordinated with state authorities (such as wildlife agencies) to identify and update GRSG habitat management areas (HMA). The BLM Oregon ACEC review, assessment, and evaluation process did not consider or consider in detail potential historic, cultural, scenic, or non-GRSG fish and wildlife values in accordance with the purpose and need for this planning effort. (Nominations that addressed resource values beyond greater sage-grouse will be considered by the BLM during future planning efforts.) The BLM Oregon assessment considered all existing, designated ACECs and Research Natural Areas when located in PHMA (existing and new/proposed). This review and assessment of all PHMA/PACs also included many of the proposed, analyzed, and not-designated ACEC areas from the 2014/2015 EIS alternatives (when located in existing or new PHMA and assessing based only on the new science information). During the assessment process BLM Oregon discussed and coordinated cross border issues and locations with the BLM Nevada and BLM Idaho. The BLM Oregon also coordinated with the Oregon Department of Fish and Wildlife during the assessment process to identify potential ACEC locations/areas using their population and habitat criteria. As noted above, the assessment process for all PHMA (existing and proposed) in Oregon resulted in identification of two areas that the BLM evaluated to determine if they met the relevance and importance criteria. After evaluating the two areas (Louse Canyon and Soldier Creek), the team concluded that both areas met the relevance criteria for fish and wildlife resource (specific to GRSG and the new science), but that neither area met the importance criteria (more than locally significant). Because none of the nominated areas were

Alternative	Rationale for Dismissal From Detailed Analysis
Star Mountain Red Hills Lone Mountain Jackass Goose Frederick Butte East Warner Diable Peak Cow Creek Corner Buck Creek Beatys Butte Antelope Abert Rim	identified as having relevance and importance, the BLM did not identify any of the nominated ACECs in Oregon as potential ACECs in the Draft or Final EIS.
Alternative that would increase protections for existing ACEC is Oregon: Abert Rim Black Canyon Castle Rock Coal Mine Basin Devils Garden Lava Beds Fish Creek Rim Foley Lake Foster Flat Guano Creek-Sink Lakes Hawksie-Walksie High Lakes Juniper Mountain Kiger Mustang Lake Ridge Long Draw North Ridge Bully Creek Rahilly-Gravelly Red Knoll South Bull Canyon Spanish Lake Spring Mountain	**Alternative would not respond to the purpose and need** In reviewing potential areas for nomination as ACECs in the Draft EIS, the Oregon team evaluated whether existing ACECs should receive additional levels of protection than already afforded by their existing RMP decisions. The team also noted that some district designated ACECS and RNAs (designated in district specific Resource Management Plans underlying the 2015 ARMPA) were in part designated with specific GRSG/GRSG habitat relevance/importance values along with special management considerations. In addition, the 2015 GRSG ARMPA added special management considerations for additional ACECs/RNAs. During the assessment process for this EIS the team noted that many of these district-specific and 2015 ARMPA ACECS/RNAs are in appropriate locations relative to the new science data. Through this evaluation process the BLM did not identify any increased level of protections needed for any of the identified ACECs with the exception of the High Lakes ACEC which is in PHMA and has been identified in the Proposed RMP Amendment as an area where PHMA with limited exceptions management direction will apply. It was determined that providing additional protections to the existing ACECs identified, aside from the management direction already proposed for the GRSG HMAs was outside the purpose and need for the amendment because the BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use.

Alternative	Rationale for Dismissal From Detailed Analysis
Stockade Mountain Toppin Creek Butte	
Alternative that includes the Nevada Department of Wildlife Population Management Units nominated ACEC.	**Alternative is inconsistent with BLM policy objectives for management of the area;** The BLM Nevada reviewed all of the nominations received during the scoping and during the Draft EIS comment period including the proposal to nominate the Nevada Department of Wildlife Population Management Units (PMUs) as an ACEC. The PMUs include all habitat management areas as well as areas of non-habitat within the Nevada and northeastern California sub-region. The BLM evaluated the PMUs for consistency with ACEC policy and concluded that these areas generally meet the relevance criteria for fish and wildlife resource (specific to GRSG), but did not meet the importance criteria (more than locally significant). Because the nominated areas did not meet both relevance and importance criteria, and because GRSG habitat within the PMUs are already identified for GRSG-specific management, the BLM did not identify the PMUs as a potential ACEC.
Alternatives consistent with state and local plans	**Alternative is substantially similar in design to an alternative that is analyzed; Alternative would have substantially similar effects to an alternative that is analyzed; Alternative would not respond to the purpose and need;** The BLM has worked extensively with the ten state governments within the planning area to promote consistency with each of the states' GRSG plans and with the GRSG plans of the many cooperating local and county governments. The feedback and input of state fish and wildlife agencies and local governments significantly shaped the Draft Plan Amendment/Draft Environmental Impact Statement (EIS) and the Proposed RMP Amendment/Final EIS. Each BLM State Office has held numerous meetings with state wildlife agencies and county cooperating agencies to seek consistency with their respective plans. Additionally, the BLM and the states have each participated in over twenty meetings as part of Western Governor's Sage-grouse Task Force, including weekly meetings preparing the alternatives in the fall of 2023. In analyzing a range of alternatives to meet the BLM's purpose and need for action, it is recognized that some alternatives will align with state and local plans to differing degrees. The BLM works to find a balance among uses and needs as reflected in these local government plans and has done so in the preparation of the Draft RMPA/EIS. The FLPMA requires that the BLM's land use plans be consistent with state and local plans "to the extent…practical." In a situation where state and local plans conflict with federal law, the BLM must follow federal law. The BLM has identified known inconsistencies with Tribal, state, and local plans in **Chapter 1**, **Section 1.8** and **Appendix 23**. The BLM has also provided a cumulative effects analysis that addresses each state's GRSG plans in **Appendix 14**, **Section 14.1**. The BLM did not consider an alternative that directly incorporates the entirety of state or local plans as many of the components therein are substantially similar to alternatives considered or are substantially similar in effect to alternatives analyzed in detail. Moreover, such an alternative would not meet the BLM's purpose and need for this planning effort.

2.4 DETAILED DESCRIPTION OF THE PROPOSED RMP AMENDMENT

This section describes the Proposed RMP Amendment rangewide goal, objectives, and management direction in **Table 2-2**, **Table 2-3**, **Table 2-4**, and **Table 2-5** for the resource topics identified for amendment in the purpose and need (**Chapter 1**, **Section 1.4.2**). The rangewide management direction is organized by Habitat Management Area designation and applies to all states unless specifically identified. **Table 2-2** identifies the Proposed RMP Amendment's goal. **Table 2-3** describes the management direction that applies in Priority Habitat Management Areas (PHMA), **Table 2-4** describes the management direction for areas within PHMA receiving limited exceptions, and **Table 2-5** describes the management direction that applies in General Habitat Management Areas (GHMA). Following this rangewide, HMA-specific description of the management direction, **Section 2.5** provides additional, state specific management direction organized by state.

Table 2-2. GRSG Goal

Proposed RMP Amendment Goal
Conserve, enhance, restore, and manage GRSG habitat to support persistent, healthy populations, consistent with Section 102 of the Federal Land Policy Management Act, as amended, BLM's Special Status Species Management Policy (BLM-M-6840, and BLM's Wildlife and Fisheries Management Manual (BLM-M-6500)) and in coordination and cooperation with state wildlife agencies and appropriate state authorities. Habitat conservation and management should maintain existing connectivity between GRSG populations.

Habitat Management Area Alignments

The BLM reviewed new scientific publications since previous planning efforts on key population (e.g., Doherty et al. 2016, Coates et al., 2021), genetics (e.g., Cross et al., 2018, Oyler-McCance et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021) and coordinated with state authorities (such as wildlife agencies) to identify and update GRSG habitat management areas (HMA) as a component of this RMP Amendment effort. The HMAs are identified using inventory data on habitat use and occupancy and reflect the dynamic nature of the vegetation communities that make-up GRSG habitat. The HMA boundaries are not identified using survey-grade assessments (e.g., comprehensive on-the-ground surveys and edge verifications) and, in some states, are the result of large-scale modeling. Therefore, not every acre within an HMA boundary may be GRSG habitat. BLM will address areas of non-habitat within an HMA in accordance with the **Criteria Based Management for Non-Habitat** management direction described in **Table 2-3** below.

The BLM applies its management allocations and management direction for GRSG within these HMAs. Those allocations and management direction are described in the tables that follow. Although the BLM has identified and mapped the HMAs to encompass multiple land ownerships, reflecting the wide-ranging ecological needs of GRSG, the management allocations and management direction that follow only apply to BLM-administered lands, including areas where BLM administers subsurface minerals. Following are the rangewide HMA categories that are identified in each state in the planning area followed by a description of additional, state-specific HMAs that have been identified. Refer to **Appendix 3** for a description of the strategies applied by each state to identify HMAs. See **Appendix 1** for maps of the HMAs.

Table 2-3. Habitat Management Areas

Proposed RMP Amendment Allocation
GRSG habitat management areas would be identified as shown on **Map 2.7**. Acres by state and rangewide are shown in **Table 2-15**. Information on state-by-state GRSG HMA mapping strategies is in **Appendix 3**.
Rangewide Habitat Management Areas
Priority Habitat Management Areas (PHMA) have the highest value to maintaining sustainable GRSG populations and can include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors. The BLM intent for these areas is to maintain and enhance habitat conditions that will support persistent and healthy GRSG populations through management to minimize habitat loss and degradation. **PHMA with limited exceptions** are areas within PHMA where additional protections to support conservation of GRSG habitat would reduce impacts from highly probable resource threats.
General Habitat Management Areas (GHMA) are lands that are, or have the potential to become, occupied seasonal or year-round habitat outside of PHMA, managed to sustain GRSG populations. These areas are defined differentially by state wildlife management agencies, but generally are of poorer GRSG habitat quality with reduced occupancy when compared to PHMA. Some state wildlife agencies have identified areas of GHMA as important for restoration, connectivity, or seasonal habitats. The intent for GHMA is to maintain habitat conditions to support GRSG populations consistent with the state agency designations of recovery, connectivity, or seasonal habitats.
State-Specific Habitat Management Areas Additional, state-specific habitat management areas have been identified in Colorado, Idaho, Montana/Dakotas, Nevada/California, Utah, and Wyoming. Refer to **Appendix 3** for a description of the strategies applied by each state to identify HMAs and for updates that have been made to these areas between the Draft and Final EIS.
Colorado **Linkage Management Area (LMA)** are defined as areas that have been identified as broader regions of connectivity important to facilitate the movement of GRSG and to maintain ecological processes.
Idaho **Important Habitat Management Areas (IHMA**) are defined as lands that encompass moderate to high-quality GRSG habitat and populations necessary for providing a management buffer for PHMA, connecting patches of PHMA, and in some cases supporting important populations and habitat independent of PHMA. The intent for IHMA is to maintain habitat conditions that will support persistent and healthy GRSG populations.

Proposed RMP Amendment Allocation
Montana/Dakotas **Unique Habitat Management Areas (HMAs):** Areas identified that need different objectives or management to address unique challenges. For example, these are areas identified as habitats by state agencies but contain ongoing and imminent impacts due to oil and gas development and associated infrastructure, habitat conversion, mining, disease, and/or the peripheral nature of the population. Due to the unique circumstances management actions are needed that emphasize long-term reclamation and habitat goals, and maintain connectivity, in order to provide/enhance habitat for recovery of GRSG populations. These include three areas: • **Little Missouri HMA**: Identified core area by the states of Montana and North Dakota. This area contained high-quality GRSG habitat in Montana and encompasses the remaining GRSG habitat in North Dakota. However, a substantial portion of the area is a unitized oil and gas field (the Cedar Creek Anticline). Formerly occupied habitat has been converted or degraded, an outbreak of West Nile Virus impacted bird numbers, and GRSG are challenged by being on the periphery of their range. Unique management is needed to maintain connectivity of sagebrush and GRSG habitat between Montana and North Dakota and focus restoration efforts. • **South Carter HMA:** Identified core area by the state of Montana. However, this area is primarily developed or existing bentonite claims. Unique management is needed to balance GRSG habitat and mineral development, in the short term, while planning for longer-term reclamation. • **Connectivity HMA**: Areas that provide regions of connectivity important to facilitate the movement of GRSG and maintain ecological processes, including between priority populations, adjacent states, and across international borders, including but not limited to Montana Connectivity areas. This HMA boundary represents where stopover sites may exist, likely within a matrix of degraded or converted habitat or non-habitat (such as in Montana general habitat within the HiLine). Areas are delineated using results from analyses of seasonal migratory movements and habitat characteristics conducive to movements, particularly between silver sagebrush and big sagebrush habitats.
Nevada/California **Other Habitat Management Area (OHMA)**: Areas with appropriate environmental conditions for Greater Sage-Grouse that are less used by Greater Sage-Grouse or have marginal habitat suitability.
Utah **General Habitat Management Area - Connectivity Habitat Management Area (GHMA- Connectivity):** Areas within GRSG GHMA habitat that contain an increased level of biological importance because they provide for connectivity between localized areas of PHMA, above that of regular GHMA, based on new science (Row et al. 2018) and telemetry studies.
Wyoming **Stewardship Habitat Management Area (SHMA)**: GRSG habitats that are generally characterized by large percentages of private land, existing disturbance and prior and existing rights, and fragmented landscapes but that continue to support substantial populations of GRSG, provide important connections between populations, and are important for maintaining GRSG populations.

Table 2-4. Priority Habitat Management Area (PHMA) Allocations and Management Direction

This table identifies the resource topics and the rangewide amendments being proposed for application in PHMA. The table describes the rangewide amendments in the left hand column and the right hand column identifies where there are state-specific differences to the rangewide direction. The table describes if the Proposed RMP Amendment is amending the "objective", "allocation", or "management direction" for the resource topic identified. In some instances, the Proposed RMP Amendment addresses all three of these planning categories for a resource topic while in other resource topics only one or two of the categories are being proposed for amendment. All three planning categories are identified for each resource topic and if it is not being proposed for amendment it will be identified as "N/A", not applicable. In those "N/A" instances, the 2015 or 2019 Amendment decision is not being proposed for amendment and remains in place. The existing 2015 and 2019 Amendment decisions are described in **Appendix 2**. **Appendix 2** provides a description of the decisions that remain in place and how and where that management direction is being proposed for amendment by this amendment.

GRSG habitat management areas would be identified and managed as shown on **Map 2.7**. Acres by state and rangewide are shown in **Table 2-15**. Information on state-by-state GRSG HMA mapping strategies is in **Appendix 3**.

Proposed RMP Amendment for PHMA	
Objective/Allocation/Management Direction	**State-Specific Differences**
Utility Scale Solar	
Utility scale solar projects are projects with nameplate capacity (theoretical output registered with authorities) of 5 megawatt (MW) or higher that deliver electricity to the electricity transmission grid (refer to Glossary). **Objective:** N/A **Allocation:** Exclusion for utility scale solar testing and development **Management Direction:** **Exception Criteria** Testing and development could only occur if the following three criteria are met: 1) The area is determined to be non-habitat or unsuitable, lacks the ecological potential to become marginal or suitable habitat, and does not provide important connectivity between habitat areas (as determined by a qualified biologist and confirmed by the BLM using criteria such as the Habitat Assessment Framework and coordinated with appropriate state authority) and/or the topography/areas of non-habitat create an effective barrier to impacts. 2) The project is designed to prevent indirect disturbance to or disruption of adjacent seasonal habitats. 3) Infrastructure as proposed or conditioned (including disturbance cap and mitigation requirements) would not impair habitat use by GRSG (as determined in coordination with the state wildlife agency and other appropriate state authorities) and will meet the RMP GRSG goal and habitat objectives. **OR** 1) If co-location of the proposed authorization with existing disturbance will result in no additional impacts to those already associated with the existing major infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats.	**Oregon:** In addition to the rangewide language, refer to **Table 2-11** for state-specific management direction.

Proposed RMP Amendment for PHMA	
Objective/Allocation/Management Direction	**State-Specific Differences**
To approve an authorization based on any of the above exception criteria, after coordination with the BLM State Office and appropriate State agency, the Authorized Officer must document that the proposed action satisfies the criteria listed above. If the State agency does not concur with granting the authorization, the Authorized Officer must provide rationale for how the criteria are met considering the information the State provides.	
Utility Scale Wind	
Utility-scale wind projects are projects larger than 1 megawatt (MW) (refer to Glossary). **Objective:** N/A **Allocation:** Exclusion for utility scale wind testing and development (including met towers). **Management Direction:** **Exception Criteria** Testing and development could only occur if the following three criteria are met: 1) The area is determined to be non-habitat or unsuitable, lacks the ecological potential to become marginal or suitable habitat, and does not provide important connectivity between habitat areas (as determined by a qualified biologist and confirmed by the BLM using criteria such as the Habitat Assessment Framework and coordinated with appropriate state authority) and/or the topography/areas of non-habitat create an effective barrier to impacts. 2) The project is designed to prevent indirect disturbance to or disruption of adjacent seasonal habitats. 3) Infrastructure as proposed or conditioned (including disturbance cap and mitigation requirements) would not impair habitat use by GRSG (as determined in coordination with the state wildlife agency and other appropriate state authorities) and will meet the RMP GRSG goal and habitat objectives. **OR** 1) If co-location of the proposed authorization with existing disturbance will result in no additional impacts to those already associated with the existing major infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats. To approve an authorization based on any of the above exception criteria, after coordination with the BLM State Office and appropriate State agency, the Authorized Officer must document that the proposed action satisfies the criteria listed above. If the State agency does not concur with granting the authorization, the Authorized Officer must provide rationale for how the criteria are met considering the information the State provides.	**Oregon:** In addition to the rangewide language, refer to **Table 2-11** for state-specific management direction.
Fluid Minerals (including geothermal)	
Objective: Manage fluid mineral leasing and development (including geothermal) in GRSG habitat management areas to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction. *No specific objective or management action would specify a fluid mineral leasing strategy. However, not including specific leasing prioritization language or a leasing strategy does not remove the desired condition to manage public lands to provide suitable GRSG habitat at the HAF mid-, fine- and site-scales. Fluid mineral leasing would be considered in GRSG*	**Wyoming**: Allocation. Open to leasing (unless already closed) subject to no surface occupancy (NSO) within 0.6 mi of leks and seasonal limitations (breeding, nesting, early brood-rearing and winter habitat) and Controlled Surface Use (CSU) (density and

Proposed RMP Amendment for PHMA	
Objective/Allocation/Management Direction	**State-Specific Differences**
habitat management areas consistent with the Secretary's discretion under the Mineral Leasing Act (as amended), as well as applicable BLM regulations and policies, and in conformance with RMP goals, objectives, stipulations, and required design features to avoid, minimize, and compensate impacts to GRSG. **Allocation:** Open to leasing subject to no surface occupancy (NSO) (unless otherwise closed). Refer to the following NSO exceptions. **Management Direction:** **Management Action to Address Development in Areas Already Leased:** When considering exploration and development on areas leased for fluid mineral resources in PHMAs, including geothermal, application of measures to avoid, minimize, rectify, reduce and/or mitigate potential impacts will be considered through completion of the environmental record of review (43 CFR Part 3162.5 and 36 CFR Part 228.108), including appropriate documentation of compliance with NEPA. Such measures may include existing lease stipulations, project design, operator-committed measures, RMP required design features (RDFs), and local conditions of approval (COAs). The BLM will work with project proponents to promote measurable GRSG conservation objectives such as, but not limited to, consolidation of project related infrastructure to reduce habitat fragmentation and loss and to promote effective conservation and connectivity of seasonal habitats and PHMAs. The BLM will continue to work with project proponents and the state wildlife agency and other appropriate state authorities to site their projects in a manner that honors their lease rights but have been determined to contain the least sensitive habitats (based on vegetation, topography, or other habitat features) and resources whether inside or outside of PHMAs. Surface use rights associated with existing leases will be recognized and respected. For proposed operations in PHMA, the Surface Use Plan of Operations (refer to 43CFR Part 3162.3-1(f)) shall address, at a minimum, the applicable RDFs in the RMP. Seasonal habitats or project features related to potential GRSG impacts that are not addressed in the Surface Use Plan of Operations based on site-specific or project-specific considerations shall be noted in the project file, along with a rationale for not including them. In this process the BLM will evaluate whether each conservation measure is reasonable and consistent with surface use rights as part of the environmental review process (e.g., 43 CFR Part 3101.12). **NSO Exceptions** a) **Exception 1 -** The Authorized Officer may consider and grant an exception to the NSO stipulation within 0.6 miles of active leks in PHMA if it can be demonstrated that development and surface occupancy would have no direct impacts to or disruption of GRSG or its habitat based on at least one of the following conditions– after documenting the review of available information associated with the site proposed for the exception – both internally compiled and as provided by State, County and other local agencies, tribal governments, project proponents, other federal agencies, or interested stakeholders: I. The location of the proposed authorization is determined to be non-habitat (refer to Glossary; as determined by a qualified biologist and confirmed by BLM using methods such as the Habitat	disturbance) in PHMA outside of the 0.6-mi NSO buffer. Modification: The Authorized Officer may consider and grant a modification to the fluid mineral lease NSO stipulation, allowing for surface occupancy only after documenting that a review of available information, in coordination with the appropriate State agency, establishes that the NSO or a portion of the NSO area is nonessential (e.g., the lek upon which the NSO is centered is not active), or that the proposed action could be conditioned so as to maintain the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the GRSG, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. This state-specific difference replaces the rangewide management direction in the first paragraph of the Modification management direction. **Colorado**: Management Direction. Exception 1: The same exception would apply in PHMA within 1 mile of active (CO occupied) leks. Exception 2: Beyond 1 mile from active (CO occupied) leks **Montana/Dakotas:** Management Direction. No exception would be applied w/in 0.6 miles of active leks. Refer to **Appendix 16**: Montana/Dakotas Oil and Gas Lease Stipulations for Exception language beyond .6 miles from an active lek. **Idaho:** Allocation. NSO allocation and exceptions apply to PHMA with the following variances.

Proposed RMP Amendment for PHMA	
Objective/Allocation/Management Direction	**State-Specific Differences**
Assessment Framework), does not provide important connectivity between habitat areas, and the project includes design features to prevent indirect disturbance to or disruption of adjacent seasonal habitats (whether adjacent seasonal habitat are within 0.6 miles of an active lek or greater than 0.6 miles from active leks) that would impair their biological function. II. Topography/areas of non-habitat create an effective barrier to adverse impacts (e.g., protected from visual and audible disturbances to GRSG and its habitat). III. By co-locating the proposed authorization with existing disturbance, no additional impacts would be realized above those already associated with the existing similarly sized infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function. Beyond considering an exception where no direct or indirect impacts on GRSG or its habitat would occur, an exception could also be considered if the proposed location on public lands would be undertaken as an alternative to a similar action occurring on a nearby non-public lands parcel (for example, due to landownership patterns), and development on the public parcel in question would eliminate impacts on more important and/or limited GRSG habitat (e.g., wet meadows, brood-rearing habitat, etc.) on the non-public nearby parcel; this exception must also include measures sufficient to allow the BLM to conclude in its documenting analysis that such benefits will endure for the duration of the proposed action's impacts on public lands (e.g., confirmation of an easement). To approve this exception based on any of the above criteria, after coordination with the appropriate State agency, the Authorized Officer must document, that the proposed action satisfies at least one of the criteria listed above. If the State agency does not concur with granting the exception, the Authorized Officer must provide rationale for how the criteria are met considering the information the State provides. Prior to granting an exception to an NSO stipulation, the potential exception shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process) and all exceptions granted would be tracked in a public place and the exception tracker would be consulted when exceptions are being considered. If the area associated with the proposed development seeking the exception (e.g., well pad, compressor station, etc.) is in an area (neighborhood lek cluster or as appropriate an alternative adaptive management unit as described and allowed in the adaptive management section) that has met one of the adaptive management thresholds (hard or soft) (refer to Adaptive Management section in this table), no exceptions would be considered until the causal factor analysis is completed. If the causal factor analysis concludes that development associated with the type of activity seeking the exception is or could contribute to the threshold being met or not recovering, no exception would be granted. If the causal factor analysis is inconclusive on cause, exceptions could be considered by the authorized officer.	Management Direction. Exception 1: would apply to 3.1-mile buffers of active and pending active leks. NSO Exception #1 would also be subject to screening criteria (PHMA: MD SSS 29); Exception 2 would apply to areas beyond 3.1-miles of active and pending active leks. **Oregon:** For NSO Exception 1, refer to **Table 2-11**. Exception 2 would apply to PHMA beyond 3.1 miles of active and pending active leks. **Nevada/California:** Management Direction. Exception 1 would apply to 3.1-mile buffers of active and pending active leks. Exception 2 would apply to areas beyond 3.1-miles of active and pending active leks.

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b) **Exception 2** - The Authorized Officer may consider and grant an exception to the NSO stipulation associated with the remainder of PHMA beyond 0.6 miles from active leks if one of the following criteria apply – after documenting the review of available information associated with the site proposed for the exception – both internally compiled and as provided by State, County and other local agencies, tribal governments, project proponents, other federal agencies, or interested stakeholders: I. The criteria presented in Exception #1. **OR** II. Granting the exception must be in conformance with the RMP GRSG goal and habitat objectives, and the impacts anticipated by the proposed activity would be addressed through application of the mitigation hierarchy, including consideration of compensatory mitigation in accordance with compensatory mitigation direction in the Mitigation section. To grant this exception based on the use of compensatory mitigation, the compensatory mitigation direction in the Mitigation section must be followed, though the compensation project must be completed and habitat functionality documented before the exception is granted. The compensation must also provide offsetting benefits to the population being impacted. If it can be demonstrated by a qualified biologist and confirmed by the BLM, based on site-specific information (using tools such as the Habitat Assessment Framework), that the project cannot be avoided or minimized and granting the mitigated exception would not result in adverse effects to GRSG seasonal habitats.	
Prior to granting an exception to an NSO stipulation the potential exception shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process) and all exceptions granted would be tracked in a public place and the exception tracker would be consulted when exceptions are being considered. If the area associated with the proposed development seeking the exception (e.g., well pad, compressor station, etc.) is in an area (neighborhood cluster) that has met one of the adaptive management thresholds (hard or soft) (refer to Adaptive Management Section), no exceptions would be considered until the causal factor analysis is completed. If the causal factor analysis concludes that development associated with the type of activity seeking the exception is or could contribute to the threshold being met or not recovering, no exception would be granted. If the analysis is inconclusive on cause, exceptions could be considered.	
NSO Modifications The Authorized Officer may consider and grant a modification to the fluid mineral lease NSO stipulation, allowing for surface occupancy only where: 1) an exception is granted, as described above, for the primary disturbance (e.g., well pad, compressor station), **and** 2) the potential associated infrastructure related to the development is not individually precluded by other actions (e.g., roads, pipelines, power lines that could otherwise be considered through a ROW).	**Oregon:** No modification to NSO within 3.1 miles of active or pending active leks.

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While the NSO stipulation could be modified for these additional developments, they must still comply with other GRSG management actions (e.g., mitigation, disturbance cap, minerals/energy density, seasonal restrictions, RDFs, etc.) if an exception to the NSO is granted. Prior to modifying the area subject to the NSO stipulation, the potential modification shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process). If the area (neighborhood cluster) associated with the proposed exception has met one of the adaptive management thresholds (hard or soft) (refer to Adaptive Management section in **Table 2-3**), no modification would be considered until the causal factor analysis is completed. If the causal factor analysis concludes that development associated with the type of activity seeking the exception is or could contribute to the threshold being met or not recovering, no modification would be granted. If the analysis is inconclusive on cause, modifications could be considered. **NSO Waiver** The Authorized Officer may consider and grant a waiver of the NSO stipulation on an existing lease after documenting, in coordination with the appropriate State agency, that the lease with the GRSG NSO stipulation is no longer in PHMA. This would only be applicable on leases that were issued when the parcel was in PHMA, then the PHMA boundaries were subsequently adjusted through the appropriate planning process (i.e., plan maintenance or amendment). Prior to waiving the NSO stipulation for a given area, the potential waiver shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process).	
Disturbance Cap Exceptions and Waivers For fluid mineral (including geothermal) disturbance cap exceptions and waivers, follow the direction for Disturbance Cap exceptions and conditions found in this table (**Table 2-3**). In addition, prior to granting an exception to the disturbance cap stipulation for fluid minerals, the potential exception shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process). **Disturbance Cap Modifications** None. **Disturbance Cap Waivers** The Authorized Officer may consider and grant a waiver of the stipulation on an existing lease if the area mapped as PHMA when the lease was issued is no longer mapped as such through the appropriate planning process (i.e., plan maintenance or amendment). Prior to waiving the disturbance cap stipulation for a given area, the potential waiver shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process).	

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Seasonal Constraints/Stipulations Exception The Authorized Officer may consider and provide temporary relief from seasonal constraints (identified in the 2015 and 2019 RMPAs, refer to **Appendix 2**) by granting an exception after documenting the review of available information, including best available science, associated with the site proposed for the exception. This direction applies in PHMA, GHMA, and all other state identified HMAs. While the BLM considers information from all sources, the State wildlife agency can provide information directly associated with bird use (including whether GRSG populations are not using the seasonal habitat during that year's seasonal life cycle period if available). Based on this information and recommendation, and documented variability in climatic conditions (e.g., early/late spring, long/heavy winter), use patterns, or other applicable information the Authorized Officer may consider a one-time exception if development associated with it will not have direct/indirect negative impacts on GRSG and/or their habitat. **Season Constraints/Stipulations Modifications** The BLM can and does grant modifications to seasonal restrictions if the BLM, in coordination with the state wildlife agency and other appropriate state authorities, on a case-by-case basis, determines that granting the modification would not adversely impact the population being protected. The authorized officer may consider and grant a modification to the dates and areas associated with seasonal timing restrictions based on one of the criteria described below – after documenting the review of available information associated with the site proposed for the modification, if: 1) The geographic and temporal conditions demonstrate that any modification (shortening/extending seasonal timeframes) is justified on the basis that it serves to better protect or enhance GRSG and its habitat than if the strict application of seasonal timing restrictions are implemented. Under this scenario, modifications can occur if one or more of the following conditions can be documented: a. A proposed authorization is expected to have beneficial or neutral impacts on GRSG and its habitat. b. Topography or other factors eliminate direct and indirect impacts from visibility and audibility to GRSG and its habitat. c. There are documented local variations that indicate the seasonal life cycle periods are different than presented. 2) Modifications are needed to address an immediate public health and/or safety concern in a timely manner (e.g., maintaining a road impacted by flooding). **Season Constraints/Stipulations Waiver** The Authorized Officer may consider and grant a waiver of the stipulation on an existing lease if the area that was mapped as a GRSG habitat management area (regardless of type) when the lease was issued is no longer mapped as such through the appropriate planning process (i.e., plan maintenance or amendment). **Tracking Waivers, Exceptions, or Modifications** Refer to **Appendix 7**, Greater Sage-grouse Monitoring Framework, Measure 6 for tracking requirements.	

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Saleable Minerals/Mineral Materials	
Objective: N/A **Allocation**: Closed, but Open for new free use permits and Open for the expansion of existing pits. **Management Direction:** N/A	**Idaho**: Refer to **Table 2-8** for Idaho Additional Management Direction. **Montana/Dakotas:** Refer to **Table 2-9** for Montana specific direction on mineral materials management. **Oregon:** Refer to Oregon Additional Management Direction **Table 2-11**. **Wyoming**: Open for new free use permits and expansion of existing pits subject to occupancy, seasonal limitations, disturbance, density, and the BLM can verify the expansion would not adversely impact any adjoining seasonal habitat, otherwise closed.
Nonenergy Leasable Minerals	
Objective: N/A **Allocation**: Closed to new leases but allow expansion of existing operations. **Management Direction**: N/A	**Colorado:** Refer to additional management direction in **Table 2-7**. **Nevada/California**: Closed but can consider project level considerations. Refer to Nevada/California Additional Management Direction **Table 2-10**. **Wyoming**: Open to the expansion of existing operations subject to occupancy, seasonal limitations, disturbance, and density, but closed to new leases except in situations required for human health and safety (e.g., ventilation shafts for underground mining operations).

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Coal	
Objective: N/A **Allocation:** N/A **Management Direction**: **States w/ coal resources (Colorado, Montana/Dakotas, Utah and Wyoming):** Unless a suitability process has already been conducted that considered GRSG HMAs, at the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR Part 3461.5. Coordination with the appropriate State agency and the determination of essential habitat for maintaining GRSG as per the suitability criteria at 43 CFR Part 3461.5(o)(1) will consider site-specific information associated with lease nomination areas as part of the unsuitability process. **States without coal resources (Idaho, Nevada/California, and Oregon):** No management direction due to the absence of the mineral.	
Locatable Minerals	
Objective: N/A **Allocation:** Open, unless currently withdrawn. **Management Direction**: N/A	
Major Rights of Way	
Objective: N/A **Allocation:** Avoidance for new major ROWs (linear features such as overhead transmission lines, distribution pipelines, and large non-linear surface disturbing projects. Refer to glossary). **Management Direction**: If during consideration of a proposed ROW action (project level authorization) the determination of whether it is a major or minor ROW is questioned, with supporting rationale, the Authorized Officer (AO), in consultation with the BLM State Office lead(s), will make the final determination. Authorizations may be granted if one of the criteria below and the additional conditions are met. **Major Rights of Way Avoidance Criteria:** 1) RMP designated corridors within PHMA are open to consideration of a new major ROW in the category of ROW for which the corridor was designated if co-location of the proposed authorization within the existing ROW disturbance results in minimal impacts similar to those already associated with the existing major infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats. 2) The ROW can be routed through, or located within, non-habitat/unsuitable (as determined by a qualified biologist and confirmed by the BLM using criteria such as the Habitat Assessment Framework and coordinated with State wildlife agencies and other appropriate state authority) and lacks the ecological potential to become suitable habitat. ROWs shall not disrupt connectivity between habitat areas and	**Idaho:** In addition to the rangewide management direction for major rights of way in PHMA, new major ROWs in PHMA are subject to Anthropogenic Disturbance Screening Criteria (MD SSS 29). Refer to **Table 2-8** for Idaho specific direction on major ROW management. **Montana/Dakotas:** Refer to **Table 2-9** for Montana specific direction on ROW management, including unique HMA types. **Oregon**: Additionally, PHMA would be buffered by 0.5 miles such that both GHMA and Non-Habitat within the 0.5 mile PHMA buffer would also be Avoidance, unless the same criteria are met as the rest of PHMA. See **Table 2-11** for additional Oregon ROW management.

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should be designed to prevent indirect disturbance to or disruption of adjacent seasonal habitats (as disclosed in the environmental analysis). a. Applicants must clearly demonstrate to the Authorized Officer (AO) and State Sage-grouse lead that no viable alternatives exist for placement of facilities outside the avoidance area prior to analyzing placement within an avoidance area. Considerations can include wildfire risk, human health and safety, and national security. The ROW must be the minimum necessary to achieve the ROW's purpose and would not otherwise be viable in an area that is "open" to ROWs. 3) The proposed location on public lands would be undertaken as an alternative to a similar action occurring on a nearby non-public lands parcel (for example, due to landownership patterns), and development on the public parcel in question would eliminate impacts on more important and/or limited GRSG habitat (e.g., wet meadows, brood-rearing habitat, etc.) on the non-public nearby parcel. The ROW must be the minimum necessary to achieve the ROW's purpose and would not otherwise be viable in an area that is "open" to ROWs. *If one or multiple of the avoidance criteria can be met, the ROW must also meet the following conditions in order to be permitted in PHMA:* a) Micro-siting while developing the major ROW is required to limit impacts and maintain connectivity corridors between seasonal habitats. This includes using topography and non-habitat as effective barrier to adverse impacts and co-location with existing, similarly sized, infrastructure. b) Where the development of the major ROW is outside a designated corridor, apply minimization measures (e.g., disturbance cap, seasonal constraints, tall structure limitations, RDFs, nest and perch deterrents). c) Residual direct and indirect impacts would be mitigated through compensatory mitigation to achieve the mitigation standard. If requiring compensatory mitigation both inside and outside of RMP-designated corridors disincentivizes location in the designated corridor or another route that has lesser impacts to GRSG, the Authorized Officer may consider adjusting the compensatory mitigation requirement if doing so reduces impacts to GRSG compared to an alignment that otherwise requires compensatory mitigation (e.g., development in an RMP-designated corridor that has existing transmission lines already present). When considering adjustments to the BLM's no net loss compensatory mitigation requirement for a major ROW (see GRSG mitigation action), the Authorized Officer shall coordinate with the applicable State agencies to ensure compliance with compensatory mitigation required by State policies or regulations that go beyond BLM's compensatory mitigation requirement.	
Minor Rights-of-Way	
Objective: N/A **Allocation:** Avoidance as per direction in the 2015 GRSG plan amendment (unchanged by this Proposed RMP Amendment except for the State-Specific Differences identified for Colorado, Idaho, Montana/Dakotas, and Wyoming).	**Colorado:** Refer to Colorado Additional Management Direction in **Table 2-7**.

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Management Direction: N/A	**Idaho:** Refer to Idaho specific management direction in **Table 2-8**. **Montana/Dakotas:** Exclusion within 0.6 miles of active leks and within crucial winter range. Avoidance in designated corridors in those areas, and in the remainder of PHMA. Refer to **Table 2-9**.
Areas of Critical Environmental Concern (ACECs)	
No ACECs are proposed for designation.	
Livestock Grazing	
Objective (RM-1): Specific to GRSG habitat, manage livestock grazing in a manner that meets or makes progress toward meeting the Land Health Standard for special status species, and applies the guideline that addresses "restoring, maintaining, or enhancing habitats of...special status species to promote their conservation" (43 CFR Part 4180.2(e)(9) or subsequent changes to regulations or policy). **Allocation (RM-1)**: The presence of GRSG HMAs would not affect whether an area is available for livestock grazing; maintain existing areas designated as available or unavailable for livestock grazing. During grazing authorization renewals, Allotment Management Plan development, or other appropriate implementation-level planning, BLM will follow all applicable livestock grazing regulations including 43 CFR Subpart 4120 – Grazing Management and 43 CFR 4180.2 Standards and Guidelines for Grazing Administration or any subsequent revisions. In conformance with these regulations, BLM will consider adjustments to active AUMs, timing, intensity, duration, and frequency of grazing are completed at the allotment scale based on site-specific conditions to meet or make progress towards meeting Land Health Standard for special status species. Additionally, temporary adjustments of timing, intensity, duration, and frequency of grazing can be made annually to livestock numbers, the number of AUMs, and season of use within the range of the terms and conditions and in accordance with applicable regulations. In managing livestock grazing, consider and apply where appropriate the livestock grazing best management practices and design features in **Appendix 15**. **Management Direction** **RM-1**: During the land health assessment (LHA) process, use the criteria identified in the Sage-Grouse Habitat Assessment Framework (BLM-TR-6710-1 - Stiver et al. 2015 – as revised) and other BLM approved methodology to provide multiple lines of evidence (which are consistent with BLM Manual 1283) for determining whether vegetation structure, condition, and composition are meeting or making significant progress towards meeting the Land Health Standards (LHS) for BLM special status species – which includes GRSG referencing appropriate ESD, associated State and Transition Model (STM) and existing ecological condition information. For GRSG, the standard would generally be met when vegetation conditions provide for suitable GRSG habitat at the HAF site	**Oregon:** Refer to Oregon specific management direction in **Table 2-11** for objective language specific to Oregon. **Idaho:** Refer to Idaho specific management direction for livestock grazing under **Table 2-8**.

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scale (refer to **Table 8-1, Appendix 8**), based on existing ecological condition, ecological potential, and existing vegetation information. Where the LHS for SSS habitat (including GRSG) is not being met – as indicated by an unsuitable site-scale HAF assessment relative to site potential – and existing livestock grazing is a significant causal factor (43 CFR Part 4180, BLM H-4180-1 or subsequent changes to regulations or policy), adjustments to livestock grazing practices and activities will be made at the authorization, allotment or activity plan level and in accordance with applicable regulations (43 CFR Part 4180.2) or subsequent changes to regulations or policy). Any adjustments to grazing will be made based on current ecological potential according to ESD, associated STM and existing ecological state. **RM-2**: In PHMA, when fully processing grazing authorizations where the special status species standard is not being met, specific to GRSG habitat, and current livestock grazing has been identified as a significant causal factor (43 CFR Part 4180, BLM H-4180-1 or subsequent changes to regulations or policy), the NEPA analysis must include in at least one alternative specific thresholds and defined responses to be included in the terms and conditions of the grazing authorization. One or more defined responses will allow the authorizing officer to implement adjustments to livestock grazing during the term of the authorization that have already been analyzed in a NEPA document. Thresholds specific to GRSG habitat would be developed to maintain or move PHMA toward providing suitable GRSG habitat (e.g., **Table 8-1, Appendix 8**), and be designed to address the LHA findings (see MA RM-2) that warranted the HAF assessment rating, and consider ecological site potential, and relevant locally specific conditions, and Land Health Standards (43 CFR Part 4180.2 or subsequent changes to regulations or policy). **RM-3**: During the grazing authorization renewal process, evaluate all existing livestock management range improvements with respect to their effect on GRSG and GRSG habitat. Consider removal or modification of projects that negatively affect GRSG or GRSG habitat. Functional projects needed for management of sensitive species habitat or other sensitive resources should be maintained but consider implementing improvements in a manner less impactful to GRSG (Refer to **Appendix 15** for Livestock Grazing Management Best Management Practices and Design Features). **RM-4**: Design new range improvement projects (any activity or program relating to rangelands which is designed to improve forage, change vegetative composition, control patterns of use, provide water, stabilize soil and water conditions and provide habitat for livestock and wildlife) to enhance livestock distribution or management and to control the duration, timing and intensity of utilization, including application of new technologies such as virtual fencing. In PHMA, focus authorization of new water developments and structural range improvements (e.g., fences) to projects that have a nominal or incidental effects or that are beneficial to GRSG seasonal habitats. Any new structural range improvements should be placed along existing disturbance corridors or in the least suitable habitat, to the extent practical, and are subject to appropriate design features (**Appendix 15**).	

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RM-5: Identify fences in high-risk areas - especially within 1.2 miles of an active lek (Christiansen 2009; Stevens 2011) - or other areas identified as important seasonal habitats or areas of GRSG concentration in coordination with the state wildlife agency or other appropriate state authority. Evaluate if the fence is needed and/or up to BLM wildlife friendly fencing standards (BLM H 1741). If the fence is unnecessary, remove it. If the fence is needed to support management, mark fences (install reflective fence markers) in high risk or important areas (Christiansen 2009; Stevens 2011). Where marking fences does not reduce fence-related GRSG mortality, modify fences. Modification could include re-routing, altering construction materials, drop fencing, or limiting perching of predators. New fences within high-risk areas would only be authorized if at least one of the following criteria is met: a) It is consistent with the overall RMP GRSG objective. b) Local terrain features shield nearby habitat or reduce the habitat importance. c) The fence is constructed with high visibility markers to reduce GRSG strikes. Monitoring of existing fences to assess mortality risk is recommended in all GRSG habitats. **RM-6**: At the time a permittee or lessee voluntarily relinquishes grazing preference and the associated authorization, the BLM will consider whether to offer the permit for re-authorization to other grazing applicants or if the public lands where that permitted use was authorized shall be used for other resource management objectives. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR Part 4110.2-3. When a permittee or lessee voluntarily relinquishes grazing preference and associated grazing authorization, consider conversion of the allotment to a reserve common allotment that will remain available for use on a temporary, nonrenewable basis for the benefit of GRSG habitat. Authorize temporary nonrenewal permits in reserve common allotments to meet resource objectives elsewhere such as rest or deferment due to wildfire or vegetation treatments. Temporary use of reserve common allotments would not be allowed due to drought or overuse of allotments.	
Wild Horse and Burro	
Objective: N/A **Allocation: N/A** **Management Direction:** **Management Action 1**: Where wild horses and burros overlap with GRSG: a. Manage wild horse and burro populations within established appropriate management levels (AML). b. Incorporate GRSG habitat objectives into wild horse and burro management (e.g., herd management area plans, AML) monitoring, and gather prioritization, with prioritization of such activities in PHMA, then GHMA.	**Wyoming**: Management Action 1 (c) would not apply in Wyoming.

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c. Prioritize gathers in GRSG PHMA unless removals are necessary in other areas to address higher priority issues, including herd health impacts. **Management Action 2:** Manage wild horse and burros herd management areas in GRSG habitat (or portions of the herd management area overlapping or within GRSG habitat) within the established AML ranges to achieve and maintain GRSG habitat objectives and achieve or make significant progress towards achieving LHS, considering the full suite of approaches to maintain AML, including temporary fertility control and non-reproducing, or partially non-reproducing herds. **Management Action 3**: If GRSG site scale habitat objectives are not being met in PHMA and GHMA, evaluate AMLs and adjust, if necessary, through the NEPA process where wild horse or burro use is identified as significant causal factor to not meeting LHS, or is a factor in the area not meeting the GRSG habitat objectives.	
Predation	
Objective: Reduce predation from increased numbers of predators resulting from anthropogenic disturbance and habitat loss and function. **Allocation: N/A** **Management Direction:** **Management Action 1:** Apply minimization measures and BMPs to new, existing, and renewal of authorizations and activities to minimize threats from predators shown to pose a threat to GRSG, consistent with applicable law. This includes, but is not limited to stopping, slowing, and/or discouraging the incursion of predators, increased levels of predators, or predators expanding into new areas. Minimization measures and BMPs include, but are not limited to, the following: a. Limit the footprint for all proposed projects to the smallest area necessary to achieve the project objectives in order to reduce habitat loss. b. Place project components within existing disturbance areas whenever possible to minimize habitat loss. c. Eliminate or minimize external food resources from anthropogenic sources (e.g., trash resources from human activities, road killed animals, carcass dumps). d. Reduce or prevent opportunities for raven and raptor perching and nesting through such measures as nest/perch deterrents and regular maintenance. **Management Action 2**: For authorizations that require expanded or new or renewal of energy or transmission related energy, mining, and infrastructure as identified in **Table 7-4** in **Appendix 7**, Greater Sage-grouse Monitoring Framework) in PHMA the project proponent is required to submit a predator management plan to minimize influx and support of new predators as a result of the new project. The requirement to prepare a predator management plan could be waived as a result of site-specific circumstances and with State Director concurrence. The predator management plan shall be coordinated with state and federal agencies (e.g., USFWS and APHIS) as appropriate. The predator management plan will:	**Idaho:** Refer to Idaho specific management direction under **Table 2-8** for predation. **Oregon:** Management Action 2 also applies in GHMA. **Nevada/California**: Management action 2 also apply in GHMA. In addition to the rangewide, see **Table 2-10** for additional language for NV/CA.

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a. Outline how the project will be designed to minimize threats to GRSG beyond the natural range of variability from predators; b. Describes project design features to reduce or eliminate threats from predators (e.g., reducing raven and raptor perching and nesting by burying powerlines, locating structures out of line of site of breeding and nesting habitat, using tubular non-branching material for structures, etc.); c. Describe and outline the coordination and concurrence with state and federal agencies, if appropriate (e.g., USFWS, APHIS, etc.); d. Include a monitoring strategy to assess efficacy of the predator management plan and GRSG population response. **Management Action 3:** The BLM will collaborate with appropriate state agencies, other landowners, federal agencies (e.g., USFWS, APHIS, etc.), and Tribal governments, as appropriate and consistent with BLM policy, in their efforts to minimize impacts from predators on GRSG where impacts have been documented (e.g., reduced recruitment of GRSG from predation), including providing needed authorizations to support predator management actions.	
Application of Habitat Objectives	
Objective: **Objective SSS [X]:** Within GRSG habitat management areas provide suitable habitat by managing for connected mosaics of sagebrush and associated communities that provide for seasonal habitats, dispersal, and migration, while limiting widespread anthropogenic disturbances and fragmentation. This objective will be accomplished by applying RMP land use allocations and management actions among HMAs, proactive habitat treatments, and project-level application of mitigation (avoiding, minimizing, and compensating, per MS-1794 and H-1794) for internal and external project proposals. **Objective SSS [Y]:** Manage GRSG habitat management areas to provide seasonal habitats at the HAF Site Scale (Level 4) by providing for habitat characteristics that support seasonal habitat needs, including adequate protective cover and food needed to survive and reproduce. Seasonal habitats may include areas where sagebrush is the current dominant vegetation type, sagebrush is a primary shrub species within the various states of the ecological site, or dominated by other vegetation types but still provides GRSG habitats, such as mesic areas. This objective will be accomplished through the combination of RMP land use allocations and management actions and restoration – based on ecological potential, current vegetative condition, and existing seasonal values – and the project-level application of mitigation (avoiding, minimizing, and compensating, per MS-1794 and H-1794) for internal and external project proposals (refer to Mitigation direction in this table (**Table 2-3**). **Allocation:** N/A **Management Direction:** **Management Action SSS [X1]:** Assess the suitability of GRSG habitat at HAF mid- and fine-scales (HAF Levels 2 and 3, respectively) based on the methods in the Sage-grouse Habitat Assessment Framework (HAF, Stiver et al. 2015, BLM TR 6710-1, as revised; see **Appendix 8**).	

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Management Action SSS [X2]: Design and implement projects that will maintain or improve habitat suitability, availability, and connectivity, based on site location, existing seasonal values, and habitat needs using the results of mid- and fine-scale habitat assessments and other complementary research, tools, or information and in coordination with partners across land management jurisdictions. **Management Action SSS [Y1]:** Assess suitability of GRSG habitat at the HAF site-scale (Level 4) based on the methods in Sage-grouse HAF (Stiver et al. 2015, BLM TR 6710-1, as revised; **Appendix 8**) utilizing current geographically applicable research on seasonal habitat requisites of GRSG (see **Appendix 8**). Updates to seasonal habitat indicators and ESDs will be developed locally and coordinated with partners (see **Appendix 8**). **Management Action SSS [Y2]:** Maintain, improve, or restore the suitability of GRSG seasonal habitats using the Habitat Indicators Table (see **Appendix 8**) to inform measurable project objectives during implementation-level planning for BLM-permitted and BLM-initiated site-specific actions in HMAs, in coordination with applicable partners. Use the results of site-scale habitat assessments and other best available information to inform management decisions and the design and implementation of habitat projects.	
Mitigation	
Objective: Implement the mitigation hierarchy, with an emphasis on avoiding and minimizing habitat loss. Compensatory mitigation in arid sagebrush ecosystems is challenging, often taking decades to achieve with no guarantee of durability and is not appropriate in all situations. Where impacts remain following application of available avoidance and minimization measures, project proponents must ensure compensatory mitigation minimally achieves no net habitat loss considering both direct and indirect effects (refer to compensation section below). **Allocation:** N/A **Management Direction:** **Management Action**: In all GRSG habitat management areas and consistent with valid existing rights and applicable law, BLM will apply the mitigation hierarchy when authorizing internal and third-party actions resulting in GRSG habitat loss and degradation (including indirect impacts) to achieve a minimum standard of no net habitat loss (refer to **Appendix 7**, Monitoring Framework for table of activities related to habitat loss and degradation). BLM will apply mitigation in accordance with the BLM mitigation handbook and other mitigation related BLM policy, CEQ regulations (40 CFR Part 1508.1(y)), and comply with the most recent State agency and/or State regulatory requirements (refer to the state mitigation policies, regulations, and/or authorities, as applicable). **Application of Mitigation Hierarchy:** *Avoidance*: Avoiding impacts is defined by not taking certain action or parts of an action (CEQ regulations; 40 CFR Part 1508.1(y)). Impact avoidance in GRSG habitats is the priority since restoration of most sagebrush systems can take decades. While the avoidance priority is reflected in many PHMA allocations, BLM may also determine on a case-by-case basis to avoid impacts by not issuing an authorization in areas open to development. *Minimization*: Where avoidance is not possible, impacts can be minimized through managing the severity of a project impact at a specific location. If impacts to GRSG habitats cannot be avoided, minimization measures will be applied (e.g., minimizing the disturbance footprint, lek buffers, BMPs, and RDFs). BLM can consider	**Colorado:** Refer to Colorado Additional Management Direction in **Table 2-7**. **Oregon:** In addition to the rangewide language, refer to **Table 2-11** for mitigation requirements for free-use saleable developments. **Montana/Dakotas:** In addition to the rangewide language, refer to **Table 2-9** for state-specific mitigation standard.

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site-specific minimization measures beyond those listed in this plan, through site-specific environmental review to meet the no net habitat loss standard. Minimization does not eliminate project impacts and remaining residual impacts may require compensatory mitigation for habitat loss or degradation. *Compensation*: Where avoidance or minimization will not fully offset a project's impacts compensatory mitigation is required and will at minimum meet the requirements of the state wildlife agency or other appropriate state authority, and BLM/DOI mitigation policy. Prior to identifying compensatory mitigation, BLM must document the avoidance and minimization applied and why they are not effective at eliminating all impacts (i.e., residual effects), as well as documenting how compensatory mitigation is an appropriate tool for the situation. Any impacts that cannot be avoided or minimized to no net habitat loss would be compensated at a level and in a manner to fully offset both direct and indirect (e.g., disturbance, noise, changes in water availability) impacts from the project to habitat function as identified at the project-level. Compensatory mitigation amounts shall comply with the most recent State agency and/or State regulatory and or policy requirements, including net conservation gain standards, as appropriate, and be consistent with BLM mitigation policy. In States without a mitigation requirement, compensatory mitigation should minimally apply a no net habitat loss standard, considering key factors such as the nature of residual impacts (including indirect and direct impacts), and the types, attributes, amount, sites, and mechanisms of the compensatory mitigation (e.g., H-1794-1 Chapter 3.5). Establishing no net loss will require full restoration of functional habitats or enhancement of habitats such that the habitat can support the number of GRSG present prior to disturbance at the apex of the population cycle. The metrics identified in the HAF should be used to determine if restoration actions provide GRSG habitat. Where restoration is not possible, preservation (e.g., conservation easements, acquisition of inholdings) can be used to offset impacts and should be designed to protect uniquely important habitats (e.g., limiting winter habitats, connectivity corridors) or areas of GRSG habitats that are at a high risk of conversion. Mitigation should be prioritized to occur within the same habitat area as the proposed impact so that it benefits the populations affected by the project (e.g., within the same neighborhood cluster (Coates et al. 2021), or if not possible, same HAF fine scale area (Stiver et al., 2015, as revised), or nearest equivalent HMA (e.g., PHMA, GHMA)). The compensation project must be planned, funded, and approved by the operator, BLM, surface owner, in coordination with the appropriate state agency prior to construction, surface occupancy, or surface disturbing activities. Compensatory mitigation should be completed prior to initiating the activity causing the need for compensation and monitored for retention and efficacy unless inconsistent with state law. Compensatory mitigation shall be durable and resilient, ensuring GRSG habitat will persist (barring any natural disaster). The project proponent will be responsible for ensuring the durability and success of any compensatory mitigation associated with their project. Compensatory mitigation will not be required for activities implemented to conserve species listed as threatened or endangered under the Endangered Species Act. Compensatory mitigation is not required by the BLM for operations conducted under the Mining Law of 1872, but operators may always voluntarily engage in compensatory mitigation. Minimization actions and	

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compensation should be discussed with project proponents/operators and incorporated into alternatives when appropriate. Compensation may also be required by state regulations. Refer to **Appendix 7**, Greater Sage-grouse Monitoring Framework, Measure 5, for compensatory mitigation tracking requirements.	
Disturbance Cap	
Objective: N/A **Allocation**: N/A **Management Direction**: If direct habitat disturbance from existing and proposed infrastructure developments exceeds either: 1) 3% at the project scale (refer to description below) in all states, or 2) 3% at the Habitat Assessment Framework (HAF) Fine Scale habitat selection area for all states (or Colorado management zones and populations – refer to **Table 2-7**); New infrastructure projects would be deferred to the extent allowable under applicable laws (such as the Mining Law of 1872), or valid existing rights: d. until such time as the percentage of habitat disturbance in the areas has been reduced below the cap threshold through restoration of existing disturbance to meeting habitat objectives or increasing the amount of suitable habitat through restoration, or e. redesigned to not result in additional surface disturbance (co-location), redesigned to move it outside of habitat in PHMA (refer to non-habitat criteria), or redesigned to move it outside PHMA. **Disturbance Cap Calculation** <u>Numerator</u> For all states, the disturbance cap calculation is limited to the following specific activities, whether existing projects or new proposals (refer to **Appendix 7** for additional details on how these items would be monitored): • Oil and gas wells and development facilities • Coal mines • Wind developments (e.g., towers, sub-stations, etc.) • Solar fields • Geothermal development facilities • Mining (active locatable, nonenergy leasable and saleable/mineral material developments) • Roads (transportation features with a maintenance intensity of level 3 or 5 – refer to BLM Technical Note 422 – Roads and Trails Terminology, 2006 or as updated (does not include two-tracks) • Railroads • Power lines • Communication towers • Other vertical infrastructure, as well as developed rights-of-way with habitat loss (e.g., pipelines) • Coal bed methane ponds (at the project scale)	**Colorado:** Cap calculated at Management Zone population scales. **Idaho:** Refer to Idaho specific management direction in **Table 2-8**. **Wyoming:** Same as the rangewide, with the following changes: 1) 5% at the project scale. Disturbances associated with the state's Disturbance Density Calculation Tool (DDCT) approaches (e.g., wildfire and agricultural) in the numerator (agriculture disturbance data would be provided by the state, since no such activities are permitted on public lands). **Oregon:** See Additional Management Direction in **Table 2-11**. **Montana/Dakotas:** See Additional Management Direction in **Table 2-9**. **Nevada:** Management Direction 2: In Nevada, the Authorized Officer may grant an exception to the disturbance cap at the HAF fine scale if the project meets criteria associated with the project-scale assessment (including requirements for exceptions and conditions), is in compliance with the Nevada Greater Sage-grouse Conservation Plan and Conservation Credit System (CCS) as required by Nevada regulation (Nevada Revised Statutes (NRS) Chapter 232.16 and Nevada Administrative Code (NAC) 232.162-232.480), and the offsetting compensatory

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• Meteorological towers (e.g., wind energy testing) (at the project scale) • Nuclear energy facilities (at the project scale) • Airport facilities and infrastructure (at the project scale) • Military range facilities and infrastructure (at the project scale) • Hydroelectric plants/facilities (at the project scale) Where such data are available, this disturbance is measured by the footprint of direct disturbance of the PHMA area where habitat is removed (including staging areas, dispersed structures, parking lots, equipment storage areas, etc.), or by the distance between the outermost lines for transmission lines. When considering new project proposals, any project associated with the above list that has been approved/authorized but not yet constructed should be treated as though it were already constructed when calculating the disturbance cap to account for authorized but not yet constructed disturbance. No other activities or actions beyond those listed in the above list are included when calculating the cap (e.g., wildfire, agriculture, vegetation treatments, residences, barns, fencing or range improvements, etc.). A disturbed area is included in the numerator until it has been restored to provide equal or improved habitat function as was provided by the area before the disturbance. BLM will coordinate with State agencies and use available HAF and land health data in determining if the habitat function of an area has been restored. Consistent with the BLM's responsibility to consider cumulative impacts when making decisions for activities on public lands, the disturbance percentage includes acres from the above disturbances regardless of land ownership, where such data are available. This will only inform decision-making on public lands and cannot impact private property rights. Wildfire and agriculture would not be included in the numerator at the HAF Fine Scale. <u>Denominator</u> At the project scale, the assessment area (denominator) is determined by identifying the extent of the GRSG PHMA that supports the GRSG population potentially affected by the proposed project that is also located in PHMA ; it is not to be limited to the area where indirect impacts are anticipated. The project scale denominator should include the PHMA used by the potentially affected local GRSG population, including the associated seasonal habitats and the transition zones between those habitats (only within PHMA) associated with where the project is proposed. If sufficient monitoring information is not available to identify the portions of the PHMA used by the potentially affected local GRSG population, identify project level boundaries using an approach similar to the DDCT approach developed by the State of Wyoming: 1) Determine potentially affected active leks by placing a 4-mile buffer around the proposed area of physical disturbance related to the proposed project. All active leks located within the 4-mile project buffer and within PHMA will be considered affected by the project. 2) Next, place a 4-mile buffer around each of the affected active leks. 3) All PHMA within the 4-mile project buffer, combined with the 4-mile lek buffer(s), creates the project analysis area for each individual project, absent other monitoring data.	mitigation (or credits per the Nevada CCS Manual) occur within the HAF fine scale where the project occurs. The CCS was developed to meet regulatory requirements established by NRS Chapter 232.162 to fulfill compensatory mitigation requirements for anthropogenic disturbances and to achieve a net conservation gain to Greater Sage-grouse (GRSG) habitat on public lands in Nevada. The use of the CCS to offset impacts to GRSG became mandatory in Nevada with the adoption of NAC 232.400-232.480 in 2019.

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If there are no active leks within the 4-mile project buffer, the project scale analysis area will be that portion of the 4-mile project buffer within PHMA. "Pending leks" and other similarly defined state-based lek categories can be considered as active leks based on inclusion from the state wildlife agency or appropriate state authority. In Colorado, BLM would use the state management zones (refer to **Table 2-7**). At the HAF Fine Scale, the assessment area (denominator) is the acres of PHMA within the boundaries of the HAF Fine Scale habitat delineation area. Calculation of the 3% cap would include all acres of PHMA in the Fine Scale area as the denominator. In Colorado, BLM would use the state identified populations (refer to **Table 2-7**). At either scale, all areas in PHMA would be included in the denominator unless specific information documents otherwise (i.e., seasonal habitat maps for the HAF Fine Scale assessment area). Any potential areas that are unsuitable at the HAF site scale are treated neither as habitat nor disturbance, which results in the area being removed from the denominator piece of the formula. The denominator includes all lands (regardless of land ownership) to help the BLM consider the cumulative impacts of disturbances on GRSG when considering projects on public lands. **Disturbance Cap Exceptions** Authorized Officer may consider projects on public lands that could result in exceeding the disturbance cap across all ownership at the **project scale** only if the project meets the criteria for one of the following categories of exceptions and also meets the following conditions applicable to that exception: **Categories** for **Disturbance Cap Exceptions:** a. If the disturbance is associated with the renewal or re-authorization of existing infrastructure in previously disturbed sites or expansions of existing infrastructure that do not result in new direct, indirect, or cumulative impacts on GRSG and its habitat, and is documented. b. If a technical team evaluates and concludes site-specific GRSG habitat and population information, combined with project design elements – including compensatory mitigation, indicates the proposed project is expected to improve the condition of GRSG habitat within the proposed project analysis area. The technical team should consist of, at a minimum, a BLM field office biologist and a biologist from the appropriate State agency. The methods, rationale, and data used in developing recommendations shall be retained as part of the project record. c. If the disturbance is within an RMP designated utility corridors, the disturbance cap may be exceeded if site specific NEPA analysis indicates doing so will decrease impacts to GRSG habitat in comparison to siting a project outside the designated corridor. This exception is limited to projects that fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location. The disturbance cap cannot exceed 3% at the HAF fine scale. (Note: A plan amendment would be required for the development of new corridors and, as necessary, would need to appropriately address any changes in the disturbance cap.)	

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d. If the environmental review document(s) explains how the GRSG RMP goals and objectives will be met, including compliance with the RMP's GRSG mitigation strategy (**Table 2-4**) of avoidance first (e.g., locating the proposed projects outside PHMA, colocation within footprint of existing disturbance, etc.), then minimization (including application of RDFs, etc.) with appropriate documentation. The environmental review document must also consider the cumulative effects of other exceptions granted in adjacent project scale units. If avoidance is not possible and minimization does not address all direct, indirect, and cumulative impacts, compensatory mitigation can be considered, in coordination with the appropriate State agency.	
If one or more of the exception criteria can be met, the activity associated with the disturbance must also meet all of the following conditions in order to be permitted: a. If the exception relies on compensatory mitigation: 1. the mitigation must be completed prior to the disturbance that results in the exceedance of the disturbance cap and provide the same or better value habitat based on site limitations, or better based on site limitations, **AND** 2. The compensation must be implemented in the same HAF Fine Scale unit as the potential development. Consideration may be given to providing compensatory mitigation in adjacent fine-scale HAF areas if doing so will more effectively provide the offsetting benefit. b. All disturbance cap exceptions MUST have concurrence from the State Director. c. If proposed disturbance cap exception is requested in an area (neighborhood lek cluster or as appropriate an alternative adaptive management unit) that has met one of the adaptive management thresholds, no exceptions to the disturbance cap at the project scale would be considered until the causal factor analysis is completed and cause identified and corrected unless the disturbance is needed for the protection of human life and safety, as concurred by the State Director. d. All disturbance cap exceptions will be tracked by the BLM state sage-grouse lead and provided for cumulative analyses for any proposed development within the same neighborhood cluster or appropriate biological area. All requests for the use of compensatory mitigation to exceed the disturbance cap should be reviewed by the technical team for likelihood of success and efficacy of offsetting impacts to the affected habitats and associated populations. e. There would be no exceptions to the 3% PHMA disturbance cap at the **HAF Fine Scale** in any state unless: i. The disturbance is needed for the protection of human life and safety, as concurred by the State Director. f. All HAF Fine Scale disturbance cap exceptions approved by the State Director will be tracked by the BLM State sage-grouse lead. g. In the event of a conflict between the project scale and HAF fine scale disturbance caps, the Authorized Officer may consider and grant an exception to the disturbance cap at the HAF fine scale if, in	

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coordination with the appropriate State agency, it is determined that the impact to GRSG of the habitat disturbance resulting in the disturbance cap being met is better assessed at the project scale. h. Apply the disturbance cap to the extent consistent with applicable law (such as the Mining Law of 1872) and valid existing rights.	
Adaptive Management	
Objective: Address unanticipated negative impacts to GRSG from potential changes in habitat conditions before consequences become severe or irreversible. **Allocation:** N/A **Management Direction:** **Management Action:** The BLM must consider the best available information regarding habitat and population thresholds. This includes state wildlife agency population trend analyses; annual population trend results published using the Hierarchical Population Monitoring Framework (specifically the Targeted Annual Warning System procedures [TAWS]; Coates et al., 2021) and subsequent updates or revisions; geospatial data sources for habitat degradation such as Rangeland Condition Monitoring Assessment and Projection (RCMAP) and LandFire; and any scientifically defensible future tools that support understanding of habitat and population trends. The BLM will produce an annual summary of any adaptive management thresholds reached and associated response. An annual review of habitat and population information between the BLM and associated state wildlife agency and other appropriate state authorities is encouraged even if no thresholds are identified. **Adaptive Management Units:** To accurately assess any anomalies or thresholds being met, and any necessary responses, monitoring of habitat and population trend should be evaluated at the same scale. The BLM will use neighborhood clusters identified by USGS (Coates et al., 2021) to track habitat conditions and population trend analyses. A neighborhood cluster generally represents a GRSG population unit and includes local aggregations of leks and the seasonal habitats used by GRSG attending those leks. Habitat trends can also be monitored at smaller scales (e.g., lek level) as identified by state wildlife agency plans for GRSG, or at larger scales such as the Habitat Assessment Framework (HAF) Fine-Scale if appropriate. Neighborhood clusters are generally nested within the HAF Fine-Scale unit, though some exceptions occur. The causal factor analysis (CFA) should list the analysis units relevant to the threshold in question. The response required to address thresholds may need to be addressed at multiple scales. **Habitat Adaptive Management Thresholds:** 1. A soft habitat threshold is met when any single occurrence or combination of occurrences in PHMA in a neighborhood cluster result in the loss of more than 5% of the area capable of supporting sagebrush in a given year (including wildfire). Where a neighbor cluster overlaps with more than one habitat designation (e.g., PHMA and GHMA) the percent habitat loss will be calculated on the PHMA (and in Idaho PHMA and IHMA) only. Baselines for calculating sagebrush loss will be determined by the sagebrush base layer delineated using the most recent LandFire data (detailed in **Appendix 7**) available at the time of publication of the Approved RMPA and ROD.	

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2. A hard habitat threshold will be met when existing sagebrush extent, as described in the first bullet, within a neighborhood cluster drops below 65% of the area capable of supporting sagebrush (Aldridge et al., 2008; Connelly et al., 2000). A hard habitat threshold will also be met if a soft habitat threshold is met (as calculated from baseline described above) in 4 consecutive years (≥5% decline in each of 4 consecutive years). A hard or soft habitat threshold can be reversed if restoration of sagebrush vegetation communities within the neighborhood cluster returns to the sagebrush conditions and/or habitat function that existed prior to meeting a habitat threshold. The assessment to reverse a habitat threshold should occur in collaboration with the state wildlife agency and other appropriate state authorities. If the neighborhood cluster cannot be restored to original sagebrush conditions and/or habitat function due to ecological or disturbance limitations (e.g., intense fire killed soil microfauna, dense anthropogenic activities) restoration and/or habitat enhancement in adjacent neighborhood clusters can be considered to increase the number of GRSG supported in those areas. In these situations, habitat threshold reversal occurs when there are sufficient numbers of GRSG (abundance) to allow for recovery of regional population numbers to those present at or before the threshold was met as described below. This will be done in coordination with appropriate state agencies. If enhancing habitats in adjacent areas does not reverse the threshold further assessment may be necessary to determine if the area in which the habitat threshold was met should still be considered GRSG habitat. **Population Trend Adaptive Management Thresholds:** State wildlife agencies and other appropriate authorities should alert the BLM to population concerns as determined by the entity's internal assessments. The BLM will also review the annual results of TAWS and other available scientific information (including other tools included in the USGS Sage-Grouse Population Monitoring Framework) examining population trends in PHMA in determining if those trends indicate potential habitat concerns. Since State wildlife agencies receive lek specific information from TAWS and the other tools contained in the USGS Sage-Grouse Population Monitoring Framework, in advance of the publicly released neighborhood cluster analyses used by the BLM, they can also provide early alert to the BLM when population thresholds (soft or hard) are met to initiate a causal factor analysis. (Note: the BLM does not receive lek specific information from TAWS, nor is it included in the annual publication on neighborhood cluster analyses). If a threshold is identified, the BLM (including the Authorized Officer) and the state wildlife agency will coordinate to confirm that data presented indicate that a threshold has been met, preferably within 60 days to allow a nimble response to a habitat causal factor. If the identified threshold was in error, the data supporting reversal of the threshold will be documented. If there is disagreement in the analyses, BLM and the state wildlife agency will coordinate to identify the source of the error and document all discussion. If there is still disagreement, the finding will be elevated to the appropriate BLM State Director who will work in coordination with the BLM State and National sage-grouse biologist, and local BLM field biologist as needed to determine if a causal factor team should be convened to	

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determine if any potential underlying habitat factor may be contributing to the population trend anomaly. The BLM State Director will then advise the state wildlife agency head of the BLM recommendation. **Interpretation of TAWS model results will be as follows:** 1. A soft population trend threshold is equivalent to a TAWS watch (a 2 consecutive year, negative rate of population change at the neighborhood cluster that shows a population decline that is either different or more rapid than that of the associated climate cluster; Coates et al., 2021). 2. A hard population trend threshold is equivalent to a TAWS warning (a 2 out of 3 (fast) or 3 out of 4 (slow) consecutive year negative rate of population change at the neighborhood cluster that is either different or more rapid than those of the associated climate cluster; Coates et al., 2021). **A hard or soft population trend threshold can be reversed if the following criteria are met:** 1. Population trends at the neighborhood cluster scale realigns for a minimum of three consecutive years with the climate cluster trend as indicated by the TAWS model (i.e., no longer a TAWS "watch" or "warning"); OR 2. There are sufficient numbers of GRSG (abundance) to allow for recovery of population numbers to those present at or before the threshold was met, based on local growth rates determined by the state wildlife management agency, and BLM has the concurrence of the state wildlife management agency and other appropriate state authorities; **OR** 3. The BLM and partners determine the threshold alert was in error. Data and other information supporting reversal of the threshold will be documented. **Causal Factor Analysis:** If a habitat or population threshold is met the BLM, along with state wildlife management personnel and other stakeholders with knowledge of local conditions will initiate an assessment as soon as alerted to a threshold being hit to determine the causal factor(s). The composition of the CFA team will be determined at the implementation level, and should minimally include the local BLM biologist, BLM state sage-grouse lead, and a representative from the state wildlife agency. Additional subject matter experts and other affected parties can be added as necessary for individual site-specific analyses or as consistent with existing CFA team structures. The analysis shall be detailed in a written report that includes but is not limited to descriptions of existing land uses, landownership patterns, history of population and habitat trends in the area, condition of the habitat, cause(s) of habitat and/or population decline, recommendations of management actions to address the potential causes of decline, and the data and expertise used to reach conclusions presented in the report. Any substantive disagreements between CFA team members will be noted in the report along with the basis for the disagreement. The report will be submitted to the local BLM manager, the BLM state sage-grouse lead in the state(s) the threshold was met, and the BLM national sage-grouse coordinator as well as all members on the CFA team as soon as the analyses are complete.	

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Adaptive Management Responses: When any adaptive management threshold is met, (and population thresholds confirmed with the state wildlife agency) a rapid assessment may be completed to identify "obvious" causes. Obvious causes are those easily identified such as a large wildfire or other discrete event. If the rapid assessment identifies the cause, a formal CFA will not be needed. Rapid assessments can be conducted by the BLM or appropriate state agency, or both, but results should be confirmed by all. Documentation of the cause will be submitted to the local BLM manager, the BLM state sage-grouse lead in the state(s) the threshold was met, and the BLM national sage-grouse coordinator as well as all members on the CFA team. Existing permitted activities and new discretionary activities in the affected areas can continue unless those activities are causing mortality to GRSG or direct loss or degradation of occupied GRSG habitat. If an obvious causal factor cannot be identified in the rapid assessment, a CFA to identify potential causes of the adaptive management threshold being met will be completed on a timeframe established by the CFA team, but not longer than 12 months from the initial alert. If a soft threshold is met, new discretionary activities can be considered during the completion of the CFA as long as those activities do not result in mortality of GRSG or GRSG habitat loss and degradation. However, if a CFA for a soft threshold is not completed within the established time frame, no new discretionary activities will be authorized after that time until a CFA is completed, as legally allowed. New authorizations, or reauthorization of existing permits can then be considered if similar activities were not contributing to factors resulting in meeting either a population or habitat threshold. Project level NEPA will specifically evaluate if the new permitted activity could result in the threshold being sustained or met again. If a hard threshold is met no new proposed permitted activities will be authorized until a CFA is completed. Project level NEPA will then specifically evaluate if the new permitted activity could result in additional or cumulative impacts to GRSG. The CFA team can alter the level of the threshold met (soft to hard, or hard to soft) based on their review and if supported by local data. For example, habitat loss of 5% results in a soft threshold, but if the loss is of limited crucial habitat (e.g., the only winter or mesic habitat in the neighborhood cluster) the CFA team can request hard threshold management responses be implemented. Similarly, a local assessment of habitat loss meeting a hard threshold may be reversed if the loss is of marginal areas, or areas documented as not supporting GRSG. These threshold reversals must be supported by data and fully detailed in a written report. Final determination of the reversal will be made by the authorizing officer, in consultation with the local CFA team. The CFA team can expand the analysis and management response to adjacent neighborhood clusters based on their review. For example, migratory populations that utilize multiple neighborhood clusters may require increased protection during other seasonal habitats and use areas to reverse population declines. The CFA team should also identify if a threshold is met as the result of actions on non-BLM lands that negatively affect habitat or populations on BLM lands.	

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If the CFA identifies the cause for habitat or population declines BLM will modify any permitted activity identified as a causal factor, as legally allowable to reduce, mitigate or eliminate the impact on BLM lands in coordination with the permit holder. Monitoring of the affected habitat or population (or both if appropriate) will be necessary to assess the efficacy of the modification. For new authorizations project level NEPA will specifically evaluate if the proposed new activity could result in contributing to sustaining the threshold or result in the threshold being met again. New authorizations may be subject to more restrictions appropriate for the specific resource, as determined necessary by local information. **Exceptions to limitations imposed for exceeding thresholds include**: 1. Renewal of existing activities that require a permit if: a. The activity is scheduled within 60 days of when a threshold is met and identified, and b. The project proponent can show significant negative economic impacts (i.e., documented loss of income equivalent to the income potential of the event), and c. The renewal can only be considered if it does not result in known impacts to habitats or populations. 2. Activities essential for human health and safety in a current or likely catastrophic event (e.g., repair of dams, emergency vehicle access). 3. ES&R activities essential to restoration after a wildfire. 4. Grazing permits that will expire within the same year the threshold is identified. A permit or lease to extend the current grazing practice for less than 10 years may be renewed until the causal factor analysis is completed. If grazing is not determined as a causal factor to an adaptive management threshold, grazing permit or lease renewal can proceed normally. If grazing is a contributing cause to an adaptive management threshold, the terms and conditions of the grazing permit or lease will need to be examined and modified to reduce or eliminate the impact. 5. Continuing the terms and conditions for livestock grazing when a permit or lease has expired or was terminated due to a grazing preference transfer in accordance with Section 402(c)(2) of the FLPMA as amended by Public Law No. 113-291. BLM will work with proponents identified in the above exceptions to reduce potential impacts on GRSG habitats. If the neighborhood in which a population trend threshold is met is 50% or greater GHMA, lek level threshold analyses should be conducted to determine which leks are contributing to the trend deviation. If meeting the threshold is the result of lek attendance declines entirely within GHMA new permits can be considered prior to completing a CFA if that activity is not in conflict with any GHMA designation identified by the state wildlife agency (restoration, connectivity, seasonal, or other), and if that activity will not negatively impact habitats or populations in the adjacent PHMA. If a reduction in the ability for the habitat to support GRSG occurs as a result of habitat impacts, additional restrictions may be necessary to preclude further habitat losses. Local responses to thresholds in GHMA can be considered if deemed necessary by the BLM and the appropriate state agency. A	

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similar analysis will be conducted if a neighborhood cluster covers mixed landownerships. If the threshold is the result of habitat conditions on non-BLM administered lands, new authorizations can be considered if the activity will not negatively impact habitats or populations in the adjacent lands or contribute to indirect or cumulative impacts. The restrictions from meeting soft or hard habitat or population trend thresholds will be removed once the criteria for reversing the threshold, described above are met. If a threshold is met as the result of actions on adjacent non-BLM lands, new authorizations can be considered if the activity will not negatively impact habitats or populations or contribute to indirect or cumulative impacts. Habitat improvement projects should also be considered if likely to reverse the threshold. **Habitat Threshold due to Wildfire**: If wildfire results in a habitat threshold being met, an assessment of the impact on affected GRSG habitat will be conducted by BLM staff and appropriate state agency personnel to determine the actual extent of habitat loss (which can include an assessment of burn severity – did the wildfire burn hot enough to kill the sagebrush) within the wildfire perimeter. This review may be done in addition to any BLM ESR review. No new discretionary authorizations that would result in additional habitat loss within PHMA in affected neighborhood clusters will be authorized until the assessment of habitat impacted is completed (this can include the initial rapid assessment if the results indicate the threshold can be reversed). If the assessment indicates wildfire severity is such that habitat services (the ability of the area to provide food, cover, water, and connectivity at the time just prior to the wildfire) for GRSG within the wildfire perimeter remain and the area can support the same abundance of GRSG that was present prior to the wildfire the threshold will be considered reversed. If habitat assessment determines the PHMA influenced by the wildfire can no longer support GRSG populations at levels prior to the wildfire, new infrastructure projects or permits may be deferred if consistent with applicable law (such as the Mining Law of 1872), and valid existing rights until an assessment demonstrates the habitat can support GRSG at the levels that existed prior to the wildfire event have been restored. Authorizations may be considered if the proposed project will have no direct or indirect impact to GRSG or their habitats. The associated determination must be documented in a report to the BLM state sage-grouse lead, the BLM state director and the National BLM GRSG coordinator. If the wildfire event precludes restoration to GRSG habitat permanently, further assessment may be necessary to determine if the area should still be considered GRSG habitat. **Multi-factorial CFAs:** Where there are multiple potential causes identified the BLM may consider implementing additional restrictions specific to the identified causes on existing or new authorizations in the area, consistent with permits/surface use rights in coordination with the permit holder and the state wildlife management agency and other appropriate state authorities. Any restrictions will be determined by the authorizing officer, with the documented biological rationale from BLM field biologists. In addition to considering project-level restrictions, the BLM should direct	

Proposed RMP Amendment for PHMA	
Objective/Allocation/Management Direction	**State-Specific Differences**
habitat improvement projects specific to the causes identified to the neighborhood cluster and surrounding clusters. **Inconclusive CFAs:** If no cause for a habitat or population decline can be determined the BLM may consider implementing additional restrictions on existing or new authorizations in the area, consistent with permits/surface use rights in coordination with the permit holder and the state wildlife management agency. Any restrictions will be determined by the authorizing officer, with the documented biological rationale from BLM field biologists. Following Inconclusive CFAs, the CFA team should monitor the area and include any new or changing information in the annual adaptive management report or as an addendum to the CFA. New authorizations must disclose a threshold has been met and consider the proposed activity's potential cumulative impact to either the habitat or population trend (dependent on which threshold has been met). In addition to considering project-level restrictions, the BLM should direct habitat improvement projects to the neighborhood cluster and surrounding clusters. CFAs that are not completed within the time frame identified by the CFA team will not be considered inconclusive and should be prioritized for completion.	
Criteria Based Management for Non-Habitat	
Objective: N/A **Allocation:** (no allocation identified but allocations can be affected if non-habitat criteria are met) **Management Direction** (can affect HMA allocation and management direction, see Tables above): Habitat management areas include areas where the BLM will apply goals, objectives, and management actions for conservation of GRSG. The HMAs are identified using inventory data on habitat use and occupancy and reflect the dynamic nature of the vegetation communities that make-up GRSG habitat. The HMA boundaries are not identified using survey-grade assessments (e.g., comprehensive on-the-ground surveys and edge verifications) and, in some states, are the result of large-scale modeling. Therefore, not every acre within an HMA boundary may be GRSG habitat. Additionally, because GRSG habitat use and occupancy and vegetation communities are dynamic, the BLM will use up-to-date high-quality information, including through field investigations, where appropriate, to make adjustments to the management actions to be applied within identified HMA boundaries. In accordance with existing law, regulation and policy, inventories will continue to be conducted to provide information on GRSG habitat and distribution (BLM Manual 6840 .04 D 3; BLM-M-6840 .04 E 2). In the mapped GRSG HMAs, there may be areas of non-habitat (areas that lack the ecological potential to provide principal habitat components necessary to support GRSG) and where conformance with the RMP would not support GRSG conservation (refer to definitions for existing habitat, potential habitat, and non-habitat in glossary). If during consideration of a proposed action (project level authorization) within GRSG PHMA, GHMA, IHMA (in ID), Unique HMAs (in MT)/DKs, SHMA (in WY) and OHMA (in NV/CA) potential non-habitat is identified by the BLM, a project-specific review should be conducted by a BLM biologist (or reviewed and accepted for confirmation). This review should use published, scientific methods (preferably more than one) for identifying GRSG habitat (e.g., Stiver et. al. 2015 [as revised], NRCS ecological site descriptions (ESDs) and	**Nevada/California**: In Nevada and California, the project-specific review to consider which HMA criteria and management (e.g., in PHMA, GHMA, OHMA) should apply can include areas that provide more conservation value than the current designation identifies as well as areas of non-habitat. In the State of Nevada, the project-specific review will include representatives from BLM, NDOW, and the SETT at a minimum and include both spatial analyses and field derived information. On California BLM-managed lands, the review will include state representatives and include both spatial analyses and field derived information. USGS may be included in the project-specific review to advise on model accuracy and identification of model parameters that resulted in the mapped categorization. Consistent use of the USGS model results is an objective of this collaborative review. Any proposed change in HMA allocation for the

Proposed RMP Amendment for PHMA	
Objective/Allocation/Management Direction	**State-Specific Differences**
associated state and transition models) and be coordinated with the appropriate state agencies. Any discrepancies between the mapped GRSG HMAs and the site-specific conditions will be disclosed, with supporting data (e.g., vegetation monitoring, state and transition models, ecological site descriptions, etc.) and analyzed as a component of the NEPA process. However, indirect and direct impacts to adjacent GRSG populations and their habitats (including potential habitat) still need to be considered when planning and authorizing projects in these non-habitat areas. All management objectives and decisions associated with each management area type will apply unless all the following criteria are documented: 1. Project is proposed in verified non-habitat. 2. There are no indirect impacts to adjacent habitat or individual or populations of GRSG occupying these adjacent areas due to project design and required design features (e.g., minimize noise, preclude tall structures, require perch deterrents, etc.), as demonstrated in the project's NEPA document. Indirect impact consideration includes the following: (1) The project does not impact connectivity, i. Within or between populations, ii. Between seasonal habitats (e.g., nesting, early brood rearing, winter, etc.), or iii. Within or between existing habitat. 3. Any project related access through/across GRSG habitat (as verified through site-specific field checks) only occurs on existing routes, and the proposed action would not include new roads or upgrades to roads that would change the vehicle use, vehicle type, or traffic volume during the applicable season of GRSG use, subject to valid existing rights, throughout all stages of the proposed project. 4. Coordination with the appropriate state and federal agency biologists and other appropriate staff has been documented. If coordination is not possible the reasons will be documented. All proposed actions, including those in the same area, would need to undergo individual analysis to confirm the criteria are met prior to authorization. Exempting a proposed project from the management actions that would otherwise be required in a GRSG habitat management area identified on the maps in this RMPA because the proposal has been determined to be in non-habitat, based on the above criteria, would not change the GRSG habitat management area boundaries as identified in the RMP. The determination to exempt a proposed project from the management actions that would otherwise be required in the GRSG habitat management area identified in maps in this RMPA, when supported by science and consistent with the criteria above, may only be made by the Authorized Officer. However, if there is not concurrence between the coordinating federal and/or state wildlife biologists, then the determination will be at the discretion of the BLM State Director.	area resulting from the review must be approved by the State Director.

Proposed RMP Amendment for PHMA	
Objective/Allocation/Management Direction	**State-Specific Differences**
Definition of Lek	
Objective: N/A **Allocation:** N/A **Management Direction:** Use the Western Association of Fish and Wildlife Agencies (WAFWA) lek definitions (Cook et. al., 2022). (Refer to Glossary and **Appendix 4**). Unless otherwise specifically noted, when language in the RMPs uses the term "lek" it applies to the WAFWA definition for "active lek."	**Colorado:** The WAFWA active lek definition applies to "occupied leks" as defined by Colorado Parks and Wildlife. **Oregon:** The lek definition applies to "active lek" AND "pending active lek". **Nevada/California/Idaho**: The lek definition applies to "active lek" AND "pending active lek". **Wyoming:** The active lek designation applies to "occupied leks" as defined by Wyoming Game and Fish Department.

Table 2-5. Priority Habitat Management Areas (PHMA) with limited exceptions Allocations and Management Direction

This table identifies the resource topics and the rangewide amendments being proposed for application in PHMA with limited exceptions. The table describes the rangewide management category in the left-hand column, the proposed allocations and management direction in the middle column, and the state-specific differences to the rangewide direction in the right hand column. The table describes if the Proposed RMP Amendment is amending the "objective", "allocation", or "management direction" for the resource topic identified. In some instances, the Proposed RMP Amendment addresses all three of these planning categories for a resource topic while in other resource topics only one or two of the categories are being proposed for amendment.

GRSG habitat management areas would be identified and managed as shown on **Map 2.7**. Acres by state and rangewide are shown in **Table 2-15**. Information on state-by-state GRSG HMA mapping strategies is in **Appendix 3**.

Proposed RMP Amendment for PHMA with limited exceptions		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
All the PHMA allocations and management direction described in Table 2-4 apply except as described below for Utility Scale Solar, Utility Scale Wind, Fluid Minerals (including Geothermal), Saleable Minerals/Material Management, Nonenergy Leasable Minerals, and Major Rights of Way.		
Utility Scale Solar	**Allocation:** Exclusion without exceptions for utility scale solar testing and development.	—
Utility Scale Wind	**Allocation:** Exclusion without exceptions for utility scale wind energy testing and development (including met towers).	—
Fluid Minerals (including Geothermal)	**Allocation:** NSO and no Waivers/Exceptions/Modifications	—
Saleable Minerals/Material Management	**Allocation:** Closed, but Open for new free use permits (within 1/4 mile of an existing improved roads and not located within 3.1-miles of a lek) and expansion of existing pits if: 1. the proposed disturbance will be less than 40-acres; or 2. the BLM can verify the area is not habitat and the expansion would not adversely impact any adjoining seasonal habitat.	**Wyoming**: Closed, but Open for new free use permits and expansion of existing pits subject to occupancy, seasonal limitations, disturbance, density, and the BLM can verify the expansion would not adversely impact any adjoining seasonal habitat. **Montana**: Same as PHMA, see **Table 2-9**. **Oregon:** Refer to **Table 2-11** for additional management direction.

Proposed RMP Amendment for PHMA with limited exceptions		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
Nonenergy Leasable Minerals	**Allocation:** Closed to new leases including fringe acreage leasing (i.e., no expansion of existing leases).	**Wyoming**: Closed to new leases including fringe acreage leasing (i.e., no expansion of existing leases) except in situations required for human health and safety (e.g., ventilation shafts for underground mining operations).
Major Rights of Way	**Allocation**: Exclusion for Major Rights of Way (ROW) (linear features such as overhead transmission lines, distribution pipelines, and large non-linear surface disturbing projects (refer to glossary) with the following exceptions. **Management Direction**: If during consideration of a proposed ROW action (project level authorization) the determination of whether it is a major or minor ROW is questioned with supporting rationale, the Authorized Officer (AO), in consultation with the State Office lead(s), will make the final determination. **Major Rights of Way Exception Criteria** Exceptions will be granted if the criterion below and the additional conditions are met. 1. RMP designated corridors within PHMA with limited exceptions are open to consideration of a new major ROW in the category of ROW for which the corridor was designated if co-location of the proposed authorization within the existing ROW disturbance results in minimal impacts to those already associated with the existing major infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats. *If the avoidance criterion can be met, the ROW must also meet the following conditions in order to be permitted in PHMA with limited exceptions:* a) The ROW must be the minimum necessary to achieve the ROW's purpose and would not otherwise be viable in an area that is "open" to ROWs. b) Micro-siting is required to limit impacts and maintain connectivity corridors between seasonal habitats. This includes using topography and non-habitat as effective barrier to adverse impacts and collocation with existing, similarly sized, infrastructure. c) Residual direct and indirect impacts would be mitigated through compensatory mitigation to achieve the mitigation standard.	**Montana**: Exclusion with no exceptions within 0.6m of leks and in crucial winter range. Refer to **Table 2-9**.

Proposed RMP Amendment for PHMA with limited exceptions		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
	If requiring compensatory mitigation both inside and outside of RMP-designated corridors disincentivizes location in the designated corridor or another route that has lesser impacts to GRSG, the Authorized Officer may consider adjusting the compensatory mitigation requirement if doing so reduces impacts to GRSG compared to an alignment that otherwise requires compensatory mitigation (e.g., development in an RMP-designated corridor that has existing transmission lines already present). When considering adjustments to the BLM's no net loss compensatory mitigation requirement for a major ROW (see GRSG mitigation action), the Authorized Officer shall coordinate with the applicable State agencies to ensure compliance with compensatory mitigation required by State policies or regulations that go beyond BLM's compensatory mitigation requirement.	

Table 2-6. General Habitat Management Area (GHMA) Allocations and Management Direction

This table identifies the resource topics and the rangewide amendments being proposed for application in GHMA. The table describes the rangewide management category in the left-hand column, the proposed allocation and management direction in the middle column, and state-specific differences to the rangewide direction in the right hand column. The table describes if the Proposed RMP Amendment is amending the "objective", "allocation", or "management direction" for the resource topic identified. In some instances, the Proposed RMP Amendment addresses all three of these planning categories for a resource topic while in other resource topics only one or two of the categories are being proposed for amendment. All three planning categories are identified for each resource topic and if it is not being proposed for amendment it will be identified as "N/A", not applicable. In those "N/A" instances, the 2015 or 2019 Amendment decision is not being proposed for amendment and remains in place. The existing 2015 and 2019 Amendment decisions are described in **Appendix 2**. **Appendix 2** provides a description of the decisions that remain in place and how and where that management direction is being proposed for amendment by this amendment.

GRSG habitat management areas would be identified and managed as shown on **Map 2.7**. Acres by state and rangewide are shown in **Table 2-15.** Information on state-by-state GRSG HMA mapping strategies is in **Appendix 3**.

Proposed RMP Amendment for GHMA Allocations and Management Direction		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
Utility Scale Solar	**Objective:** N/A **Allocation:** Open with applicable state specific minimization measures from the 2015 and 2019 GRSG Plan Amendments, and compensatory mitigation, to maintain habitat supporting GRSG populations consistent and concurrent with state agency habitat designations (e.g., restoration, connectivity, seasonal, or other), and to preclude negative impacts to any adjacent PHMA habitats. **Management Direction:** N/A	**Colorado:** Avoidance for solar development. Development could be authorized if the Authorized Officer can document that there would be no negative impacts to any PHMA habitats or important seasonal habitats in GHMA. Refer to Colorado Additional Management Direction in **Table 2-7**. **Oregon:** Avoidance for solar development. Refer to **Table 2-11** for state specific management direction. **Idaho:** Open in GHMA, subject to RDFs, buffers, and mitigation. Refer to **Table 2-8** for state specific management direction. **Montana/Dakotas:** Exclusion w/in 2 miles of leks, UMRBNM, and crucial winter habitat. Avoidance in rest of GHMA. Refer to **Table 2-9** for state specific management direction on unique HMAs. **Utah:** Avoidance in GHMA connectivity areas. Development could be authorized if the Authorized Officer can document that there would be no negative impacts to any PHMA habitats or important seasonal habitats in GHMA connectivity areas. New ROWs in the remainder of GHMA (non-connectivity) could be considered if they apply the

Proposed RMP Amendment for GHMA Allocations and Management Direction		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
		pertinent management for discretionary activities in GHMA identified in MA-SSS-5 (Utah ARMPA). **Wyoming:** Open with applicable state specific minimization measures from the 2015 and 2019 GRSG Plan Amendments, and compensatory mitigation, to maintain habitat supporting GRSG populations consistent and concurrent with state agency habitat designations (e.g., restoration, connectivity, seasonal, winter concentration, or other), and to preclude negative impacts to any PHMA habitats. GHMA management for solar energy development applies to SHMA in Wyoming. **Nevada/California:** Avoidance for utility scale solar testing and development. Development could be authorized if the Authorized Officer can document that there would be no negative impacts to PHMA or important seasonal habitats in GHMA.
Utility Scale Wind	**Objective:** N/A **Allocation:** Open with applicable state specific minimization measures from the 2015 and 2019 GRSG Plan Amendments, and compensatory mitigation, to maintain habitat supporting GRSG populations consistent and concurrent with state agency habitat designations (e.g., restoration, connectivity, seasonal, or other), and to preclude negative impacts to any PHMA habitats. **Management Direction:** N/A	**Colorado:** Avoidance for wind development including met towers. Development could be authorized if the Authorized Officer can document that there would be no negative impacts to any PHMA habitats or important seasonal habitats in GHMA. Refer to Colorado Additional Management Direction in **Table 2-7**. **Oregon:** Avoidance for utility scale wind development. Refer to **Table 2-11** for state specific management direction. **Idaho:** Open in GHMA, subject to RDFs, buffers, and mitigation. Refer to **Table 2-8** for state specific management direction. **Montana/Dakotas:** Exclusion w/in 2 miles of leks, UMRBNM, and crucial winter habitat. Avoidance in rest of GHMA. Refer to **Table 2-9** for state specific management direction on unique HMAs. **Utah:** Avoidance in GHMA connectivity areas. Development could be authorized if the Authorized Officer can document that there would be no negative impacts to any PHMA habitats or important seasonal habitats in GHMA connectivity areas. New ROWs in the remainder of GHMA

Proposed RMP Amendment for GHMA Allocations and Management Direction		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
		(non-connectivity) could be considered if they apply the pertinent management for discretionary activities in GHMA identified in MA-SSS-5 (Utah ARMPA). **Wyoming:** Open with applicable state specific minimization measures from the 2015 and 2019 GRSG Plan Amendments, and compensatory mitigation, to maintain habitat supporting GRSG populations consistent and concurrent with state agency habitat designations (e.g., restoration, connectivity, seasonal, winter concentration, or other), and to preclude negative impacts to any PHMA habitats. GHMA management for wind energy development applies to SHMA in Wyoming. **Nevada/California:** Avoidance for utility scale wind testing and development (including met towers). Development could be authorized if the Authorized Officer can document that there would be no negative impacts to any PHMA habitats or important seasonal habitats in GHMA.
Fluid Minerals (including Geothermal)	**Management Objective, Allocation, and Management Actions**: Same management direction as identified in 2015 and 2019 for all States except as noted in "State-Specific Differences" column. **NSO Exception** The Authorized Officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of GRSG due to site-specific terrain and habitat features, such as topographic features that would reduce the habitat impacts by shielding nearby habitat from disruptive factors. An exception could also be granted if it can be demonstrated by a qualified biologist and confirmed by the BLM, based on site-specific information (using State mitigation tools such as Habitat Equivalency Analysis or Habitat Quantification Tool, or other State mitigation programs), that the impacts anticipated by the proposed activity would be offset through compensatory mitigation developed in coordination with the appropriate State agency that meets principles of GRSG compensatory mitigation identified in the RMP, including providing for no net loss of habitat.	**Colorado:** CSU w/in 1 mile of PHMA to avoid indirect impacts to PHMA, CSU within 1 mile of leks occurring in GHMA to avoid impacts to important seasonal habitats, timing limitations for all of GHMA. Refer to Colorado Additional Management Direction in **Table 2-7**. **Montana/Dakotas:** NSO w/in 0.6 mile of leks and in crucial winter range; CSU (avoid surface occupancy and use in seasonal habitats unless impacts can be addressed) elsewhere. UMRBNM closed. Refer to **Appendix 16**: Montana/Dakotas Oil and Gas Lease Stipulations for full list of stipulations. **Nevada/California:** Open with minor stipulations (CSU for lek buffers and seasonal limitations). **Oregon:** For fluid mineral allocation, refer to Oregon state-specific management direction **Table 2-11**. No modifications to NSO in GHMA. Exception and waiver are the same as rangewide, but applied to active and pending active leks. **Utah:** NSO and seasonal limitations near leks (varies by office) based on pre-2015 management plans.

Proposed RMP Amendment for GHMA Allocations and Management Direction		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
	NSO Modification The Authorized Officer may grant a modification after a review of available information, and in coordination with the applicable state agency, documents that a portion of the NSO area is nonessential, or it is identified through scientific research or monitoring that the existing area is inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the GRSG, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting, considering both direct and indirect impacts from a potential modification. **NSO Waiver** This stipulation may be waived for a specific lek if, in coordination with the appropriate State agency, it is determined that the GRSG lek that was active has been classified as inactive as determined by the WAFWA definitions and confirmed by the appropriate State agency. Prior to waiving the stipulations, surveys should confirm that the lek is inactive and not moved to another location in the vicinity. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. **Seasonal Constraints/Stipulations** **Season Constraints/Stipulations Exception** The Authorized Officer may consider and provide temporary relief from seasonal constraints by granting an exception after documenting the review of available information associated with the site proposed for the exception. This direction applies in PHMA, GHMA, and all other state identified HMAs. While the BLM considers information from all sources, the State wildlife agency can provide information directly associated with bird use, including whether GRSG populations are not using the seasonal habitat during that year's seasonal life cycle period if available. Based on this information and recommendation, and documented variability in climatic conditions (e.g., early/late spring, long/heavy winter), use patterns, or other applicable information the Authorized Officer may consider a one-time exception if development associated with it will not affect GRSG habitat use.	**Wyoming:** NSO w/in 0.25 mile of leks; seasonal limitations within 2 miles of leks; open with standard terms and conditions outside of 2-mile lek buffer. This direction and the NSO stipulation waiver, exception, and modification direction also applies in SHMA.

Proposed RMP Amendment for GHMA Allocations and Management Direction		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
	Season Constraints/Stipulations Modifications The BLM can and does grant modifications to seasonal restrictions if the BLM, in coordination with the state wildlife agency and other appropriate state authorities on a case-by-case basis, determines that granting the modification would not adversely impact the population being protected. The authorized officer may consider and grant a modification to the dates and areas associated with seasonal timing restrictions based on the criteria described below – after documenting the review of available information associated with the site proposed for the modification, if: The geographic and temporal conditions demonstrate that any modification (shortening/extending seasonal timeframes) is justified on the basis that it serves to better protect or enhance GRSG and its habitat than if the strict application of seasonal timing restrictions are implemented. Under this scenario modifications can occur if one or more of the following conditions can be documented: A proposed authorization is expected to have beneficial or neutral impacts on GRSG and its habitat. Topography or other factors eliminate direct and indirect impacts from visibility and audibility to GRSG and its habitat. There are documented local variations that indicate the seasonal life cycle periods are different than presented. Modifications are needed to address an immediate public health and safety concern in a timely manner (e.g., maintaining a road impacted by flooding). **Season Constraints/Stipulations Waiver** The Authorized Officer may consider and grant a waiver of the stipulation on an existing lease if the area that was mapped as a GRSG habitat management area (regardless of type) when the lease was issued is no longer mapped as such through the appropriate planning process (i.e., plan maintenance or amendment).	
Saleable Minerals/Mineral Materials	**Objective:** N/A **Allocation:** Open. **Management Direction:** Apply State-specific minimization measures identified in the existing 2015 and 2019 GRSG amendments (refer to **Appendix 2**).	**Wyoming:** Direction also applies in SHMA.

Proposed RMP Amendment for GHMA Allocations and Management Direction		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
Nonenergy Leasable Minerals	**Objective:** N/A **Allocation:** Open. **Management Direction:** Apply State-specific minimization measures identified in the existing GRSG amendments (refer to **Appendix 2**)	**Colorado:** Refer to additional management direction in **Table 2-7**. **Wyoming:** Direction also applies in SHMA.
Coal	**Objective:** N/A **Allocation:** N/A **Management Direction:** **States w/ coal resources (Colorado, Montana/Dakotas, Utah and Wyoming):** Unless a suitability process has already been conducted that considered GRSG HMAs, at the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR Part 3461.5. Coordination with the appropriate State agency and the determination of essential habitat for maintaining GRSG as per the suitability criteria at 43 CFR Part 3461.5(o)(1) will consider site-specific information associated with lease nomination areas as part of the unsuitability process identified above. **States without coal resources (Idaho, Nevada/California, and Oregon):** No management direction due to the absence of the mineral.	**Wyoming:** Direction also applies in SHMA.
Locatable Minerals	**Objective:** N/A **Allocation:** Open, unless currently withdrawn. **Management Direction:** N/A	**Wyoming:** Direction also applies in SHMA.
Major Rights of Way	**Objective:** N/A **Allocation:** Open with applicable state minimization measures from 2015 and 2019, and compensatory mitigation, to maintain habitat supporting GRSG populations consistent with state agency habitat designations (e.g., restoration, connectivity, seasonal, or other), and to preclude negative impacts to PHMA habitats. **Management Direction:** N/A	**Colorado:** Avoidance and expand criteria to preclude negative impacts to PHMA habitats or important seasonal habitats in GHMA, open in designated corridors to the ROW type for which the corridor was designated. Refer to **Table 2-7** for Colorado specific direction. **Idaho**: Open, subject to RDFs, buffers, and mitigation. Refer to **Table 2-8** for Idaho specific management direction. **Oregon:** Avoidance. **Montana/Dakotas:** Refer to **Table 2-9** for Montana specific direction on major ROW management, including in CHMA and unique HMA types. **Wyoming:** Open with applicable state minimization measures from 2015 and 2019, and compensatory

Proposed RMP Amendment for GHMA Allocations and Management Direction		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
		mitigation, to maintain habitat supporting GRSG populations consistent with state agency habitat designations (e.g., restoration, connectivity, seasonal, winter concentration, or other), and to preclude negative impacts to PHMA habitats. GHMA management for ROWs applies to SHMA in Wyoming. **Utah:** Avoidance in GHMA connectivity areas that are important for GRSG connectivity between populations. Development could be authorized if the Authorized Officer can document that there would be no negative impacts to any PHMA habitats or important seasonal habitats in GHMA connectivity areas. New ROWs in the remainder of GHMA (non-connectivity) could be considered if they apply the pertinent management for discretionary activities in GHMA identified in MA-SSS-5 (Utah ARMPA). **Nevada:** Avoidance. Direction associated with PHMA applies to GHMA on lands administered by BLM-NV.
Minor Rights-of-Way	**Objective:** N/A **Allocation:** Open with applicable state mitigation requirements from 2015 and 2019 GRSG amendments (refer to **Appendix 2**). **Management Direction:** N/A	**Colorado:** Avoidance. Refer to Colorado Additional Management Direction in **Table 2-7**. **Idaho**: Open, subject to RDFs, buffers, and mitigation. **Montana/Dakotas:** Avoidance w/in 1.2 miles of active leks and w/in crucial winter range, open with mitigation requirements elsewhere. **Oregon:** Refer to **Table 2-11** for additional detail allocations associated with minor ROWs. **Wyoming:** Open with no mitigation requirements. Direction also applies in SHMA.
Livestock Grazing	Same as PHMA except RM-3 does not apply.	**Wyoming:** Direction also applies in SHMA.
Wild Horse and Burro	Same as PHMA.	—
Mitigation	Same as PHMA	**Wyoming:** Direction also applies in SHMA.
Predation	Same as PHMA except Management Action 2 does not apply.	**Nevada/California**: Same as PHMA **Oregon:** Same as PHMA
Disturbance Cap	No GHMA disturbance cap management direction.	—

Proposed RMP Amendment for GHMA Allocations and Management Direction		
Management Category	**Allocation and Management Direction**	**State-Specific Differences**
Adaptive Management	Same as PHMA	**Wyoming:** Direction also applies in SHMA.
Lek Definitions	Same as PHMA	—
Criteria Based Management Direction for Non-Habitat	Same as PHMA	**Wyoming:** Direction also applies in SHMA.

2.5 STATE-SPECIFIC CIRCUMSTANCES

The Proposed RMP Amendment includes State specific management direction to respond to locally relevant habitat variability and circumstances, consistent with the purpose and need. Different resource topics and GRSG conservation strategies addressed by individual states in this amendment effort include fire and fuels, vegetation and invasives, lands and realty actions, project screening, lek buffers, and interagency coordination. Inclusion of a management category for amendment in one state does not necessitate consideration of this category in other states or the consideration of the category rangewide. The management approaches and tools identified in the state-specific Proposed RMP Amendments that follow are limited to those identified for a given state and are only applicable in those states.

Issues or management differences between states are not based on preference, but rather on specific circumstances and are focused on issues, topics, and actions that meet the purpose and need of improving GRSG conservation. Through the alternative development process all states identified at least one state-specific circumstance. In response to the needs identified above and in response to cooperating agency and public comments received on the Draft RMP Amendment and Draft EIS, following are the state-specific circumstances that have been identified in the Proposed RMP Amendment for each state.

Colorado

The Proposed RMP Amendment includes State specific management direction to respond to locally relevant habitat variability and circumstances, consistent with the purpose and need. Most state-specific circumstances in Colorado are a result of different planning approaches in the 2015 and 2019 NWCO GRSG ARMPAs (plans). The BLM will also clarify management decisions that have been unclear since implementation of the 2015 plan.

Colorado has variable topography leading to naturally fragmented habitats, affecting ecology and plant communities, and therefore differences between GRSG population areas. Significant elevational changes may fall within standard lek buffer distances in some Colorado GRSG populations (e.g., Parachute Piceance Roan (PPR) population). Colorado typically does not see large wildfires in sagebrush ecosystems or conversion to agriculture to the same degree as other states.

Prior to the current planning process, the BLM and the State of Colorado adopted refined habitat management area maps. The multi-year (2016-2019), collaborative mapping process refined previously mapped areas to remove non-habitat in habitat management areas or expand areas with documented GRSG use. The re-mapping effort incorporated state-specific, timely research and mapping tools. See **Appendix 3** for a summary of the Colorado habitat management area mapping strategy. The state specific circumstances for the State of Colorado being addressed in this effort include the following: 1) management scale, 2) application and use of lek buffers, 3) consistency across resource uses, and 4) integration of lessons learned during implementation.

Management Scale

Colorado manages populations and sub-populations by Management Zone (MZ) which are biologically driven units delineated by GRSG use, topographic and other natural features, differences in ecological potential, and differences in issues affecting GRSG (Colorado Greater Sage-grouse Steering Committee 2008). The BLM uses the CO MZs to calculate project-scale disturbance and density caps rather than the density and disturbance methodology used by many other states. The MZs are geographically consistent with the areas used by Colorado Parks and Wildlife (CPW) but have different numbering (e.g.- BLM MZ 2 is the same area as CPW MZ 1). For ease of communication, the BLM intends to adjust the MZ numbering during this planning effort to be more consistent with the CPW naming convention.

Lek Buffers

Clarification of lek activity periods

The BLM will clarify the activity period for the leks being included in management allocations and decisions. Both the 2015 and 2019 plans included allocations and management decisions based on the distance from "active" leks using CPW's definition, which is an area used by two or more displaying males in two of the last five years in larger populations and one or more males in any of the last five years in small populations (Colorado Greater Sage-grouse Steering Committee 2008). There are inconsistencies between the CPW definition and the WAFWA definition, which describes an active lek as a lek that has 2 or more males counted during two or more years within the last 10 years (Cook et al. 2022, Connelly et al. 2000a). Because GRSG populations generally follow 9- to 10-year population cycles (Rich 1985, Fedy and Aldridge 2011, Fedy and Doherty 2011), the BLM will use a lek definition that better captures the fluctuation of population dynamics. The BLM will analyze use of the "occupied" lek definition from the 2015 and 2019 plans, which is defined as a lek that has been active during at least one strutting season within the past 10 years. CPW concurs with the approach.

The clarification of lek activity periods results in an increase to the amount of BLM-administered lands within the corresponding buffer distances. According to the Colorado 2022 lek count data from CPW, 276 leks are classified as active using the 5-year activity timeframe. The total number of leks with activity in the last 10 years increases to 445 leks. Using the 2015 and 2019 plan definitions, approximately 571,375 acres of BLM-administered lands were within 1-mile of an active lek (CPW, 5-year timeframe). With the clarification, approximately 811,215 acres are within 1-mile of an occupied lek, representing a 42% increase in BLM-administered lands that are subject to more intensive management decisions for the protection of leks, nesting, and early brood-rearing habitat.

Distance of buffer

In the 2015 plan, fluid mineral leasing was closed within 1-mile of an active lek compared to a 0.6 mile. In coordination with CPW, the BLM increased the previous stipulation area (i.e.- 0.6-mile buffer NSO) to a 1-mile closure to provide protection for leks and nesting and early brood rearing habitat in the closest proximity to leks. The 2019 plan amended the decision from a 1-mile closure to a 1-mile NSO with a different set of waiver, exception, and modification (WEM) criteria than the rest of PHMA (also NSO) but maintained the 1-mile closure around an active lek. The 1-mile standard was subsequently incorporated into the state of Colorado oil & gas regulations (CO Code 34-60-101, 2022). The BLM will analyze the 1-mile lek buffer distance as the minimum threshold in Colorado under Alternatives 1 and 2 (No Action alternatives), and 5.

Allocations/management decisions within 1-mile buffer

The 2019 plan amended the decision from a 1-mile closure to a 1-mile NSO with a different set of WEM criteria than the rest of PHMA (also NSO). However, under the Proposed RMP Amendment, PHMA is open to fluid mineral leasing subject to NSO. WEMs will include additional criteria within 1-mile of occupied leks rather than being limited to active (CPW) leks. This clarification would allow for PHMA to remain NSO with the distinction of more intensive management within 1-mile of a lek requiring the use of one NSO stipulation.

Allocations for GHMA

In the 2015 and 2019 plans, Colorado included a NSO stipulation within 2-miles of active leks in GHMA. Because of the lek status clarification above, the BLM analyzed the change between an NSO around active leks versus occupied leks in Alternative 4. The BLM also analyzed using a Controlled Surface Use (CSU) stipulation within 2-miles of occupied leks in Alternative 5 and a CSU within 1-mile of PHMA in Alternative 6 instead of the NSO to assess the impacts of different stipulation types.

CSU stipulations are applied at the leasing phase and allow the BLM to carefully consider site-specific factors during implementation that provide the appropriate level of protection and restrictions. Common CSU measures include relocating operations by more than 200 meters (656 ft) or deferring the action for more than 60 days to avoid or minimize impacts.

Alternative 4 would increase the acreage of GHMA with NSO stipulations compared to Alternatives 1 and 2. Under Alternative 5, the same amount of acreage under major stipulation (NSO) in Alternative 4 would be under moderate stipulation (CSU). Alternative 5 would allow for more flexibility in development while maintaining the BLM's ability to apply site-specific criteria for GRSG habitat protection. Alternative 6 also analyzes CSU stipulations but would be applied in GHMA within 1 mile of PHMA. This would allow for increased flexibility while allowing the BLM to consider the indirect effects that development in GHMA may have on all PHMA, not just where leks occur.

Consistency Across Resources

The BLM analyzed use of more consistent criteria for management actions such as fluid mineral permitting and ROW authorizations. Many fluid mineral permits include both an Application for Permit to Drill (APD) and a ROW (e.g.- an access road to a well pad begins off-lease and crosses on-lease). Under the 2015 and 2019 plans, the authorization would be subject to two varying sets of siting criteria. By using consistent criteria, the BLM intends to ease plan conformance and coordination across resource uses.

Lessons Learned

The BLM is including clarifications to several management decisions because of lessons learned during implementation of the previous GRSG plans. The BLM will clarify management decisions in the Fluid Mineral and Land and Realty sections. Lessons learned primarily involve administrative clarifications and remedies and are not likely to impact GRSG habitat, other resources, or resource uses.

Table 2-7. Colorado - Additional Management Direction

Management Category	Management Direction
Mitigation	**MD XX**: When necessary, conduct effective mitigation in 1) GRSG PHMA or—less preferably—2) GHMA (dependent upon the area-specific ability to increase GRSG populations and in consultation with the State of Colorado). **MD XX**: Conduct effective compensatory mitigation first within PHMA in the same Colorado MZ where the impact is realized; if not possible, then conduct mitigation within the same population as the impact, or in other Colorado GRSG populations, in consultation with the State of Colorado.
Fluid Minerals	***Unleased Fluid Minerals*** **MD MR-1:** PHMA will be open to fluid mineral leasing subject to No Surface Occupancy (GRSG NSO-1) with waivers, exceptions, or modifications (WEMs) under conditions described in the range-wide section for WEMs. **MD MR-2:** GHMA will be open to fluid mineral leasing subject to Controlled Surface Use (GRSG CSU-1) within 1 mile of PHMA and within 1 mile of occupied leks occurring in GHMA. Waivers, exceptions, and modification could be obtained under conditions described in the range-wide section for WEMs. **GRSG CSU-1:** Apply CSU constraints on surface use, occupancy, placement of permanent tall structures, and surface-disturbing activities in GHMA within 1 mile of PHMA and within 1 mile of occupied leks occurring in GHMA that would decrease habitat availability or functionality of important seasonal habitats including breeding, nesting, or winter concentration; or that create new perching/nesting/food subsidy opportunities for avian predators. Surface use including infrastructure and surface-disturbing activities may require special design, construction, and implementation measures. The actual required measures will be based on the purpose, nature, and extent of the surface occupancy including infrastructure and total surface disturbance, the affected seasonal habitat, and the feasibility of relocating the project. A tall structure is any man-made structure that provides for perching/nesting opportunities for predators (e.g., raptors, ravens) that may naturally be absent, or that decreases the use of an area. A determination as to whether something is considered a tall structure would be made based on local conditions such as existing vegetation or topography. Examples of measures and limitations include: 1. Relocate operations beyond the standard relocation setback defined in CFR 3101.12 to areas outside of habitat, to areas of existing disturbance, or to areas where site-specific topography mitigates project impacts; 2. Defer activities beyond the standard development timeframe deferral defined in CFR 3101.12 to avoid seasonal habitat use periods; 3. Modify project design to discourage avian predator perching; 4. Limit, relocate, or collocate placement of tall structures to reduce impacts of project infrastructure; 5. Limit activity associated with construction, drilling, or completions to certain seasons or times of day; 6. Minimize noise using the best available technology to dampen or direct noise away from breeding or nesting habitat. 7. Modify access routes to avoid important areas or habitats. **MD MR-3:** In PHMA & GHMA, any new leases would include Timing Limitation stipulations (GRSG TL-1) to minimize impacts to GRSG during lekking, nesting, and early brood-rearing. The following stipulation would apply:

Management Category	Management Direction
	GRSG TL-1: No activity associated with construction, drilling, or completions within 4 miles from occupied leks during lekking, nesting, and early brood-rearing (March 1 to July 15). Authorized Officer could grant an exception, modification, or waiver in consultation with the State of Colorado. **MD MR-4:** In the PHMA with Limited Exceptions area, any new leases would include Timing Limitation stipulations (GRSG TL-2) to minimized impacts to GRSG during winter concentration. The following stipulation would apply: **GRSG TL-2:** No activity associated with construction, drilling, or completions during the winter concentration period (December 1 to March 15). The Authorized Officer could grant an exception, in consultation with the State of Colorado, if the environmental record of review shows no significant direct or indirect disturbance, displacement, or mortality of GRSG. No modifications or waivers would be authorized. **MD MR-5:** Disturbance on new leases would be limited to 3% in PHMA by each Colorado population and would be limited to an average of 1 disturbance per 640 acres calculated by Colorado MZ. The following Controlled Surface Use (GRSG CSU-2) would apply: **GRSG CSU-2**: New leases in PHMA are subject to the restrictions of 3% disturbance and an average of 1 disturbance per 640 acres calculated by each Colorado population and proposed project analysis area (Colorado MZ) to allow clustered development. **MD MR-6:** No new leasing in PHMA if disturbance cap exceeds 3% calculated by each Colorado population and proposed project analysis area (Colorado MZ) or 1 disturbance per 640 acres density is exceeded. **MD MR-7:** (PHMA) Allow geophysical exploration within PHMA to obtain information for existing federal fluid mineral leases or areas adjacent to state or fee lands within PHMA. Allow geophysical operations with the application of reasonable measures that minimize impacts to GRSG and GRSG habitat (e.g., helicopter-portable drilling, wheeled or tracked vehicles on existing roads), or other approved methods conducted and are in accordance with seasonal TLs and other applicable restrictions. Geophysical exploration shall be subject to seasonal restrictions that preclude activities in breeding, nesting, brood-rearing, and winter habitats during their season of use by GRSG. ***Leased Fluid Minerals*** **MD MR-8**: Within 1 mile of occupied leks, disturbance, disruptive activities, and occupancy are precluded. If it is determined that this restriction would render the recovery of fluid minerals infeasible or uneconomic, considering the lease as a whole, or where development of existing leases requires that disturbance density exceeds an average of 1 disturbance per 640 acres and/or the 3% disturbance cap, use the **criteria*** below to site proposed lease activities to meet GRSG habitat objectives and mitigation standard. **MD MR-9:** In PHMA and GHMA within 4 miles of an occupied lek, the **criteria*** below would be applied to guide development of the lease or unit that would result in the fewest impacts possible to GRSG. **MD MR-10:** Based on site-specific conditions, prohibit construction, drilling, and completion within PHMA and GHMA within 4 miles of an occupied lek during lekking, nesting, and early brood-rearing (March 1 to July 15). In consultation with the State of Colorado, this TL may be adjusted based on application of the criteria below.

Management Category	Management Direction
	Criteria*: 1. The location of the proposed authorization is determined to be non-habitat, lacks the ecological potential to become habitat, does not provide important connectivity between habitat areas, and the project includes design features to prevent indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function. 2. Topography/areas of non-habitat create an effective barrier to adverse impacts (e.g., protected from visual and audible disturbances to GRSG and its habitat). 3. By co-locating the proposed authorization with existing disturbance, impacts would be minimized or similar to impacts associated with the existing infrastructure. 4. The proposed location would be undertaken as an alternative to a similar action occurring on a nearby parcel (for example, due to landownership patterns), and authorizing the activity on the parcel in question would have less of an impact on GRSG or its habitat than on the nearby parcel; this criterion must also include measures sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. In addition to meeting one of the criteria above, applicable minimization measures including Disturbance Caps, Timing Limitations, Design Features, or other site-specific constraints would be included as Conditions of Approval (COAs) on the authorized activity. **MD MR-11:** If the **criteria*** above do not apply but it can be demonstrated that the direct and indirect impacts of the proposed activity would be offset through compensatory mitigation, the authorized officer may consider permitting the action. The environmental record of review must demonstrate why avoidance is not attainable. To grant the activity based on compensatory mitigation, the compensation project must be planned, funded, and approved by the operator, BLM, surface owner, in coordination with the State of Colorado prior to construction, surface occupancy, or surface disturbing activities. Applicable minimization measures including Disturbance Caps, Timing Limitations, Design Features, or other site-specific constraints would be included as Conditions of Approval (COAs) on the authorized activity. **MD MR-12:** Within PHMA, operators would be encouraged to complete Master Development Plans in consultation with the State of Colorado, instead of single-well Applications for Permit to Drill for all but exploratory wells. **MD MR-13**: In PHMA and GHMA, require a full reclamation bond specific to the site in accordance with 43 CFR, Parts 3104.2, 3104.3, and 3104.5. Ensure bonds are sufficient for costs relative to reclamation that would result in full restoration of the lands to the condition prior to disturbance. Base the reclamation costs on the assumption that contractors for the BLM will perform the work.
Solid Minerals	**MD MR-20:** Existing nonenergy mineral leases: Apply the following conservation measures as conditions of approval (COAs) where applicable and feasible: • Preclude new surface occupancy on existing leases within 1 mile of occupied leks (Blickley et al. 2012; Harju et al. 2012). • If the lease is entirely within 1 mile of an occupied lek, require any development to be placed in the area of the lease least harmful to GRSG based on vegetation, topography, or other habitat features. • Preclude new surface disturbance on existing leases within 2 miles of occupied leks within PHMA. If the lease is entirely within 2 miles of an occupied lek, require any development to be placed in the area of the lease least harmful to GRSG based on vegetation, topography, or other habitat features. • Limit permitted disturbances to 1 disturbance per 640 acres average across the landscape in PHMA. Disturbances may

Management Category	Management Direction
	not exceed 3% in PHMA in any Colorado population and proposed project analysis area (Colorado MZ). GRSG TL-47-51 – Based on site-specific conditions, prohibit surface occupancy or disturbance within PHMA within 4 miles of an occupied lek during lekking, nesting, and early brood-rearing (March 1 to July 15).
Wind and Solar Energy Development	Manage areas within GHMA as avoidance areas for wind and solar energy testing and development (including met towers). Development could be authorized if the Authorized Officer can document that there would be no adverse impacts to GRSG, any adjacent PHMA, or important seasonal habitats in GHMA based on the **ROW Avoidance Criteria*.**
Lands and Realty	**MD LR-1:** Manage areas within PHMA as avoidance areas for major new major ROWs (linear features such as overhead transmission lines, distribution pipelines, and large non-linear surface disturbing projects (>100 kV transmission and >24" pipeline, refer to glossary) except for designated corridors, which would be open to consideration of new major ROWs in the category of ROW for which the corridor was designated. See range-wide section for Major ROW Avoidance Criteria for PHMA. **MD LR-2:** Manage areas within PHMA as avoidance areas* for minor BLM ROW permits. **MD LR-3:** Manage areas within GHMA as avoidance areas* for major (>100 kV transmission and >24" pipeline, refer to glossary) and minor BLM ROW permits, except for designated corridors which would be open to consideration of new major ROWs in the category of ROW for which the corridor was designated. **MD LR-4:** No new tall structures would be authorized within 1 mile of an occupied lek. Tall structures are defined as any man-made structure that provides for perching/nesting opportunities for predators (e.g., raptors, ravens) that may naturally be absent, or that decreases the use of an area. A determination as to whether something is considered a tall structure would be made based on local conditions such as existing vegetation or topography. Tall structures include but are not limited to: communication towers, meteorological towers, power lines, and transmission lines. Tall structures would only be authorized if it can be demonstrated that the proposed authorization would have no adverse impacts on GRSG or its habitat based on the **ROW Avoidance Criteria*** below. Additionally, if tall structures cannot be buried (i.e.- power lines), require perch deterrents. ***ROW Avoidance Criteria:** ROWs may be issued if it can be demonstrated that the proposed authorization would have no adverse impacts on GRSG or its habitat based on at least one of the following: 1. The location of the proposed authorization is determined to be non-habitat, lacks the ecological potential to become habitat, does not provide important connectivity between habitat areas, and the project includes design features to prevent indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function. 2. Topography/areas of non-habitat create an effective barrier to impacts. 3. By co-locating the proposed authorization with existing disturbance, impacts would be minimized or similar to impact associated with the existing infrastructure. 4. The proposed location would be undertaken as an alternative to a similar action occurring on a nearby parcel (for example, due to landownership patterns), and authorizing the ROW on the parcel in question would have less of an impact on GRSG or its habitat than on the nearby parcel; this criterion must also include measures sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. In addition to meeting one of the criteria above, applicable minimization measures including Disturbance Caps, Timing Limitations, Design Features, or other site-specific constraints would be included as Terms & Conditions of the ROW.

Management Category	Management Direction
	MD LR-5: If the **ROW avoidance criteria*** above do not apply but it can be demonstrated that the direct and indirect impacts of the proposed activity would be offset through compensatory mitigation, the authorized officer may consider granting a ROW. The environmental record of review must demonstrate why avoidance is not attainable. To grant a ROW based on compensatory mitigation, the compensation project must be completed prior to construction, surface occupancy, or surface disturbing activities. Applicable minimization measures including Disturbance Caps, Timing Limitations, Design Features, or other site-specific constraints would be included as Terms & Conditions of the ROW. **MD LR-6:** Any new projects within PHMA would be subject to the 3% disturbance cap. If the 3% disturbance cap is exceeded in PHMA in any Colorado MZ, no new ROW would be authorized in PHMA within that Colorado population and proposed project analysis area (Colorado MZ), unless site-specific analysis documents no impact to GRSG. Within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location. **MD LR-7:** In PHMA and GHMA, prohibit surface occupancy and surface-disturbing activities associated with BLM ROW during lekking, nesting, and early brood-rearing (March 1 to July 15). **MD LR- 8:** If the ROW authorization is the off-lease component of an action that occurs on-lease (e.g.- a road beginning off-lease that crosses on-lease would require both a ROW and subject to the conditions of the APD), ensure that the conditions for each authorization are consistent for mitigation, reclamation, and design features, as appropriate. **MD LR-9:** Construct new roads to the appropriate Gold Book standard and add the surface disturbance to the total disturbance in the PHMA. **MD LR-10**: (PHMA and GHMA) In PHMA and GHMA, for ROW renewals, where existing facilities cannot be removed, buried, or modified, require perch deterrents. **MD LR-11**: (PHMA and GHMA) Reclaim and restore ROWs considering GRSG habitat requirements. **MD LR-12**: (PHMA and GHMA) Designate new ROW corridors in GRSG PHMA or GHMA only where there is a compelling reason to do so and location of the corridor within PHMA or GHMA will not adversely affect GRSG populations due to habitat loss or disruptive activities. **MD LR-13**: (PHMA) Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in the Monitoring Framework (**Appendix 7**)−under valid existing rights prior to authorizing new projects in PHMA. **Land Tenure Adjustment** **MD LR-14:** Retain public ownership of GRSG PHMA. Consider exceptions where: It can be demonstrated that: 1) disposal of the lands, including land exchanges, will provide a net conservation gain to the GRSG; or 2) the disposal of the lands, including land exchanges, will have no direct or indirect adverse impact on GRSG conservation, there is mixed ownership, and land exchanges would allow for additional or more contiguous federal ownership patterns within the GRSG PHMA. **MD LR-15**: (PHMA) In isolated federal parcels, only allow tract disposals that are beneficial or neutral to long-term management of GRSG populations.

Management Category	Management Direction
	MD LR-16: (GHMA) For lands in GHMA that are identified for disposal, the BLM would only dispose of such lands consistent with the goals and objectives of this ARMPA, including, but not limited to, the ARMPA objective to maintain or increase GRSG abundance and distribution. **MD LR-17**: (ADH) Consider GRSG habitat values in acquisitions. For example: Identify key GRSG habitats on private or state land, adjacent to existing BLM land, where acquisition and protection by BLM could substantially benefit the local GRSG population. This could be accomplished via purchase, exchange, or donation to satisfy mitigation requirements.

Idaho

The Proposed RMP Amendment includes State specific management direction to respond to locally relevant habitat variability and circumstances, consistent with the purpose and need. State specific management direction for the State of Idaho include 1) management of saleable minerals/mineral materials – specifically consideration of new free use pits in PHMA, 2) application and use of lek buffers (with buffer distances the same as the 2015 Plan; see **Appendix 19** for analysis), and 3) application of renewable energy management to nuclear and hydropower developments in addition to wind and solar.

For consistency with the Proposed RMP Amendment goals and objectives for GRSG, allocations under MD RE-1 would be exclusion in PHMA, avoidance in IHMA, and open in GHMA, as in the 2015 Plan. References to wind and solar development under MD RE-1 were removed for consistency with the rangewide direction for wind/solar development.

The BLM also clarified existing management decisions (MDs) and Special Status Species (SSS) direction to align with the rangewide management direction in the Proposed RMP Amendment. Note that appendices referenced under MD SSS refer to appendices from the 2015 Plan, or, as for Appendix B Buffers, the proposed updates to Appendix B described below under Lek Buffers.

- *Updating terms*. In the Proposed RMP Amendment, the following terms would be replaced under MDs SSS 4, 5, 6, 13, 14, 22, and 30:
  - Trigger with threshold
  - Conservation Area with Neighborhood Lek Cluster for adaptive management
  - Conservation Areas with Fine-scale HAF for disturbance cap
  - Conservation Areas with area for prioritization of restoration and mitigation
  - Key habitat with habitat
  - Remove Biologically Significant Unit (BSU) baseline map
- *Remove obsolete management decisions* (MDs). Currently, Idaho updates key habitat maps annually which are used in disturbance cap calculations. The Proposed RMP Amendment describes a different approach to disturbance cap calculations which will make the following MDs related to key habitat obsolete: MD SSS 8, 41, and 42.
- *Update management decisions to align with the Proposed RMP Amendment*, including new terms and goals and objectives: MD SSS 1, 2, 29, 32, and 44. Under MD SSS 1, references to Conservation Areas were removed and terms related to adaptive management updated. In MD SSS 2, HMA definitions were updated for consistency with the Proposed RMP Amendment and references removed to Conservation Areas. Under MD SSS 29, direction was updated to align with adaptive management thresholds under the Proposed RMP Amendment and co-location language for major ROWs under the Proposed RMP Amendment. For MD SSS 32, text was retained from the 2015 Plan to align with the Proposed RMP Amendment's goals and objectives for GRSG; including Appendix C: RDFs from the 2015 Plan. Under MD SSS 44, language was updated to reflect the interagency Memorandum of Understanding (MOU) that was signed in 2022, which made Appendix K obsolete.

Table 2-8. Idaho - Additional Management Direction

Management Category	Management Direction
Utility Scale Wind	**IHMA –** Avoidance, subject to Anthropogenic Disturbance Development Criteria (MD SSS 30), including RDFs and buffers.
Utility Scale Solar	**IHMA –** Avoidance, subject to Anthropogenic Disturbance Development Criteria (MD SSS 30), including RDFs and buffers.
Fluid Minerals	**IHMA -** Open to leasing subject to no surface occupancy (NSO) – waivers, exceptions, modifications for new leases. Same as described under PHMA direction above (except Anthropogenic Disturbance Development Criteria MD SSS 30 instead of MD SSS 29 for PHMA).
Nonenergy Leasable Minerals	**IHMA** - Open in Known Phosphate Leasing Areas (KPLAs) subject to RDFs and buffers. Outside KPLAs, open subject to disturbance thresholds, RDFs and buffers.
Major Rights-of-Way	**IHMA –** Avoidance, subject to Anthropogenic Disturbance Development Criteria (MD SSS 30), including RDFs and buffers.
Minor Rights-of-Way	**IHMA** – Avoidance, subject to RDFs and buffers.
Livestock Grazing	**IHMA** – Open; same as described under PHMA direction above.
Wild Horse and Burro	**IHMA -** Same as described under PHMA direction above.
Predation	**IHMA -** Same as described under PHMA direction above.
Habitat Objectives	**IHMA –** Same as described under PHMA direction above.
Mitigation	**IHMA -** Same as described under PHMA direction above.
Disturbance Cap	**IHMA –** Same as described under PHMA direction above. The disturbance cap calculation includes both PHMA and IHMA at the Fine Scale Habitat Assessment Framework (HAF).
Adaptive Management	**IHMA –** Same as described under PHMA direction above.
Non-Habitat	**IHMA –** Same as described under PHMA direction above.
Saleable Minerals/Mineral Materials	**MD MR 11:** **PHMA**—PHMA will be closed to new mineral materials development but open for new free use permits and the expansion of existing pits (within ¼ mile of existing improved roads, but not within 3.1-miles of leks, proposed disturbance of less than 40-acre if new free use pit), or if the BLM can verify the area is not habitat and the expansion would not adversely impact any adjoining seasonal habitat. **IHMA**—IHMA will be open to mineral materials development. In order to support maintenance needs for existing local roads and ensure public safety, new and expansion of existing free-use permits would be exempt from Anthropogenic Disturbance Screening and Development Criteria (MD SSS 29 in PHMA; MD SSS 30 in IHMA), but subject to RDFs and buffers. **GHMA**—GHMA will be open to mineral materials development, subject to RDFs and buffers.

Management Category	Management Direction
Renewable Energy – RE-1	**PHMA/IHMA**: PHMA would be exclusion areas and IHMA avoidance areas for nuclear and hydropower energy development. New projects for nuclear and hydropower energy development in PHMA must meet Anthropogenic Disturbance Screening and Development Criteria (MD SSS 29) and in IHMA (MD SSS 30). Infrastructure for nuclear and hydropower energy development in PHMA and IHMA could be considered only if it can be demonstrated that as proposed or conditioned, it would not impair habitat use by GRSG (as determined in coordination with the GRSG Implementation Team) and will meet that the RMP GRSG goal and habitat objective. **GHMA**: Open with minimization measures (e.g. RDFs and buffers) and compensation, to maintain habitat supporting GRSG populations consistent with state agency habitat designations (e.g., restoration, connectivity, seasonal, or other), and to preclude negative impacts to any adjacent PHMA habitats.
Special Status Species	**MD SSS 1**: The geographic basis for evaluating disturbance and density caps are calculated at the fine scale HAF units (**Figure 3.8**). For the adaptive management responses, the geographic scale is based on (**Figure 3.2**). **MD SSS 2:** Designate GRSG Habitat Management Areas: Priority, Important and General Habitat Management Areas. **Priority Habitat Management Areas (PHMA**) have the highest value to maintaining sustainable GRSG populations and include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors. PHMA focus is on areas with the highest conservation value to GRSG, based on the presence of larger leks, habitat extent and quality, and important movement and connectivity corridors and winter habitat. **Important Habitat Management Areas (IHMA)** contain additional habitat and populations that provide a management buffer for the PHMA and to connect patches of PHMA. IHMA encompasses areas of generally moderate to high conservation value habitat and/or populations but that are not as important as PHMA. **General Habitat Management Areas (GHMA)** encompass habitat that is outside of PHMA or IHMA. GHMA are generally characterized by lower quality disturbed or patchy habitat of low lek connectivity. **MD SSS 29:** Subject to valid existing rights, new anthropogenic disturbances in PHMA: Anthropogenic Disturbance Screening Criteria. In order to avoid surface-disturbing activities in PHMA, priority will be given to development of rights-of-way (ROWs), fluid minerals, and other mineral resources subject to applicable stipulations outside of PHMA. When authorizing development in PHMA, priority will be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. The following criteria must all be met in the project screening and assessment process: a. The population for Greater Sage-Grouse in the associated neighborhood lek cluster is not currently engaging in any adaptive management thresholds. This applies strictly to new authorizations; renewals and amendments of existing authorizations will not be subject to this criterion when it can be shown that long-term impacts from those renewals or amendments will be substantially the same as the existing development. b. The development with associated design features, avoidance, minimization, or compensatory mitigation actions will not result in a net loss of Greater Sage-Grouse habitat or of the respective PHMA. c. The project, its design features, avoidance and minimization actions, and associated impacts will not result in habitat fragmentation or other impacts causing a population decline in the associated neighborhood lek cluster.

Management Category	Management Direction
	d. The development cannot be reasonably accomplished outside of the PHMA and can be either: developed pursuant to a valid existing authorization or collocated within or adjacent to the footprint of existing infrastructure. For such developments, the AO may waive criteria a. listed above, if all other criteria are met. e. Development will adhere to the RDFs described in **Appendix C** and buffers (**Appendix B**). f. The project will not exceed the disturbance cap (MD SSS 27). g. Large-scale anthropogenic disturbances in PHMA will be reviewed by the GRSG Implementation Team, as described in MD SSS 44. (See the glossary for definition of large-scale anthropogenic disturbances.) **MD SSS 32:** Incorporate RDFs as described in **Appendix C** in the development of project or proposal implementation, reauthorizations or new authorizations and suppression activities, as conditions of approval (COAs) into any post-lease activities and as best management practices for locatable minerals activities, to the extent allowable by law, unless at least one of the following conditions can be demonstrated and documented in the NEPA analysis associated with the specific project: a. A specific RDF is not applicable to the site-specific conditions of the project or activity; b. A proposed design feature or BMP is determined to provide equal or better protection for GRSG or its habitat; or c. Analysis concludes that following a specific RDF will provide no more protection to GRSG or its habitat than not following it, for the project being proposed. **MD SSS 44:** In collaboration with the Idaho Governor's Office of Species Conservation, Idaho Department of Fish and Game, Idaho Department of Lands, Idaho Governor's Office of Energy and Mineral Resources, US Fish and Wildlife Service, US Forest Service, and Natural Resource Conservation Services, the BLM will form and maintain an interagency Idaho Greater Sage-grouse Implementation Team, consisting of two teams (a technical and a policy team) through a memorandum of understanding. These teams will be responsible for reviewing proposed infrastructure developments, proposed exceptions and variances, adaptive management thresholds and responses, habitat management area adjustments, and mitigation. The technical team will make recommendations to the policy team comprised of agency decision-makers who provide information for decision-making by the Authorized Officer.
Lek Buffers	**Applying Lek Buffer-Distances When Approving Actions** **Buffer Distances and Evaluation of Impact on Leks** Evaluate impacts to active and pending active leks (Cook, et al. 2022; **Appendix 4**) within HMA from actions requiring NEPA analysis. In addition to any other relevant information determined to be appropriate (e.g. State wildlife agency plans), the BLM will assess and address impacts from the following activities using the lek buffer-distances as identified in the USGS Report, *Conservation Buffer Distance Estimates for Greater Sage-Grouse - A Review* (Manier et al. 2014). The BLM will apply the lek buffer-distances specified as the lower end of the interpreted range in the report unless justifiable departures are determined to be appropriate (see below). The lower end of the interpreted range of the lek buffer-distances is as follows:

Management Category	Management Direction
	• Linear features (roads)[2] within 3.1 miles of leks • Infrastructure related to energy development within 3.1 miles of leks. • Tall structures (e.g., communication or transmission towers, transmission lines) within 2 miles of leks. • Low structures (e.g., fences, rangeland structures) within1.2 miles of leks. • Surface disturbance (continuing human activities that alter or remove the natural vegetation) within 3.1 miles of leks. • Noise and related disruptive activities including those that do not result in habitat loss (e.g., motorized recreational events) at least 0.25 miles from leks. Justifiable departures to decrease or increase from these distances, based on local data, best available science, landscape features, and other existing protections (e.g., land use allocations, state regulations) may be appropriate for determining activity impacts. The USGS report recognized "that because of variation in populations, habitats, development patterns, social context, and other factors, for a particular disturbance type, there is no single distance that is an appropriate buffer for all populations and habitats across the sage-grouse range". The USGS report also states that "various protection measures have been developed and implemented… [which have] the ability (alone or in concert with others) to protect important habitats, sustain populations, and support multiple-use demands for public lands". All variations in lek buffer-distances will require appropriate analysis and disclosure as part of activity authorization. In determining lek locations, the BLM will use the most recent lek data available from the state wildlife agency. **For Actions in GHMA** • The BLM will apply the lek buffer-distances identified above as required conservation measures to fully address the impacts to leks as identified in the NEPA analysis. Impacts should first be avoided by locating the action outside of the applicable lek buffer – distance(s) identified above. • The BLM may approve actions in GHMA that are within the applicable lek buffer distance identified above only if: – Impacts should first be avoided by locating the action outside of the applicable lek buffer-distance(s) identified above. – If it is not possible to relocate the project outside of the applicable lek buffer-distance(s) identified above, the BLM may approve the project only if: o Based on best available science, landscape features, and other existing protections, (e.g., land use allocations, state regulations), the BLM determines that a lek buffer-distance other than the applicable distance identified above offers the same or a greater level of protection to GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area; **or** o The BLM determines that impacts to GRSG and its habitat are minimized such that the project will cause minor or no new disturbance (ex. co-location with existing authorizations); **and** o Any residual impacts within the lek buffer-distances are addressed through compensatory mitigation measures sufficient to ensure a net conservation gain, as outlined in the Mitigation Strategy (Appendix J).

[2] Roads are linear routes declared as a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use. Roads do not include trails, primitive roads, temporary routes, or administrative routes with maintenance intensity of 0 or 1 (2015 ARMPA ROD).

Management Category	Management Direction
	For Actions in PHMA and IHMA • The BLM will apply the lek buffer-distances identified above as required conservation measures to fully address the impacts to leks as identified in the NEPA analysis. Impacts should be avoided by locating the action outside of the applicable lek buffer-distance(s) identified above. • The BLM may approve actions in PHMA and IMHA that are within the applicable lek buffer distance identified above only if with input from state fish and wildlife agency, it determines, based on best available science, landscape features, and other existing protections, that a buffer distance other than identified above offers the same or greater level of protection for GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area. • Range improvements which do not impact GRSG, or, range improvements which provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats, meet the lek buffer requirement. The BLM will explain its justification for determining the approved buffer distances meet these conditions in its project decision. (Refer to **Appendix 19**.)

Montana/Dakotas

The Proposed RMP Amendment includes State specific management direction to respond to locally relevant habitat variability and circumstances, consistent with the purpose and need. GRSG in Montana range across most of the state, with about 1,000 confirmed active sage-grouse leks. GRSG in North and South Dakota have limited distributions and small population sizes. These differences resulted in variable factors being considered for identifying HMAs (in cooperation with state natural resource entities) (see **Appendix 3**, GRSG HMA State-by-State Mapping Strategies). Factors include differences in the amount of the population in GHMA, HMAs to address different seasonal movement strategies, and addressing cross-state populations. These differences also require consideration of different management approaches at a local level (state specific circumstances) in contrast to rangewide approaches (cross-cutting issues) considered in this Proposed RMPA/Final EIS.

GRSG planning efforts completed in 2015 were initiated while plan revisions were ongoing for multiple other plans in the region. The 2015 effort resulted in updated GRSG management in seven plans. However, the Butte Field Office (BFO) and the Upper Missouri River Breaks National Monument (UMRBNM) were not included due to minor amounts of habitat (BFO) and protections provided by inclusion of GRSG as an object and value of the UMRBNM proclamation. Subsequently, the Lewistown Field Office completed a plan revision in 2021, and the North Dakota Field Office is currently undergoing a plan revision. Montana-Dakotas BLM offices were not part of the GRSG plan amendments completed in 2019.

While concepts and approaches are generally consistent between the plans, separate planning efforts resulted both wording and management action inconsistencies. State-specific circumstances address: 1) measures to improve consistency between the nine Field Offices (RMPs) for sage-grouse management; 2) incorporating unique circumstances of peripheral populations and accounting for the higher proportion of sage-grouse leks found in GHMA in Montana; and 3) applying 2021 Plan Evaluation recommendations and lessons learned from implementation of the 2015 plans.

Increasing Consistency between Montana-Dakotas BLM Plans and State Conservation Approaches

The BLM's review of the seven Montana-Dakotas plans included in the 2015 planning effort identified varying management recommendations. While some of these differences are simply minor wording differences, other inconsistencies include the omission or inclusion of actions not included in neighboring plans. These differences also include numerous stipulations for oil and gas leasing in HMAs and occupied GRSG habitat. Among offices, there are varying objectives for GRSG management under the sensitive status species sections or may contain objectives listed as management action in different plans. Furthermore, the BLM identified differences in buffer distances for ROW avoidance around leks, variation in protections for winter range, and several other differences in management among HMAs between offices.

The BLM examined these inconsistencies to determine if they are justified using the following criteria: 1) Biological circumstances between offices that warrant distinction; 2) Wording differences that create inconsistent interpretation and management; 3) Whether specific management objectives and actions were needed within BFO and the UMRBNM, and; 4) Relationships with the state GRSG conservation plans from North Dakota, South Dakota, and Montana.

The action alternatives below strive to provide better consistency among BLM offices and partner natural resource entities. They are intended to provide clear and consistent direction to applicants and partners for cross-office boundary projects and simplify the coordination among field offices. Other potential changes

including monitoring, adaptive management, and implementation tracking would be streamlined to increase internal efficiencies and improve coordination with partners.

Addressing Variations in HMAs and Peripheral Populations

In Montana, general habitat, and BLM GHMA, contains a larger proportion of leks relative to these habitat types than many other states (see **Appendix 3**, GRSG HMA State-by-State Mapping Strategies). To meet objectives for GRSG and be more consistent with state management approaches, more restrictive GHMA management is presented for some resources in the alternatives below. The Montana-Dakotas BLM is considering crucial winter range in stipulations and maintains lek-based buffers for ROWs in GHMA (including utility scale renewable energy projects). Peripheral populations present unique challenges to management approaches. The population spanning the Montana and North Dakota Border (Cedar Creek Anticline area) has specific objectives considered to address ongoing development in the area, restoration needs, and cross-state and cross organizational GRSG management in this mixed-ownership area. In Montana, this area is considered as an RHMA in most alternatives to reflect the desire for long-term restoration. In North Dakota, GRSG range is PHMA, but specific objectives and management are considered to address restoration and habitat enhancement, including protecting historical leks (those active in 2010) similar to currently active leks. This is intended to conserve the landscape to provide opportunities for restoration. GRSG in northern Montana and Canada exhibit unique migratory behavior, moving from breeding habitat in silver sage communities to winter south in Wyoming Big Sagebrush dominated communities. To capture these migratory pathways and protect stopover sites the BLM identified connectivity areas, called CHMA, based on the State of Montana connectivity areas (see **Appendix 3**, GRSG HMA State-by-State Mapping Strategies). While the revised GRSG HMAs in the action alternatives and the Pryor Mountain Wild Horse Range overlap by just over 300 acres in the Billings Field Office, GRSG and wild horse use do not overlap due to physical barriers. Therefore, this topic is not addressed in detail.

2015 Plan Evaluations and Lessons Learned

Implementation of the 2015 plans (including 2021 plan evaluations) has identified areas of potential misunderstanding that are included as cross cutting issues in alternatives in this EIS. The BLM Montana-Dakotas also identified opportunities, unique to the region, including cross-boundary coordination with other natural-resource management entities. Additionally, new local and rangewide research provides updated information to consider for GRSG management action adjustments. As a result, the state-specific alternative below incorporates the following new information. The Dillon FO was previously included in a combined Idaho-SW Montana amendment. However, that amendment included management unique to Idaho, but not applicable in Montana including Wild Horse and Burro management, use of the Fire and Invasives Assessment Tool, and incorporation of Key Habitat references. The Montana-Dakotas BLM also considers options to remove the distinction between major and minor rights of way, both for consistency with state management and to address specific impacts of the proposed disturbance or disruption of ROW actions relative to GRSG. Lastly, the revised guidance on conservation buffer distances, project screens, and design features identified in the Proposed RMP Amendment provides a common approach for analyzing different program and project types that result in similar impacts.

Table 2-9. Montana/Dakotas - Additional Management Direction

Management Category	Management Direction
Special Status Species: GRSG	Apply the range wide GRSG goal, Habitat Objectives, etc. In addition, retain existing goals and objectives, but edit or add to ensure the following direction is contained: **Goal (Unique HMAs):** Maintain sagebrush communities while taking strategic opportunities to expand GRSG habitat through habitat treatment and reclamation actions that remove the primary threats found on BLM managed surface acres (e.g., conifer encroachment, infrastructure, etc.) to allow for longer-term GRSG habitat enhancement. **Objective:** Maintain, improve, and restore sagebrush habitats to increase habitat availability and quality for GRSG, sagebrush obligates and other sagebrush dependent species. **Objective**: Manage GRSG through collaborative, coordinated efforts that utilize cooperative planning and implement and monitor activities to achieve desired conditions and to maximize the utilization of available funding opportunities. Coordination efforts can include: adjacent landowners, federal and state agencies, local governments, tribes, communities, other agencies, nongovernmental organizations, and other interested parties/stakeholders. **All HMAs MA**: Greater sage-grouse management will be consistent with current adopted BLM conservation strategies, will utilize GRSG conservation plans, as revised or updated, from partners such as WAFWA (e.g., Sagebrush conservation strategy; Remington et al. 2021), USFWS (e.g., Greater Sage-grouse (*Centrocercus urophasianus*) Conservation Objectives: Final Report; USFWS 2013), and state wildlife or habitat management agency action, management, or conservation plans (e.g., MT EO 2015, MT SGWG 2005, SD GF&P 2022, ND G&F 2014), and the best available science. **PHMA, LMHMA, SCHMA MA:** Geophysical exploration is allowed in unleased areas provided the work can be accomplished without temporary or new road construction, avoiding surface disturbing or disruptive activities, and the project is in accordance with seasonal timing and other restrictions that may apply**.** **All HMAs MA**: Compensatory mitigation will initially employ a net conservation gain standard. The BLM may create mitigation strategies at the state or other applicable geographies when warranted based on habitat condition or anticipate land uses. These strategies will consider mitigation measures and approaches, sites for mitigation, alternative mitigation standards, and other factors as appropriate (see BLM Handbook H-1794-1 Chapter 4). **All HMAs MA**: Assess and modify as needed water features to reduce the risk of potential impacts from West Nile Virus or other disease outbreaks (see RDF/BMP appendix from each RMP).
Sensitive Status Species: Surface disturbing activities in GRSG habitat	**Objective**: Limit overall surface disturbance and disruption that impacts Greater Sage-grouse habitat through factors such as the reduction, co-location, and siting of activities and uses, and the restoration and enhancement of habitat. Actions in HMAs should be neutral or beneficial to sage-grouse. **Management Action (all HMAs):** For all activities, in undertaking BLM management actions and consistent with valid and existing rights and applicable law in authorizing actions, the BLM will assess impacts to seasonal habitat and important areas for connectivity (i.e., areas needed to provide and maintain functional dispersal and genetic movement) and apply conservation measures (applicable BMPs, design features, and COAs; contained in applicable appendices in existing plans) and the mitigation hierarchy to achieve GRSG objectives. In addition, for GRSG, limitations on surface disturbing and disruptive activities include a 0.6-mile exclusion from leks in PHMA, and for all HMAs timing limitations of December 1 through March 15 in winter range and March 15 - July 15 in breeding and nesting habitats. Timing limitations will be assessed and applied as needed for construction and/or operations and maintenance activities.

Management Category	Management Direction
	Management Action (all HMAs): The BLM will take a consistent approach towards evaluating projects among programs falling in HMAs, through utilizing all GRSG management approaches, as applicable for HMA type, such as allocations, disturbance calculations, population and habitat adaptive management thresholds, mitigation practices, habitat objectives, and the variance/exception approaches contained therein. For evaluations of projects in areas with restricted allocations (i.e., exceptions, avoidance, open with RFDs, etc.) approval of the project requires analysis and/or justification that processes and approaches have been met/followed, and that the proposed action satisfies GRSG goals and objectives.
GRSG Unique HMAs: LMHMA and SCHMA Objectives and Management	**Objective 1:** Develop and implement an area-wide habitat management plan. The plan will identify opportunities, including short term actions that can reduce disturbance and threats to sage-grouse (conifer encroachment, duplicative roads, infrastructure removal, etc.), habitat treatments (areas to increase sagebrush cover and understory plants), and longer-term actions to put in place as development is completed. **Objective 2:** Manage for no net loss of sagebrush habitat, subject to valid existing rights, and maintained connectivity. **Objective 3:** Strategically target treatments, as possible with partners across jurisdictions, in disturbed landscapes in a manner which increases or improves the quality and quantity of GRSG habitat. **MA SSS-X (LMHMA in North Dakota)**: Develop a MOU and/or restoration plan between interested partners such as the Forest Service, State of North Dakota USFWS, NRCS and other conservation partners and adjacent states (Montana, South Dakota) to establish a cooperative approach regarding implementation of sage-grouse conservation measures, proposed management changes, mitigation, site-specific monitoring, adaptive management, and addressing threats to GRSG. The MOU/plan will identify responsibilities, roles and interaction to maximize the party's individual conservation efforts. **MA SSS-Y (LMHMA and SCHMA**): Manage as GHMA for adaptive management. Disturbance cap will not apply in Montana (calculations can be used for tracking Objectives), however BLM will still require project proponents to submit projects to the state that fall in core areas, and the BLM will consider state findings and recommendations in decisions. **Allocation summary:** Fluid Minerals (O&G and Geothermal): • LMHMA (MT Only): No NSO in LMHMA, specific CSU applied (Refer to **Appendix 16**: Montana/Dakotas Oil and Gas Lease Stipulations for full list of stipulations.) • SCHMA and LMHMA (North Dakota) would be the same NSO as PHMA (Refer to **Appendix 16**: Montana/Dakotas Oil and Gas Lease Stipulations for full list of stipulations.) Utility Scale Solar and Wind: • Exclusion (same as PHMA) ROWs (allocations same as PHMA): • Exclusion: o Surface disturbing or disruptive activities within 1km (0.6 miles) of active leks o Crucial winter range • Avoidance o In existing corridors or ROWs o Remainder of HMA

Management Category	Management Direction
	○ Avoidance criteria differs from PHMA, instead must be consistent with HMA objectives (emphasis on collocation). Nonenergy leasable minerals: • Closed (same as PHMA) Saleable minerals: • Primarily Closed (same as PHMA) Locatable minerals: • Same as PHMA Coal: • Same as PHMA
GRSG Unique HMAs: CHMA Objectives and Management	**Objective 1**: Maintain connectivity (e.g. stopover sites) and manage to facilitate the movement of GRSG, particularly between silver sagebrush and big sagebrush habitats **Objective 2:** Strategically target treatments, as possible with partners across jurisdictions, in disturbed landscapes in a manner which increases or improves the quality and quantity of GRSG habitat. **MA SSS-X (CHMA)**: Manage/consider as GHMA for range wide GRSG monitoring and implementation actions and requirements (e.g., adaptive management, non-habitat, criteria, habitat objectives, etc.). **Allocation summary:** Fluid Minerals (O&G and Geothermal): • Open with CSU (Refer to **Appendix 16**: Montana/Dakotas Oil and Gas Lease Stipulations for full list of stipulations.) Utility Scale Solar and Wind (same as GHMA): • Exclusion ○ Within 3.3 km (2 miles) of active leks • Avoidance ○ Rest of CHMA ROWs (same as GHMA): • Avoidance ○ Within 2 km (1.2 miles) of active leks • Open, subject to GRSG LUP objectives ○ >1.2 miles from active leks Nonenergy leasable minerals (same as GHMA): • Open Saleable minerals (same as GHMA): • Open Locatable minerals (same as GHMA): • Not withdrawn

Management Category	Management Direction
	Coal • Same as GHMA
Vegetation	**Retain existing objectives and management actions, but edit or add to ensure the following direction is contained:** **VEG OBJ-X (PHMA):** The desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush canopy cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6). **VEG OBJ-Y (PHMA)**: Make re-establishment of sagebrush cover and desirable understory plants (relative to ecological site potential) a high priority for restoration efforts in PHMA. Prioritize areas for conifer removal to benefit GRSG habitat. **VEG MA-A (All HMAs)**: Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal and cultural values, as well as other key resources (e.g., other SSS, including T&E, species, soils, etc.). Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where encroachment is phase 1 or phase 2. Use of site-specific analysis and tools will help refine the location for specific areas to be treated. **VEG MA-B (All HMAs)**: Restore, convert, or diversify areas with where crested wheatgrass is limiting habitat value. Prioritize treatments within occupied areas and near leks. Use of site-specific analysis and tools will be used to refine the location for specific areas to be treated. **VEG MA-X (PHMA)**: Treatments that conserve, enhance or restore Greater Sage-Grouse habitat will be allowed as well as treatments that benefit other resources and do not adversely affect sage-grouse or their habitat

Rights-of-Way	**PHMA, LMHMA, and SCHMA:**
	• Exclusion:
	  ○ Surface disturbing or disruptive activities within 1km (0.6 miles) of active leks
	  ○ Crucial winter range
	• Avoidance
	  ○ In existing corridors or ROWs
	  ○ Rest of PHMA, LMHMA, and SCHMA
	GHMA and CHMA:
	• Avoidance
	  ○ Within 2 km (1.2 miles) of active leks
	  ○ Crucial winter range
	• Open, subject to GRSG LUP objectives
	  ○ >1.2 miles from active leks
	• Corridors
	  ○ Utilizing designated/existing corridors is preferable, especially when meeting the collocation desire for activity/disturbance in GRSG habitat.

Management Category	Management Direction
ROW Avoidance Criteria	Major ROWs are linear features such as overhead transmission lines, distribution pipelines, and large non-linear surface disturbing projects, refer to glossary. If during consideration of a proposed ROW action (project level authorization) the determination of whether it is a major or minor ROW is questioned with supporting rationale, the Authorized Officer (AO), in consultation with the State Office lead(s), will make the final determination. **Major Rights of Way Avoidance Criteria in PHMA:** Authorizations for major ROWs may be granted for projects that are neutral or beneficial to GRSG. Applications and the environmental analysis must clearly demonstrate to the Authorized Officer (AO) and State Sage-grouse lead that the avoidance measure has been met. Projects may reach this measure if at least one of the criteria below and the additional conditions are met. 1) The project is neutral or beneficial to GRSG habitat through application of avoidance and minimization measures (including collocation) described in the mitigation hierarchy (i.e., does not require compensatory mitigation). 2) The ROW can be routed through, or located within, non-habitat, per the Criteria Based Management for Non-Habitat (refer to **Table 2-3**). 3) The ROW must be the minimum necessary to achieve the ROW's purpose and would not otherwise be feasible in an area that is "open" to ROWs (including existing corridors and ROWs). Analysis must also justify placement in areas within Iek buffer distances (e.g., Manier et al 2014) and that that no reasonable alternatives exist for collocation or placement of facilities outside the avoidance area. 4) The proposed location on public lands would be undertaken as an alternative to a similar action occurring on a nearby non-public lands parcel (for example, due to landownership patterns), and development on the public parcel in question would eliminate impacts on more important and/or limited GRSG habitat (e.g., wet meadows, brood-rearing habitat, etc.) on the non-public nearby parcel. If one or multiple of the avoidance criteria can be met, the ROW must also meet the following conditions in order to be permitted in PHMA: a. Micro-siting while developing the major ROW is required to limit impacts and maintain connectivity corridors between seasonal habitats. This includes using topography and non-habitat as effective barrier to adverse impacts and collocation with existing, similarly sized, infrastructure. b. Development of the major ROW includes applicable measures and additional required GRSG management (e.g., disturbance cap, mitigation hierarchy, RDFs, etc.) **Rights of Way Avoidance Criteria for Minor ROWs in PHMA, and Major and Minor ROWs in LMHMA, SCHMA, GHMA and CHMA** Authorizations for ROWs may be granted for projects that are neutral or beneficial to GRSG. Applications and the environmental analysis must clearly demonstrate to the Authorized Officer (AO) that the avoidance measure has been met. Projects may reach this measure if at least one of the criteria below are met and development of the ROW includes applicable measures and additional required GRSG management (e.g., disturbance cap, predation, mitigation hierarchy, RDFs, etc.):

Management Category	Management Direction
	1) The project is neutral or beneficial to GRSG habitat through application of avoidance and minimization measures (including collocation) described in the mitigation hierarchy (i.e., does not require compensatory mitigation). 2) The project can be collocated with an existing ROW and the new disturbance results in minimal impacts to those already associated with the existing infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats. 3) The ROW can be routed through, or located within, non-habitat, per the Criteria Based Management for Non-Habitat (refer to **Table 2-3**). 4) The ROW can be routed through, or located within, unsuitable habitat (as determined by a qualified biologist and confirmed by the BLM using criteria such as the Habitat Assessment Framework and coordinated with State wildlife agencies and other appropriate state authority) and lacks the ecological potential to become suitable habitat. ROWS shall not disrupt connectivity between habitat areas and should be designed to prevent indirect disturbance to or disruption of adjacent seasonal habitats (as disclosed in the environmental analysis). 5) The ROW would not otherwise be feasible in an area that is "open" to ROWs (including existing corridors or ROWs) and in areas outside lek buffer distances (e.g., Manier et al 2014). 6) Environmental analysis demonstrates the proposed location on public lands would be undertaken as an alternative to a similar action occurring on a nearby parcel (for example, due to landownership patterns), and development on the public parcel in question would be less impactful on GRSG habitat.
Saleable Minerals/Mineral Materials	**PHMA and PHMA LE:** Closed to new large-scale mineral material sales. Open to consideration of small-scale disposal actions (e.g., less than 20 cubic yards), free use permits, and expansion of existing pits (see also Criteria Based Management for Non-Habitat). Projects must be within 1/4 mile of an existing improved road, farther than 0.6 miles from leks, be less than 40 acres of surface disturbance, and meet the below criteria: 1) The proposed project adheres to GRSG seasonal timing restrictions. Exceptions to timing limitations may be considered on a case-by-case basis by the authorized officer and granted based on review and documenting adherence to one of the following criteria: a. The geographic and temporal conditions demonstrate that topography or other factors eliminate impacts to GRGS, or local variations indicate seasonal life cycle periods are different then the defined breeding and winter use periods. b. The project is needed to address an immediate public health and safety concern in a timely manner 2) Analysis documents the project meets the limitations to surface disturbing and disruptive activities (e.g., assessment of lek buffers, noise limitations, reclamation, disturbance caps, etc.)

Management Category	Management Direction
Disturbance	PHMA (MT and SD) and LMHMA (ND only): MT/Dak will utilize two approaches/caps at the project scale, a 3% cap following the range wide approach (refer to **Table 2-3**) and a 5% cap, including fire and agriculture. The 3% fine scale HAF cap will also apply. The following specific modifications apply: 1. For the 3% project scale cap, the BLM may also include additional energy, mining, and infrastructure disturbances (e.g., subdivisions) in the numerator to provide consistency with state approaches (i.e., the Disturbance Density Calculation Tool (DDCT) run by the MT HCP). The 3% cap would not include fire and agriculture. 2. Include at the HAF Fine scale the range wide disturbances (see **Table 2-3**) and the same additional energy, mining, and infrastructure disturbances as at the project scale (e.g., the DDCT measures and additional infrastructure identified with state entities) 3. The BLM will use the 5% project scale cap, with disturbances associated with Montana's Disturbance Density Calculation Tool (DDCT) approaches (e.g., wildfire and agricultural, and infrastructure such as subdivisions and urban) in the numerator. 4. Exception approach for the 5% cap: For project level analyses where the anthropogenic disturbance does not exceed the 3% cap, but the inclusion of fire and ag causes the disturbance to exceed 5%, the BLM may consider an exception, if analysis demonstrate that the proposed activities will not cause declines in sage grouse populations in the applicable PHMA (considering the project analysis area, neighborhood clusters, fine scale HAF, etc. as appropriate). Prior to granting the exception the Authorized Officer must provide an opportunity for input from the state fish and wildlife agency (and others as applicable) and the United States Fish and Wildlife Service (and other federal entities connected to the project), consider the distribution and extent of fire and agriculture surrounding the project, and justify how allowing an exception for the project meets the goals and objectives for GRSG management. In Montana, proposals to utilize an exception from the 5% disturbance cap will consider analysis by the Montana Habitat Conservation Program (with any additional feedback provide by MSGOT review).
Minerals	**Retain existing objectives and management actions, but edit or add to ensure the following direction is contained:** **All HMAs:** Where the federal government owns the mineral estate in GRSG HMAs, and the surface is in nonfederal ownership, the federal government will apply the same stipulations, Conditions of Approval (COAs), and/or conservation measures and mineral RDFs if the mineral estate is developed on BLM administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. Where the federal government owns the surface and the mineral estate is in non-federal ownership in GRSG HMAs, the federal government will apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.

Management Category	Management Direction
Fire and Fuels	**Retain existing objectives and management actions, but edit or add to ensure the following direction is contained:** **All HMAs:** If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address: • why alternative techniques were not selected as a viable options; • how GRSG goals and objectives will be met by its use; • how the COT Report objectives will be addressed and met; • a risk assessment to address how potential threats to GRSG habitat will be minimized Prescribed fire as vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect GRSG habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.
Dillon FO Objectives and Management Direction	Fire and Invasives Tool (FIAT): MDs including SSS MD 5, 6, 37; VEG Objective 2, VEG MD 2, 8, and 9; and MD FIRE 3, 5, 7, 9-13, 20, 21, 32, and 33 are removed or modified to clarify the FIAT does not apply to SW Montana. Key Habitat References: MDs including SSS MD 8, 9, 13, 16-18, 29, 30, 41, and 42 are removed to eliminate key habitat management actions for Dillon (key habitat is an Idaho specific process). Wild Horse and Burro Section is removed to clarify these only apply to WH&B's in Idaho, as there are no WH&B HMAs in Dillon.

Nevada/California

The Proposed RMP Amendment includes State specific management direction to respond to locally relevant habitat variability and circumstances, consistent with the purpose and need. As described in **Appendix 3** (GRSG HMA State-by-State Mapping Strategies) Nevada/California developed their HMAs using a habitat prioritization model based on an intersection of seasonal habitat selection patterns and indices of space use to prioritize areas with varied relevance to GRSG. This model was initially developed by the U.S. Geological Survey (USGS) for 2015 and is periodically updated with additional field data and advances in mapping products. An update of this model provided the base for HMA delineation in the 2019 planning effort. The model was again updated to incorporate GRSG survival metrics, which allow for the identification of population source areas. After using unpublished draft data from USGS that reflected the best available science at the time of Draft RMPA/EIS publication, the BLM has updated HMAs to reflect the Final USGS HMA model published in early 2024 (see detailed summary in **Appendix 3**, GRSG HMA State-by-State Mapping Strategies).

The identification of source areas is unique to the States of Nevada and California, and the alternatives consider this data in both HMA identification and several management actions within this document. The role wildfire and invasive grasses play in the health of GRSG habitat in Nevada and California resulted in considering adjustments to several management actions focused on addressing these threats compared to the 2015 and 2019 decisions. Decisions being considered for amendment for these states are development of nonenergy leasable minerals on lands where mining operations are currently authorized under 43 CFR Subpart 3715, 3802, or 3809, adjustment of allocation exception language considered in 2019, and clarification of application of perch deterrents and lek buffers to newly discovered leks. State-specific circumstances in Nevada and California also include management direction associated with habitat restoration and enhancement, predation, and utility scale solar and wind testing in OHMA.

Table 2-10. Nevada/California - Additional Management Direction

Management Category	Management Direction
MD SSS 1	In PHMAs and GHMAs, work with the proponent/applicant, whether in accordance with a valid existing right or not, and use the following screening criteria to avoid effects of the proposed human activity on GRSG: A. First priority—locate project/activity outside PHMAs and GHMAs while avoiding and/or minimizing direct and indirect impacts to GRSG and/or their habitat; B. Second priority—if the project/activity cannot be placed outside PHMAs and GHMAs, locate and adjust the project/activity to: a. avoid and/or minimize indirect impacts to lekking and source areas (e.g., PHMA+ in Milligan et al. 2024; See **Appendix 3**) by using topography and/or other available methods to negate or reduce auditory and visual intrusions; AND b. locate direct impacts (i.e., surface-disturbing activities) in non-habitat areas first, then in the least suitable habitat for GRSG without creating a barrier to movement or connectivity between GRSG seasonal habitats and populations. C. Third priority—collocate the project/activity next to or in the footprint of existing infrastructure.
MD SSS 5	In PHMA, GHMA, and OHMA, the State Director, in coordination with NDOW, SETT, and/or CDFW, may grant an exception to the allocation decisions if one of the following applies: i. The proposed activity will be authorized to address federal, state, or local government public health and safety concerns, specifically as they relate to preventing an emergency or responding to a catastrophic event such as a flood, wildfire, or earthquake. ii. The proposed activity is determined to be a routine administrative function conducted by federal, state or local governments, including renewal or reauthorization of prior existing uses, valid existing rights and existing infrastructure (i.e., rights-of-way for roads) or expansion of existing county or local government infrastructure that serves a public purpose and will have no adverse direct/indirect impacts on GRSG and its habitat, or is in compliance with BLM mitigation policy, CEQ regulations (40 CFR Part 1508.1(y)) and the State's mitigation policy (NAC 232.400-480). iii. Exceptions to non-disposal or exchange of lands that are identified for retention in Appendix A, Figure 2-12 (in the 2019 NV/CA ARMPA) could be considered if (a) the lands in question are identified for disposal through previous planning efforts or address a Congressional Acts (e.g., the respective Lincoln and White Pine County Conservation, Recreation, and Development Acts) and are in conformance with State law (e.g., NAC 232.400-480), or (b) the agency can demonstrate that the disposal, including land exchanges, will have no adverse direct, indirect or cumulative impacts on GRSG and its habitat.
MD SSS (new MD)	If an Active or Pending Active lek is identified in an area outside of PHMA or GHMA lek buffer-distances will be applied as described in Appendix B (of the 2019 NV/CA ARMPA) to avoid direct and indirect impacts to lek activity and habitat. Active or Pending Active leks not included in the HMA model will be added when the model is updated.

Management Category	Management Direction
MD VEG (new MD)	Use collaborative planning efforts (e.g., Cooperative Range Improvement Agreement, Local Area Working Groups, Shared Stewardship, etc.) to develop and implement habitat restoration and enhancement projects. Projects of this type will use expertise and ideas from entities such as local landowners, local GRSG working groups, permitted land users, and other federal, state, county, and private organizations. Input from interested partners will be solicited by BLM and considered in development of restoration projects.
Objective FIRE 3	Protect post-fire treatments, source areas (e.g., see **Appendix 3**), or areas that are vulnerable to invasive annual grass conversion, including areas essential for connectivity, in PHMA first, followed by similar areas in GHMAs from subsequent wildfires. Incorporate the best available science in the prioritization of post-fire treatments.
MD FIRE (new MD)	Prioritize actions (pre-suppression, suppression, and rehabilitation) that support the persistence of GRSG source areas (e.g., see **Appendix 3**). Use the best available science (e.g., Milligan et al. 2024, Doherty et al. 2022, Ricca and Coates 2020, Stringham et al. 2016, etc.) to identify habitats essential for maintaining current GRSG populations.
MD FIRE 23	Use prescribed fire designed to reduce wildfire risk or improve GRSG habitat, only when there is no other feasible means to achieve the same or similar result. The NEPA analysis for project implementation will address: • Why alternative techniques were not selected as a viable option • How GRSG goals and objectives will be met by its use • How the COT report objectives, as updated, will be addressed and met • A risk assessment to address how potential threats to GRSG habitat will be minimized. Prescribed fire shall only be considered after the NEPA analysis for the project has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect GRSG habitat in HMAs (e.g., creation of fuel breaks, burning slash piles from conifer reduction treatments, burning high-elevation late brood-rearing habitat (e.g., restore senescent vegetation, etc.), used as a component with other treatment methods to combat annual grasses and restore native plant communities, etc.). Avoid prescribed broadcast burns in known GRSG winter habitat.
MD FIRE 25	Design fuels treatments such as, but not limited to, conifer or annual invasive grass removal through an interdisciplinary team process to expand, enhance, maintain, and protect PHMAs and GHMAs. Fuel reduction techniques, such as mechanical, chemical, and biological (including prescribed and targeted grazing) treatments and prescribed fire (see MD FIRE 23), are acceptable. Use green strips and fuel breaks, where appropriate, to protect treatment areas from subsequent fires.
MD LR 17	Within 4 miles of active and pending leks, require ROW, permit, and lease holders to retrofit those portions of power lines and other utility structures with nesting and perch-deterring devices. Do this during the renewal and amendment process. Monitor and maintain perch-deterring effectiveness through the life of the structures following guidance from scientifically accepted protocols.
MD MR 25	Manage PHMAs as closed to new nonenergy leasable mineral leasing, unless the new nonenergy leasable mineral lease meets one of the allocation exception criteria outlined in **MD SSS 5** or the new nonenergy leasable mineral has coincident occurrence within existing disturbance and is subject to a non-competitive lease. No additional direct or indirect impacts shall result from extraction of the new nonenergy leasable mineral.
Predation	Reducing predation risk will be achieved using the best available science and in accordance with key elements of the State of Nevada Greater Sage Grouse Conservation Plan (State of Nevada 2019, as amended).

Management Category	Management Direction
MD RE (new MDa)	OHMA is open for utility scale solar testing and development with applicable minimization measures, and compensatory mitigation, to maintain habitat supporting GRSG populations, and to preclude negative impacts to adjacent GHMA and PHMA habitats.
MD RE (new MDb)	OHMA is open for utility scale wind testing and development with applicable minimization measures, and compensatory mitigation, to maintain habitat supporting GRSG populations, and to preclude negative impacts to adjacent GHMA and PHMA habitats.
MD LR (new MD)	In PHMA and GHMA, existing or authorized major ROWs and associated maintenance and re-authorizations would be allowed subject to applicable management.

Oregon

The Proposed RMP Amendment includes State specific management direction to respond to locally relevant habitat variability and circumstances, consistent with the purpose and need. State specific circumstances for the State of Oregon include management of 18 Areas of Critical Environmental Concern/Research Natural Areas (ACEC/RNA) as "Key RNAs" or "Key ACECs", as well as management of saleable minerals/mineral materials in GRSG HMAs. This amendment effort is limited to RMP-level actions needed to provide guidance for subsequent implementation-level actions. The land use allocation will be identified in the ROD, but if public lands are disposed of or devoted to a public purpose which precludes livestock grazing, a site-specific NEPA and a site-specific decision process pursuant to the Taylor Grazing Act and 43 CFR 4100.4-2 is necessary to cancel permits and/or removal of livestock from these areas.

Key ACECs/RNAs

The 2015 Oregon GRSG ARMPA designated the entirety of fifteen (15) existing Areas of Critical Environmental Concern/Research Natural Areas (ACEC/RNAs) as "Key RNAs" and all of three additional ACECs as "Key ACECs" (refer to 2015 ARMPA Special Designations Objective SD 4 which is described in **Appendix 2.13**, Oregon RMPs, **Table 1**). The 2015 Oregon ARMPA also allocated all or portions of thirteen Key RNAs as unavailable to livestock grazing. During the 2019 GRSG RMP amendment process, BLM Oregon proposed and analyzed a reversal of the 2015 decision to make all or portions of the 13 key RNAs (excluding the two ACEC/RNAs allocated as unavailable to livestock grazing under the 1992 Three Rivers and 2003 Lakeview RMPs) available to livestock grazing. However, the 2019 GRSG ARMPA retained the Key RNA designations, along with the applicable Management Objectives and Management Direction (BLM OR 2019 FEIS; Pages 2-8 and 2-9). The BLM is addressing Key RNA management in this RMP Amendment, and the alternatives considered in the Draft EIS and the BLM's Proposed RMP Amendment for Key RNAs are described and analyzed in **Appendix 17**.

In 2022, ODFW informed the BLM that they were going to update core and low density HMA s. The timeline outlined by ODFW for updating and approving Core- and Low-Density areas was inconsistent with the EIS analysis process. Therefore, after coordination with the state, the BLM used ODFW's published methodology and data up through the 2022 field season to estimate likely core habitat and draft PHMA map. The mapping process became the basis for the BLM's proposed PHMA and GHMA designations in the Draft RMPA/EIS. ODFW completed their GRSG core and low-density habitat designation map update, and the Oregon Fish and Wildlife Commission approved it in December 2023, which was not in time for incorporation into the BLM's Draft EIS analysis. Oregon BLM uses the final ODFW habitat designation for PHMA and GHMA in the action alternatives and the Proposed RMP Amendment in the Proposed RMPA/Final EIS. The HMA acres identified utilizing the ODFW guidance available at the time the Draft EIS was being developed the can be found in Chapter 2, Table 2-3 of the Draft EIS. The Draft EIS can be accessed at the BLM National NEPA Register at https://eplanning.blm.gov/eplanning-ui/project/2016719/510. The HMA acres for Oregon that utilize the updated ODFW final data can be found in Chapter 2, Table 2-14. The range of variance between the acres identified between the Draft EIS and the Final EIS were within the range of alternatives analyzed in the Draft EIS.

Table 2-11. Oregon - Additional Management Direction

Management Category	Management Direction
Disturbance Cap	Same as rangewide with the following additional management direction. For all development threats, including mining, infrastructure, and energy development, implement a human disturbance cap of 3%, not to exceed a 1% increase per decade, within the Oregon priority areas of conservation [PACs]) and proposed project analysis areas, as allowed under current law.
Adaptive Management	A hard threshold is reached if the management area experiences both a soft habitat and soft population threshold.
Livestock Grazing	**Objective RM-1** Specific to GRSG habitat, manage livestock grazing in a manner that 1) meets or makes progress toward meeting the Land Health Standard for special status species, 2) avoids direct adverse impacts from livestock management range improvements in areas with limited GRSG habitat; and 3) applies the guideline that addresses "restoring, maintaining, or enhancing habitats of...special status species to promote their conservation" (43 CFR Part 4180.2(e)(9) or subsequent changes to regulations or policy).
Utility Scale Solar	PHMA buffered by 0.5 miles such that Non-Habitat within the 0.5 mile PHMA buffer would be Avoidance. GHMA is avoidance for utility scale solar testing and development. Testing and development within GHMA may only occur if the following three exception criteria are met: 1. The area is determined to be non-habitat or unsuitable, lacks the ecological potential to become marginal or suitable habitat, and does not provide important connectivity between habitat areas (as determined by a qualified biologist and confirmed by the BLM using criteria such as the Habitat Assessment Framework and coordinated with appropriate state authority) and/or topography or areas of non-habitat create an effective barrier to impacts. 2. The project should be designed to prevent indirect disturbance to or disruption of adjacent seasonal habitats. 3. Infrastructure as proposed or conditioned (including disturbance cap and mitigation requirements) would not impair habitat use by GRSG (as determined in coordination with state wildlife agency) and will meet the RMP GRSG goal and habitat objectives. **OR** 1. If co-location of the proposed authorization with existing disturbance will result in no additional impacts to those already associated with the existing major infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats. To approve an authorization based on any of the above exception criteria, after coordination with the BLM State Office and appropriate State agency, the Authorized Officer must document that the proposed action satisfies the criteria listed above. If the State agency does not concur with granting the authorization, the Authorized Officer must provide rationale for how the criteria are met considering the information the State provides.

Management Category	Management Direction
Utility Scale Wind	PHMA buffered by 0.5 miles such that Non-Habitat within the 0.5 mile PHMA buffer would be Avoidance. GHMA is avoidance for utility scale wind testing and development (including met towers). Testing and development within GHMA may only occur if the following three exception criteria are met: 1. The area is determined to be non-habitat or unsuitable, lacks the ecological potential to become marginal or suitable habitat, and does not provide important connectivity between habitat areas (as determined by a qualified biologist and confirmed by the BLM using criteria such as the Habitat Assessment Framework and coordinated with appropriate state authority) and/or topography or areas of non-habitat create an effective barrier to impacts. 2. The project should be designed to prevent indirect disturbance to or disruption of adjacent seasonal habitats. 3. Infrastructure as proposed or conditioned (including disturbance cap and mitigation requirements) would not impair habitat use by GRSG (as determined in coordination with state wildlife agency) and will meet the RMP GRSG goal and habitat objectives. **OR** 1. If co-location of the proposed authorization with existing disturbance will result in no additional impacts to those already associated with the existing major infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats. To approve an authorization based on any of the above exception criteria, after coordination with the BLM State Office and appropriate State agency, the Authorized Officer must document that the proposed action satisfies the criteria listed above. If the State agency does not concur with granting the authorization, the Authorized Officer must provide rationale for how the criteria are met considering the information the State provides.
Major ROWs	Development of major ROWs would not be allowed in breeding and nesting habitats and other limiting/high value seasonal habitats.
Minor ROWs	In GHMA and PHMA, avoidance within breeding, nesting and/or seasonal habitats, otherwise open with minimization and mitigation, if minimization actions are not adequate to offset impacts to GRSG of the minor ROW.
Fluid Minerals	PHMA No Surface Occupancy Exception 1: The authorized officer may grant an exception to a fluid mineral lease no-surface-occupancy stipulation only where the proposed action is beyond 3.1 miles of active/pending active leks and: i. Would not have direct, indirect, or cumulative effects on Greater Sage-grouse or its habitat; or ii. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel and would provide a clear conservation gain to GRSG. Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than 50% of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP amendment. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts.

Management Category	Management Direction
	Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event their finding is not unanimous, the Authorized Officer must provide rationale for how the criteria are met considering the information the State and USFWS provides. Prior to granting an exception to an NSO stipulation, the potential exception shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process) and all exceptions granted would be tracked in a public place and the exception tracker would be consulted when exceptions are being considered. If the area associated with the proposed development seeking the exception (e.g., well pad, compressor station, etc.) is in an area (neighborhood lek cluster or as appropriate an alternative adaptive management unit as described and allowed in the adaptive management section) that has met one of the adaptive management thresholds (hard or soft) (refer to Adaptive Management section in this table), no exceptions would be considered until the causal factor analysis is completed. If the causal factor analysis concludes that development associated with the type of activity seeking the exception is or could contribute to the threshold being met or not recovering, no exception would be granted. If the analysis is inconclusive on cause, exceptions could be considered. <u>PHMA NSO Waiver</u> NSO within 3.1 miles of active or pending active leks may be waived for a specific lek if, in coordination with the appropriate State agency, it is determined that the GRSG lek that was active or pending active has been classified as unoccupied and confirmed by the appropriate State agency. Prior to waiving the stipulations, surveys should confirm that the lek is inactive and not moved to another location in the vicinity. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. <u>GHMA Allocation</u> Same as 2015/2019. GHMA is considered open for unleased fluid minerals with moderate constraints, including CSU and TL. Areas within 1.0 mile of an occupied or pending lek within GHMA will be open to leasing fluid minerals subject to NSO stipulations. Apply Fluid Mineral Stipulations, identified in Oregon 2015 ARMPA **Appendix G**.
Saleable Minerals/Mineral Materials	**MD MR 14**: PHMA and PHMA with limited exceptions are closed to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met: • The activity is within the Oregon PAC (and is the same footprint as PHMA) and project area disturbance cap. • All applicable required design features are applied and the activity is permissible under screening criteria (see SSS 13 in the 2015 OR GRSG ARMPA), excepting the mitigation requirement. If BLM's NEPA analysis determines that the use or expansion of an existing, authorized material site (up to the entire footprint of the existing authorized area) could be implemented without significant impacts (i.e., upon completion of an Environmental Assessment, BLM determines that a FONSI is applicable) and the applicable area has not met the disturbance cap, BLM is authorized to implement in conformance with the State of Oregon mitigation policy which requires mitigation when development is considered large scale and impacts over five acres.

Management Category	Management Direction
	Federal Highway Act material sites are a ROW and not subject to mineral sale requirements. See ROW section for management (MD LR 7 in the 2015 OR GRSG ARMPA).
Key Research Natural Areas	**Objective SD 4**: Manage Key RNAs as baseline reference areas for sagebrush plant communities they represent that are important to Greater Sage-grouse. Active or passive restoration actions are allowed within Key RNAs to support maintenance or improvement of identified vegetation communities and to meet GRSG habitat objectives. **MD LG 1**: All, some, or none of key RNAs will be unavailable to livestock grazing (see **Appendix 17**). Determine whether to remove, modify or construct additional fences, corrals, or water storage facilities (e.g. reservoirs, catchments, ponds). New proposed water-related range improvements (springs, pipelines, troughs, etc.) may be authorized where existing critical water development is no longer accessible as a result of implementing areas within the Key RNAs as unavailable to livestock grazing. Refer to **Appendix 17** for additional information.

Utah

The Proposed RMP Amendment includes State specific management direction to respond to locally relevant habitat variability and circumstances, consistent with the purpose and need. The BLM will address GHMA management in Utah as a state-specific circumstance. HMA management in Utah is a result of different approaches to planning in the 2015 and 2019 Utah GRSG RMP amendments. In the BLM's 2019 GRSG ARMPA, the BLM increased habitat management area alignment with the State of Utah's Sage-Grouse Management Areas (SGMAs) and prioritized the importance of management prescriptions on PHMA. This was to focus protection on seasonal habitats that support over 95% of GRSG populations in Utah and removed GHMA designation and management.

The state-specific circumstances for the State of Utah being addressed in this effort is the result of the 2019 amendment effort. Refer to **Appendix 2** for specific language from the 2015 and 2019 amendments, and **Appendix 3** for additional information on the Utah approaches for identifying habitat management areas.

Table 2-12. Utah - Additional Management Direction

Management Category	Management Direction
General Habitat Management Areas	**MA-SSS-5:** In GHMA, apply the following management to meet a minimum standard of no net loss for discretionary actions that can result in habitat loss and degradation: A- **Existing Management:** Implement GRSG management actions included in the existing RMPs and project specific mitigation measures associated with existing decisions. B- **No Net Loss:** Apply a minimum standard of no net loss consistent with cross-cutting language. Refer to Mitigation section in **Table 2-3**. C- **Buffers**: In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will assess and address impacts within the lek buffer-distances identified in the US Geological Survey Report Conservation Buffer Distance Estimates for Greater Sage- Grouse – A Review (Open File Report 2014-1239; Manier et al. 2014) in accordance with Appendix B, Applying Lek-Buffer Distances (Utah 2019 ARMPA). D- **Required Design Features/Best Management Practices:** In GHMA, apply the fluid mineral RDFs that are associated with GHMA identified in Appendix C (Utah 2015 ARMPA) when authorizing/permitting site-specific fluid mineral development activities/projects. The applicability and overall effectiveness of each RDF cannot be fully assessed until the project level, once the project location and design are known. Because of site specific circumstances, some RDFs may not apply to some projects and/or may require slight variations. All variations in RDFs will require that at least one of the following be demonstrated in the NEPA analysis associated with the project/activity: • A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable; • An alternative RDF, state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat; • A specific RDF will provide no additional protection to GRSG or its habitat. **MA-SSS-6**: Sage-Grouse Management Outside PHMA Outside PHMA, implement GRSG management actions included in the RMPs and project-specific mitigation measures associated with decisions that predated the 2015 amendments. Proposed projects within State of Utah SGMA and USFWS PACs, as well as adjacent to PHMA outside these areas, will consider impacts on GRSG and may implement measures to mitigate impacts on GRSG populations within adjacent PHMA when preparing site-specific planning and environmental compliance documents. Outside of PHMA, but within SGMAs and PACs, avoid removal of sagebrush and minimize development that creates a physical barrier to GRSG movement; these areas may be used by GRSG to connect to other populations or seasonal habitat areas. Exceptions shall be made for vegetation treatments to benefit Utah prairie dog, where the landscape will be managed for both species. Outside of PHMA, but within SGMAs and PACs, consider noise and permanent structure stipulations around leks.

Management Category	Management Direction
	Outside PHMA, after analyzing the impacts using the buffer distances identified in Appendix B (Utah 2019 ARMPA) from a lek that is located in PHMA, portions of State of Utah opportunity areas will be managed with the following allocations: • Fluid minerals will be open for leasing with CSU stipulations (noise and tall structures). • Lands ROWs, permits, and leases will be avoided, applying avoidance criteria for noise and tall structures. Avoid siting wind energy development in opportunity areas within the buffer distances identified in Appendix B (Utah 2019 ARMPA) from occupied GRSG leks that are in PHMA, if the lek buffer analysis as identified in Appendix B (Utah 2019 ARMPA) shows that siting wind energy development in opportunities areas will impact lek persistence within PHMA. Outside of PHMA, avoid and minimize effects from discrete anthropogenic disturbances in areas that have been treated with the intent of improving or creating new GRSG habitat. Evaluate conditions in the treated area to determine if it is providing habitat for GRSG and if additional measures are necessary to protect the habitat. Outside of PHMA, provide that acres of GRSG seasonal habitat (based on best available maps, then confirmed to be regularly used by GRSG Grouse to sustain one or more seasonal habitat requirements through coordination with the appropriate State of Utah agency and through on-the-ground information) that is lost to habitat degradation actions (Appendix C, Table C.2 of the Utah 2015 ROD/ARMPA) are replaced by creating/improving GRSG habitat within PHMA.
The following management actions include a reference to GHMA, usually just pointing to the GHMA polygons or in a prioritization approach (see **Appendix 2**, Utah existing GRSG management): • MA-SSS-1 • MA-FIRE-8 • MA-LG-1 • MA-LG-5 • MA-WHB-2 • Objective MR-1 • MA-MR-20 • MA-MR-24 • MA-LR-8 • MA-LR-9 (GHMA-Connectivity only) • MA-RE-1	Same management direction as described in the 2015 plan but with the inclusion of the changes described in **Table 2-5**. Any conflict in direction would default to the management direction described in **Table 2-5** above.

Management Category	Management Direction
The following management actions include a reference to GHMA, only include a reference to GHMA that references application of MA-SSS-5. • MA-MR-1 • MA-MR-4 • MA-MR-12 • MA-MR-14 • MA-MR-16 • MA-MR-23 • MA-LR-7	Same management direction as described in the 2015 plan but with the amended MA-SSS-5 language described above and the updated GHMA boundaries.
General Habitat Management Area - Connectivity	—
Major ROWS	Addressed in GHMA management direction table above.
Solar	Addressed in GHMA management direction table above.
Wind	Addressed in GHMA management direction table above.
Fluid Minerals (including Geothermal)	Addressed in GHMA management direction table above.

Wyoming

The Proposed RMP Amendment includes State specific management direction to respond to locally relevant habitat variability and circumstances, consistent with the purpose and need. In this planning effort, BLM is addressing Stewardship Habitat Management Areas (SHMA) in Wyoming in addition to PHMA and GHMA. In the Proposed RMP Amendment, the SHMA designation is being applied in northeastern Wyoming where private landowners worked with the State of Wyoming to establish management objectives and approaches. The remainder of this section includes Proposed RMP Amendment actions associated with SHMA.

Table 2-13. Wyoming - Additional Management Direction

Management Category	Management Direction
Habitat Management Areas	Stewardship Habitat Management Areas (SHMAs) are defined as GRSG habitats that are generally characterized by large percentages of private land, existing disturbance and prior and existing rights, and fragmented landscapes but that continue to support substantial populations of GRSG, provide important connections between populations, and are important for maintaining GRSG populations. Management in SHMA is consistent with GHMA restrictions.
Major Land Use Allocations	Addressed in rangewide HMA management direction tables above.
Fluid Mineral Leasing/Development	Addressed in rangewide HMA management direction tables above.
Waivers, Exceptions, and Modifications (WEMs)	Addressed in rangewide HMA management direction tables above.
Mitigation	Addressed in rangewide HMA management direction tables above.
Wind	Addressed in rangewide HMA management direction tables above.
Solar	Addressed in rangewide HMA management direction tables above.
Rights-of-Way	Addressed in rangewide HMA management direction tables above.
Adaptive Management	Addressed in rangewide HMA management direction tables above.
Habitat Objectives	Addressed in rangewide HMA management direction tables above.
Disturbance Caps	Addressed in rangewide HMA management direction tables above.
Threats from Predation	Addressed in rangewide HMA management direction tables above.
Livestock Grazing	Addressed in rangewide HMA management direction tables above.
Wild Horse and Burro Management	Addressed in rangewide HMA management direction tables above.
Additional SHMA Management Direction	In partnership with appropriate Federal and State Agencies and landowners and their representatives, encourage the development and implementation of landowner-led conservation benefit agreements in SHMA that focus on ensuring the long-term viability of GRSG populations in the area, and at a minimum identify key habitats and linkages, potential threats to GRSG and its habitat, appropriate conservation measures, and an avoid/minimize/compensate strategy that identifies mitigation opportunities within the boundaries of SHMA. Because the functional movement (i.e., movements that result in genetic connectivity) of GRSG likely occurs among leks, encourage the establishment of conservation benefit agreements that include management measures specific to maintaining active leks in SHMAs. Support research that identifies habitat conditions that promote or limit the movement of GRSG through a landscape to better inform management of SHMAs. Research supported by BLM and partners should be actionable. Encourage the development and implementation of invasive vegetation – including encroaching native species and legacy plantings (e.g., crested wheatgrass) – management strategies in SHMA. Strategies should be inclusive of all private and public land managers and include, but not be limited to: engagement of all pertinent stakeholders, inventory and monitoring requirements, prioritization approaches, treatment and removal options, restoration (to include site-specific management of livestock), responses to fire, and an adaptive management framework.

Management Category	Management Direction
	Work with the appropriate State and Federal agencies to establish fire response in SHMA at the same priority as protection of property. Encourage the development and implementation of fire restoration management strategies in SHMA. Strategies should be inclusive of all private and public land managers and include, but not be limited to: engagement of all pertinent stakeholders, inventory and monitoring requirements, prioritization approaches, native shrub and herbaceous seeding strategies and sources of seed, vegetation regeneration approaches (to include site-specific management of livestock), approaches to controlling invasive annual grasses, and an adaptive management framework. To minimize impact of predators to GRSG, encourage the development of a predator management plan in SHMA. Plans should include, but not be limited to: coordination requirements with appropriate State and Federal agencies if implementation of the plan becomes necessary, assessments of habitat conditions and relationships with predator populations and impacts to GRSG, anthropogenic structure design details to reduce opportunities for corvid and raptor perching and nesting, disposal options for anthropogenic food subsidies, approaches for addressing predation from domestic pets, descriptions of concurrent management actions required to address GRSG survival concerns long-term (for example, habitat enhancement), and monitoring requirements.

2.6 PLAN EVALUATION AND MONITORING

The BLM planning regulations (including 43 CFR Part 1610.4-9) require land use plans establish intervals and standards for monitoring and evaluation, based on the sensitivity of the resource decisions involved.

Evaluation

Evaluation is the process of reviewing the RMP and determining the RMP is being adequately implemented. The BLM Land Use Planning Handbook (H-1601-1; BLM 2005) directs that RMPs should be evaluated at a minimum period of every 5 years. Specifically, RMPs are evaluated to determine if:

- Decisions remain relevant to current issues;
- Decisions are effective in achieving (or making progress toward achieving) desired outcomes;
- Any decisions should be revised;
- Any decisions should be dropped from further consideration; and
- Any areas require new decisions.

Data collected during RMP implementation helps to inform the RMP evaluation.

Monitoring

Land use plan monitoring is the process of tracking the implementation of land use plan decisions (implementation monitoring) and collecting data/information necessary to evaluate the effectiveness of land use plan decisions (effectiveness monitoring) in meeting the purpose and need of the plan or plan amendment. Monitoring strategies for GRSG habitat and populations must be collaborative, as habitat occurs across jurisdictional boundaries. As part of the 2015 GRSG amendment effort, the BLM developed a Monitoring Framework to provide consistent approaches to monitor planning actions across the range (BLM 2015a). In 2021 the BLM published the *Greater Sage-Grouse Plan Implementation Rangewide Monitoring Report for 2015-2020* with the results of implementing the 2015 monitoring framework. As part of this amendment process, the BLM is revisiting the approaches in the monitoring framework, updating it based on lessons learned over the past eight years. The draft updated monitoring framework, which would apply under any alternative selected by the BLM decisionmaker, is in **Appendix 7**. The BLM's monitoring efforts will continue in partnership with federal and state fish and wildlife agencies. The BLM and other partners will use the resulting information to guide implementation of conservation activities.

Monitoring data is used to draw conclusions on whether management actions are being implemented, and if they are helping to meet the stated objectives. Conclusions are then used to recommend whether to continue current management or to identify what changes may need to be made to meet objectives. The BLM would use land use plan evaluations to determine if the decisions in the RMPA, supported by the accompanying NEPA analysis, may need to be amended in light of new information and monitoring data. Its evaluations would follow the protocols established by the BLM Land Use Planning Handbook (H-1601-1) or other appropriate guidance in effect at the time the evaluation is initiated.

2.7 SUMMARY COMPARISON OF ALTERNATIVES

The following **Table 2-14** provides a summary comparison of the management allocations and management direction for the alternatives and the Proposed RMP Amendment. A full description of Alternatives 1-6 can be found in **Appendix 21** and a full description of the Proposed RMP Amendment is provided in **Section 2.4** of this chapter. **Table 2-15** provides a comparative summary of acres by GRSG Habitat Management Area by State by Alternative. **Appendix 3** provides a summary of each state strategy in developing their habitat management areas, as well as the definitions for the GRSG habitat management areas used in each state and **Maps 2.1** through **2.6** show the relationship of the habitat management areas across the west.

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Table 2-14. Summary Comparison of Alternatives

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
Goal	For Alternatives 1 and 2, all states have at least one goal or objective that includes the following language and/or concept: • Maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain GRSG populations. • Conserve, enhance, and restore the sagebrush ecosystem upon which GRSG populations depend in an effort to maintain and/or increase their abundance and distribution, in cooperation with other conservation partners. Maintain and enhance quality/suitable habitat to support the expansion of GRSG populations on federally-administered lands within the planning area.		For Alternatives 3, 4, 5, 6, and the Proposed RMP Amendment: Conserve, enhance, restore, and manage GRSG habitat to support persistent, healthy populations, consistent with Section 102 of the Federal Land Policy and Management Act, as amended, BLM's Special Status Species Management Policy (BLM-M-6840), BLM's Wildlife and Fisheries Management Manual (BLM-M-6500), and in coordination and cooperation with state wildlife agencies and appropriate state authorities. Habitat conservation and management should maintain existing connectivity between GRSG populations.				
Habitat Management Area (HMA) Allocations	Priority Habitat Management Area (PHMA), General HMA (GHMA) Sagebrush Focal Areas: ID, MT, NV, OR, UT, WY: Manage Sagebrush Focal Areas (SFAs) as described in the 2015 amendments or revisions. Boundaries from 2015 RMPAs	PHMA GHMA MT/DK: Manage the same HMAs as Alternative 1. ID, NV, UT, WY removed SFAs and associated management. CA, CO, MT/DK are the same as Alternative 1. OR retained the SFAs but removed the recommendation for withdrawal from	PHMA Updated HMA boundaries based on updated science and data, erring on inclusion based on available data. All areas managed for GRSG would be PHMA. Under Alternative 3, some areas of PHMA would also be managed as ACECs with associated increased management and/or reduced exceptions.	PHMA, GHMA Updated HMA boundaries based on updated science and data.	PHMA, GHMA Updated HMA boundaries based on updated science and data as under Alternative 4 but adopting state government GRSG management area boundaries. Under Alternative 6, some areas of PHMA would also be managed as ACECs with associated increased management and/or reduced exceptions.		PHMA, PHMA with limited exceptions, GHMA HMAs were refined in each State using information from Alternatives 4, 5, and 6.

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
	CA, CO, ND, SD: Does not include SFAs.	location and entry under the Mining Law of 1872.					
Fluid Mineral Objective	All states (except Lewistown and Butte RMPs) Priority will be given to leasing and development outside of PHMAs and GHMAs, or within the least impactful areas within PHMA and GHMA if avoidance is not possible.	CO, ID, OR, and MT/DK offices: Same as Alternative 1. UT, NV/CA: removed the objective. WY: Clarified the priority would only apply in processing backlogs.	All states: No leasing objective as all PHMA would be closed to new leasing, and all HMAs would be PHMA.	All states: Manage fluid mineral leasing and development (including geothermal) in GRSG habitat management areas to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction.			
Fluid Minerals Allocation	PHMA: open to new leasing, with no surface occupancy (NSO) stipulations w/ Waivers, Exceptions, Modifications. State variation:(WY, CO) GHMA: varies, mainly closed, controlled surface use (CSU) or NSO within certain lek buffers	PHMA: open to new leasing, NSO w/ Waivers, Exceptions, Modifications. State variation:(WY) GHMA: varies, mainly closed, CSU or NSO within certain lek buffers	PHMA: closed to leasing. GHMA: n/a	PHMA: open to new leasing, NSO w/ Waivers, Exceptions, Modifications. State variation: (CO, MT/DK, WY) GHMA: varies by state	PHMA: open to new leasing, NSO w/Waivers, Exceptions, Modifications. State variation: (CO, MT/DK, WY) GHMA: varies by state	PHMA: open to new leasing, NSO w/Waivers, Exceptions, Modifications. State variation: (CO, MT/DK, WY) GHMA: varies by state	PHMA: open to new leasing, NSO w/ Waivers, Exceptions, Modifications. State variation (CO, WY, MT, OR, NV/CA). PHMA with limited exceptions: Open – No Surface Occupancy. No Waivers, Exceptions, Modifications. GHMA: Open, but with state variations (WY, UT, OR, NV/CA, MT/DK, CO)

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
Fluid Mineral Management Direction	No similar management direction.	No similar management direction.	In areas already leased in PHMA, the BLM will work with lessees, operators, or other project proponents to avoid, minimize, and compensatorily mitigate for impacts to GRSG and their habitat (e.g., habitat loss, fragmentation, indirect impacts, etc.) from new oil and gas development on existing leases to the extent consistent with surface use rights as part of the environmental review process (e.g., 43 CFR Part 3101.1-2). If possible, place development outside of PHMA (and IHMA);	Leasing is allowed in GRSG habitat management areas open to fluid mineral leasing (including geothermal), subject to the stipulations and RDFs included in the RMP. The BLM will evaluate parcels or those portions of parcels available for leasing associated with nominations (e.g., expressions of interest) and determine areas to continue analyzing for inclusion in a lease sale as part of the lease sale NEPA review or analysis. Where there is an existing evaluation process that considers at a minimum GRSG habitat and development proximity, the BLM will use that evaluation process.	Fluid mineral leasing would be considered in GRSG habitat management areas consistent with the Secretary's discretion under the Mineral Leasing Act (as amended), as well as applicable BLM regulations and policies, and in conformance with RMP goals, objectives, stipulations, and required design features to avoid, minimize, and compensate impacts to GRSG. Management Action to address development in areas already leased would be the same as Alternative 4.		When considering exploration and development on areas leased for fluid mineral resources in PHMAs, including geothermal, application of measures to avoid, minimize, rectify, reduce and/or mitigate potential impacts will be considered through completion of the environmental record of review (43 CFR Part 3162.5 and 36 CFR Part 228.108), including appropriate documentation of compliance with NEPA. The BLM will work with project proponents to promote measurable GRSG conservation objectives such as, but not limited to, consolidation of project related infrastructure to reduce habitat fragmentation and loss and to promote effective conservation and connectivity of

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
							seasonal habitats and PHMAs.
Fluid Mineral Waivers, Exceptions, Modifications (WEMs)	The high degree of state variation within and across the alternatives does not allow for an informative high-level summary. Please refer to the full set of management direction for fluid mineral WEMs in Alternatives 1-6 in **Appendix 21**.						The high degree of state variation within the Proposed RMP Amendment does not allow for an accurate or informative high-level summary. Please refer to the full set of management direction for fluid mineral WEMs described above in **Table 2-4** and **Table 2-6**.
Saleable Minerals & Materials	PHMA: closed but open for free use permits and expansion of existing pits. WY open GHMA: open	PHMA: closed but open for free use permits and expansion of existing pits. State variation: (NV/CA) WY open GHMA: open	PHMA: closed GHMA: n/a	PHMA: closed but open for free use permits and expansion of existing pits. State variation: (ID, OR) WY & IHMA: open GHMA: open			PHMA: closed, but open for new free use permits and open for the expansion of existing pits. State variation (ID, MT/DK, OR, WY). PHMA with Limited Exceptions: closed, but open for new free use permits and expansion of existing pits (defined as within 1/4 mile of an existing improved roads and not located within 3.1-miles of a lek) if:

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
							1) the proposed disturbance will be less than 40-acres; or 2) the BLM can verify the area is not habitat and the expansion would not adversely impact any adjoining seasonal habitat. State variation (WY, MT/DK, OR) GHMA: open, apply state specific minimization measures.
Nonenergy Leasable Minerals	PHMA: closed but can consider expansion of existing leases. State variation: (WY, ID) GHMA: open	PHMA: closed but can consider expansion of existing leases. State variation: (WY, ID, NV/CA) GHMA: open	PHMA: closed GHMA: n/a	PHMA: closed State variation: (NV/CA, WY) GHMA: open			PHMA: closed to new leases but allow for expansion of existing operations. State variation (CO, NV/CA, WY) PHMA with limited exceptions: closed to new leases including fringe acreage leasing (i.e., no expansion of existing leases). State variation (WY) GHMA: open, apply state-specific minimization measures. State variation (CO, WY)

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
Coal	PHMA: (CO, MT/DK, UT, WY only) At the time a new application is submitted, the BLM will determine whether the area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria as per 43 CFR Part 3461.5(o)(1). GHMA: varies by state	PHMA: same as Alt1 State variation: (UT) GHMA: varies by state	PHMA: (CO, MT/DK, UT, WY only) At time a new application is submitted, the BLM will determine whether the area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR Part 3461.5. Coordination with the appropriate state agency and the determination of essential habitat for maintaining GRSG as per the suitability criteria at 43 CFR Part 3461.5(o)(1) will consider site-specific information as part of the unsuitability process. GHMA: same as PHMA				PHMA (CO, MT/DK, UT, WY) & GHMA: Unless a suitability process has already been conducted the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR Part 3461.5. Coordination with the appropriate State agency and the determination of essential habitat for maintaining GRSG as per the suitability criteria at 43 CFR Part 3461.5(o)(1) will consider site-specific information associated with lease nomination. Does not apply in ID, NV/CA, or OR due to absence of the mineral.
Locatable Minerals	Open, unless currently withdrawn. SFAs are recommended for withdrawal in ID, MT/DK, NV/CA, OR, UT, WY.	Open, unless currently withdrawn. State variation: MT/DK: same as Alt. 1.	PHMA is recommended for withdrawal.	Open, unless currently withdrawn.			Open, unless currently withdrawn.

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
Major Rights-of-Way	PHMA avoidance State variation: (OR, UT, WY) GHMA varies: • CO, NV/CA, and OR Avoidance • ID, UT & WY open	PHMA: same as Alt1 State variation: (NV/CA) GHMA varies: • CO, NV/CA, and OR Avoidance • ID, UT & WY open	PHMA: Outside of Designated Corridors – Exclusion Within Designated Corridors – Avoidance GHMA n/a	PHMA: avoidance State variation: (MT/DK) GHMA Avoidance State variation: (MT/DK)	PHMA: avoidance State variation: (MT/DK) GHMA Open State variation: (MT/DK)		PHMA: Avoidance with exceptions and conditions. State variation (ID, MT/DK, OR). PHMA with Limited Exceptions: Exclusion with exceptions. GHMA: Open with minimization measures and compensatory mitigation, to maintain habitat supporting GRSG populations consistent with state agency habitat designations (e.g., restoration, connectivity, seasonal, or other), and to preclude negative impacts to adjacent PHMA habitats. State variation (CO, ID, OR, MT/DK, WY, UT, NV).
Minor Rights-of-Way	PHMA/IHMA: Avoidance WY: open GHMA: open	PHMA/IHMA: Same Alt1 State variation: (NV/CA) GHMA: open	PHMA: exclusion outside of designated corridors GHMA: n/a	PHMA/IHMA: Avoidance State variation: (CO, MT/DK) WY: open GHMA:	PHMA/IHMA: Avoidance State variation: (CO, MT/DK) WY: open GHMA:	PHMA/IHMA: Avoidance State variation: (CO, MT/DK) WY: open GHMA:	PHMA: Avoidance with exceptions and conditions. State variation (ID, MT/DK, OR, CO).

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
				CO, MT/DK & OR Avoidance ID, NV/CA, UT & WY Open	CO & MT/DK Avoidance ID, NV/CA, OR, UT & WY Open	CO & MT/DK Avoidance ID, NV/CA, OR, UT & WY Open	PHMA with Limited Exceptions: Exclusion with exceptions. GHMA: Open with minimization measures and compensatory mitigation requirements from 2015 and 2019 GRSG amendments. State variation (CO, ID, MT/DK, OR, WY).
Solar (Utility Scale)	PHMA: Exclusion except OR avoidance outside SFAs WY does not address GHMA varies: NV/CA, SD & UT exclusion CO, MT, ND, OR avoidance ID & WY open	Same as Alt 1	PHMA: Exclusion GHMA: n/a	PHMA Exclusion State variation: (ID, MT/DK) GHMA Avoidance State variation: (MT/DK)	PHMA Avoidance State variation: (MT/DK) GHMA Open	PHMA Avoidance State variation: (MT/DK) GHMA Open State variation: (MT/DK)	PHMA: Exclusion with exceptions. State variation: (OR) PHMA with limited exceptions: Exclusion. No exceptions. GHMA: Open with applicable state minimization measures. State variation (CO, OR, ID, MT/DK, NV/CA, WY, UT).
Wind (Utility Scale)	PHMA Exclusion except IHMA & WY avoidance OR avoidance outside SFAs GHMA varies:	Same as Alt 1	PHMA Exclusion GHMA n/a	PHMA Exclusion State variation: (ID, MT/DK) GHMA Avoidance State variation: (MT/DK)	PHMA Avoidance State variation: (MT/DK) GHMA Open	PHMA Avoidance State variation: (MT/DK) GHMA Open State variation: (MT/DK)	PHMA: Exclusion with exceptions. PHMA with Limited Exceptions: Exclusion. No exceptions. GHMA: Open with applicable state

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
	CO, MT/DK, NV/CA, & OR avoidance ID, UT & WY open						minimization measures. State variation (CO, OR, ID, MT/DK, WY, NV/CA, UT).
Areas of Critical Environmental Concern (ACECs)	None	None	Identifies 32 potential ACECs[3] ACECs, managed the same as PHMA under Alt. 3 with the following differences: Major Rights of Way are Exclusion Locatable minerals: Operators must submit a plan of operations (refer to 43 CFR Part 3809.11(c)(3)) and obtain BLM approval before beginning any operations (as defined in 43 CFR 3809.5).	None	None	Identifies 32 potential ACECs[3] PHMA management direction for Alternative 5 is applied in ACECs with the following differences: Locatable minerals: Operators must submit a plan of operations and obtain BLM approval before beginning any operations (as defined in 43 CFR 3809.5). Fluid minerals: Open subject to major constraints, NSO. Nonenergy minerals: closed to new leases and expansion associated with existing operations (fringe leases). Saleable: Closed to new operations for all	None

[3] A complete summary of the management direction for ACECs under Alternatives 3 and 6 are provided in Appendix 5, Areas of Critical Environmental Concern for Greater Sage-grouse Habitat.

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
						sale types except for free-use pits. Major Rights of Way: Exclusion. Designated corridors Open but would require compensatory mitigation. Wind: Exclusion Solar: Exclusion No disturbance cap exceptions.	
Criteria-Based Management for Non-Habitat within GRSG Habitat Management Areas	All states include language encouraging location of potential projects in areas of non-habitat before considering them in areas with habitat in GRSG habitat management areas.		Outlines a process by which potential non-habitat within designated PHMA or GHMA may be reviewed via a field inspection. (Under Alternative 3 there is only PHMA). Any discrepancies between the mapped GRSG habitat management areas and the site-specific conditions will be disclosed and analyzed as a component of the NEPA process. All management objectives and decisions associated with each management area type will apply unless all specific criteria are documented.				Same as Alts. 4, 5, and 6. State variation: NV/CA
Mitigation	CO, ID, MT/DK, NV/CA, OR, UT: Require and ensure mitigation that achieves a net conservation gain in all HMA types. State variation: (WY, UT, ID, NV, CO, MT/DK, OR)	CO, ID, NV/CA, OR, UT and WY compensatory mitigation would be voluntary unless required by laws other than FLPMA or by the State. State variation: (MT/DK, NV/CA, OR, CO, ID, UT, WY, UT)	In all GRSG habitat management areas and consistent with valid existing rights and applicable law, BLM will apply the mitigation hierarchy when authorizing third-party actions resulting in GRSG habitat loss and degradation (including indirect impacts) to achieve the minimum standard of no net habitat loss. The mitigation hierarchy includes avoidance, minimization, and compensation.				Same as Alt. 5 (Preferred Alt.) with clarifications regarding "no net loss" and applying state mitigation requirements. State variation (CO, MT/DK, OR).
			Apply the mitigation hierarchy to address changes in existing development or new development as the result of valid existing rights. Where avoidance or minimization will not fully offset a project's impacts compensatory mitigation is required and will at minimum	Apply the mitigation hierarchy. Where avoidance or minimization will not fully offset a project's impacts compensatory mitigation is required and will at minimum meet the requirements of the state wildlife agency or other appropriate state	The BLM will apply the mitigation hierarchy. Where avoidance or minimization will not fully offset a project's impacts compensatory mitigation is required and will at minimum meet the requirements of the state wildlife agency or other appropriate state authority, and BLM/DOI mitigation policy. If the state agency does not require mitigation, or state-sponsored mitigation is determined by BLM to be inconsistent with BLM/DOI policy, BLM will require compensatory mitigation to achieve no net habitat loss.		

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
			meet the requirements of the state wildlife agency or other appropriate state authority, and BLM/DOI mitigation policy. If the state agency does not require mitigation, BLM will require compensatory mitigation to achieve no net habitat loss.	authority, and BLM/DOI mitigation policy. If the state agency does not require mitigation, or state-sponsored mitigation is determined by BLM to be inconsistent with BLM/DOI policy, BLM will require compensatory mitigation to achieve no net habitat loss. Where habitat and/or population adaptive management thresholds have been met, compensatory mitigation beyond what is required by the States may be considered. BLM shall coordinate closely with the state wildlife management or other appropriate state agency in determining the amount and form of additional mitigation on a case-by-case basis, considering project activity, direct and indirect impacts to GRSG habitats, and			

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
				restoration success rates.			
Adaptive Management	Every state has an adaptive management process. All the states include language to the effect of the following: • While there should be no expectation of hitting a hard trigger, if unforeseen circumstances were to occur that trip either a habitat or population hard trigger, more restrictive management would be required. • Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from GRSG conservation objectives set forth in the BLM plans. • The BLM will also undertake any appropriate plan amendments or revision if necessary.	Same as Alternative 1, though some states applied strategies to improve the process based on lessons learned during implementation between 2015 and 2019. This included the addition of "un-triggers" in some states, to allow management to return to what was in the RMP amendments if conditions improved. The differences between the states persisted, creating challenges for comparing rangewide trends, as well as identifying and addressing concerns in populations that cross state lines.	Habitat Adaptive Management Thresholds: • soft threshold = PHMA/IHMA a neighborhood cluster loses more than 5% of the area capable of supporting sagebrush in a given year (including wildfire) • hard threshold = Habitat in a neighborhood cluster drops below 65% of the area capable of supporting sagebrush OR if a soft habitat threshold is met in 4 consecutive years Population Trend Adaptive Management Thresholds: State wildlife agencies can alert the BLM when thresholds are met or the BLM in review of annual TAWS results determined population trends indicate potential habitat concerns. All thresholds identified by TAWS will be confirmed with the state wildlife agency within 60 days. A hard or soft population trend threshold can be reversed if certain criteria are met. Causal Factor Analysis (CFA) teams assess/determine the causal factor(s) when a threshold is met. Adaptive Management Responses: • Rapid assessment completed within 60 days of a threshold being met • Soft threshold = new permitted activities can be considered during the completion of the CFA as long they do not result in mortality of GRSG or GRSG habitat loss and degradation. • Hard threshold = no new permitted activities until CFA is completed and cause identified • CFA team can alter threshold levels • Some exceptions Habitat threshold due to Wildfire: • Habitat Assessment completed within 60 days • No new authorizations until assessment complete • New projects/permits may be delayed based on the assessment results • Authorizations could be considered if no impacts Inconclusive CFAs: • May consider additional restrictions			Same as Alts 3-6 with edits for clarity. Added multi-factorial causal factor analysis.

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
Habitat Objectives	CO, ID, MT/DK, NV/CA, UT, includes general narrative associated with the habitat objective tables that notes the indicators and values from table would be considered when authorizing activities in GRSG habitat. WY and OR note the values would be used during the land health evaluation process to help determine if the standard applicable to GRSG habitat is being met. MT/DK and UT include language that the values may be adjusted based on local factors, data, or updated science. UT includes a qualitative desired condition separate from the quantitative values in the table.	CO, ID, MT/DK, NV/CA, UT, includes general narrative associated with the habitat objective tables that notes the indicators and values from table would be considered when authorizing activities in GRSG habitat. WY and OR these states note the values would be used during the land health evaluation process to help determine if the standard applicable to GRSG habitat is being met. ID, MT/DK, NV/CA, OR, and UT include language that the values may be adjusted based on local factors, data, or updated science. ID and UT include a qualitative desired condition separate from the quantitative values in the table.	All States: The habitat objectives identify the desired outcome for habitat on BLM-administered lands in all GRSG HMAs to support suitable GRSG habitat at multiple scales in order to support connected mosiacs of sagebrush and provide seasonal habitats and dispersal. The scale for assessing habitat suitability are identified and specific tables identifying indicators and benchmarks that various scientific publications throughout the range have identified as guidelines would be retained in the monitoring appendix as a monitoring tool through which suitability is informed.				

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
Disturbance Cap	CO, ID, NV/CA, OR, UT, DK: 3% cap does not include fire or agriculture. In ID the cap can be exceeded in utility corridors if benefit to GRSG. Cap applies at both biologically significant unit (BSU)-scale and at proposed project analysis area within PHMA. MT, WY: 5% cap at the project area scale in PHMA. Includes wildfire and agriculture.	CO, ID, NV/CA, OR, UT, DK: 3% cap does not include fire or agriculture. In ID the cap can be exceeded in utility corridors if benefit to GRSG. In UT the cap can be exceeded if will benefit GRSG. The cap is applied at the BSU and project scale except in ID which just applies it at the BSU scale. MT, WY: Same as Alt 1.	All states: 3% cap for new and pre-existing authorizations in the project analysis area and within HAF Fine-Scale boundaries while honoring valid existing rights. Cap would include infrastructure, fire, and agriculture.	All states: 3% cap in the project analysis area in PHMA, applicable only to infrastructure. 3% cap in PHMA in the HAF Fine-Scale boundaries, applicable only to infrastructure. Loss of habitat from wildfire and agriculture would be addressed through the sagebrush availability objective already included by all states, as well as the habitat objectives.	All states: 3% cap in PHMA in the HAF Fine-Scale boundaries. Applicable only to infrastructure. WY and MT: 5% cap at the project analysis area in PHMA. Includes fire and agriculture. All other states: 3% cap at project analysis area in PHMA. Does not include fire or agriculture. Loss of habitat from wildfire and agriculture would be addressed through the sagebrush availability objective already included by all states, as well as the habitat objectives.		Same as Alt. 5 with changes for when an exception could be granted to align with Alternative 4 language (compensatory mitigation must be in place when the exception is granted). Clarifying language throughout.
Predation	All states include some language related to reducing opportunities for avian predators, though the location and exceptions vary substantially between states.	Same as Alternative 1, except UT added language addressing corvid nests discovered during habitat treatments.	Collaborate with appropriate state Agencies and others in their efforts to minimize impacts from predators on GRSG. Where infrastructure in PHMA/IHMA are not avoidable, apply minimization measures and BMPs to minimize threats: • Avoid new infrastructure in undisturbed habitat.	Same as Alternative 3. plus apply minimization measures/BMPs to new authorizations and activities in PHMA and GHMA to minimize threats.	Same as Alternative 4, except no restrictions applied to GHMA and where avoidance of new infrastructure is not feasible in undisturbed habitat, the Authorized Officer could require the project proponent to develop a predator management plan.		Reduce predation from increased numbers of predators resulting from anthropogenic disturbance and habitat loss and function. Apply minimization measures and BMPs to new, existing, and renewal of authorizations and activities to minimize threats from predators shown to pose a threat to GRSG, consistent with applicable law. For authorizations that

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
			• Minimize food sources. • Predator Mgmt Plan requirement				require expanded or new or renewal of energy or transmission related energy, mining, and infrastructure as identified in **Table 7-4** in **Appendix 7**, Greater Sage-grouse Monitoring Framework) in PHMA the project proponent is required to submit a predator management plan to minimize influx and support of new predators as a result of the new project. The predator management plan shall be coordinated with state and federal agencies (e.g., USFWS and APHIS) as appropriate. collaborate with appropriate state agencies, other landowners, federal agencies (e.g., USFWS, APHIS, etc.), and Tribal governments, as appropriate and consistent with BLM policy, in their efforts to minimize impacts from predators on GRSG where impacts

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
							have been documented (e.g., reduced recruitment of GRSG from predation), including providing needed authorizations to support predator management actions. State variation (ID, OR, NV/CA).
Livestock Grazing	All states: GRSG management areas are available for livestock grazing, except OR, where all or portions Research Natural Areas would be unavailable. Prioritize monitoring and renewal of grazing in SFAs and PHMAs outside of SFAs. Include/adjust permit terms and conditions needed to meet land health standards and GRSG habitat objectives. Require thresholds and responses to address and respond to future conditions in new fully processed permits.	Same as Alt 1, except: UT: all actions addressing were addressed outside the RMP so removed prioritization. WY: clarifications on grazing in riparian areas, management of range improvements, application of land health standards to GRSG, and prioritization (removed SFAs). ID: Clarifications to applying the habitat objectives to land health standards were made. NV: Clarifications to applying the habitat objectives to land	Makes all PHMA unavailable to livestock grazing; requires construction and maintenance of fencing; may include variations based on state-specific policies; allows for targeted grazing to manage fine fuels but at a smaller scale.	GRSG management areas are available for livestock grazing, except in OR, where all or portions of 13 key RNAs would be unavailable. Managing livestock grazing to meet land health standards and avoid direct impacts to GRSG habitats from livestock range improvements. Consider adjustments to active AUMs, timing, intensity, duration, and frequency of grazing to meet or make progress towards meeting land health standards for special status species. Use criteria identified in the Sage-grouse	Similar to Alternative 4 with adjustments in language in the livestock grazing objective and the direction related to threshold and responses. Under Alternative 4, threshold and responses "shall be identified" and under Alternatives 5 and 6, the alternatives "should" be identified. OR would retain or modify allocations based on updated site-specific information, potentially increasing grazing acreage in certain RNAs.		Same objective as Alternative 5. Same management direction as identified under Alternative 4 with clarifying edits.

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
	Language related agency considerations if a permittee voluntarily relinquishes a permit or lease.	health standards were made. Prioritization in SFAs was removed. OR: Livestock grazing in the 13 key RNAs was returned to language that pre-dated the 2015 amendments.		Habitat Assessment Framework and other methodology to determine if an area is meeting or making significant progress toward meeting land health standards for BLM special status species. Adjust livestock grazing practices where livestock grazing is a significant causal factor in not meeting land health standards for special status species. In processing grazing permits include an alternative that includes specific thresholds and responses when the special status species standard is not being met due to livestock grazing. Design range improvements to reduce disturbance and effects to GRSG. Identify and address high risk fences. Consider conversion of			

Management Category	Alternative 1	Alternative 2 (No Action)	Alternative 3	Alternative 4	Alternative 5 (Draft EIS Preferred Alternative)	Alternative 6	Proposed RMP Amendment
				the allotment to a reserve comment allotment for the benefit of GRSG habitat when a permittee or lessee voluntarily relinquishes grazing preference and associated grazing authorization.			
Wild Horse and Burro Management	• Manage within established appropriate management levels (AML). • Incorporate GRSG habitat objectives into plans, • Prioritize WH&B activities - such as monitoring, gathers, AML adjustments (due to causal factor) etc. - in SFAs, then PHMA, then GHMA.	Same as Alternative 1, except remove reference to SFAs and remove reference to GHMA in UT.	Wild horses and burros would be removed from PHMA.	Same as Alternative 2, except retain reference to GHMA in Utah.			Where wild horses and burros overlap with GRSG: Manage wild horse and burro populations within established appropriate management levels (AML) and to achieve or make significant progress towards achieving land health standards. State variation (WY).
Definition of Lek	Both the 2015 and 2019 plans included allocations and management decisions based on the distance from "active" leks using the Colorado Parks and Wildlife agency's definition, which is an area used by two or more displaying males in two of the last five years in larger populations and one or more males in any of the last five years in small populations (Colorado Greater Sage-grouse Steering Committee 2008).		Use the Western Association of Fish and Wildlife Agencies (WAFWA) lek definitions (Cook et. al., 2022). (Refer to **Glossary** and **Appendix 4**). Unless otherwise specifically noted, when language in the RMPs uses the term "lek" it applies to the WAFWA definition for "active lek."				Same as Alts. 3-6. State variation: CO, OR, NV/CA, ID, WY

Table 2-15. GRSG Habitat Management Areas (BLM administered surface acres only)

Habitat Management Area[1]	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6	Proposed RMP Amendment
Rangewide Habitat Management Area Alignments						
PHMA	32,465,000	32,535,000	64,990,000	35,855,000	33,929,000	34,521,000
PHMA with LE[4]	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*4,213,000*
GHMA	26,383,000	25,878,000	N/A	21,535,000	21,610,000	21,535,000
SFA	10,817,000	2,890,000	N/A	N/A	N/A	N/A
Colorado Habitat Management Area Alignments						
PHMA	748,000	921,000	1,538,000	751,000	751,000	752,000
PHMA with LE	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*5,000*
GHMA	788,000	727,000	N/A	786,000	786,000	786,000
LCMA	97,000	82,000	97,000	97,000	97,000	97,000
Idaho Habitat Management Area Alignments						
PHMA	4,178,000	4,106,000	8,860,000	4,472,000	4,573,000	4,573,000
PHMA w/LE	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*257,000*
IHMA	2,736,000	2,796,000	N/A	2,477,000	2,503,000	2,526,000
GHMA	1,958,000	1,958,000	N/A	1,910,000	1,721,000	1,699,000
SFA	3,855,000	N/A	N/A	N/A	N/A	N/A
Montana/Dakotas Habitat Management Area Alignments						
PHMA	3,275,000	3,275,000	5,255,000	3,301,000	3,301,000	3,233,000
PHMA w/LE	N/A	*N/A*	*N/A*	*N/A*	*N/A*	*639,000*
GHMA	2,384,000	2,384,000	N/A	1,859,000	1,859,000	1,932,000
RHMA	165,000	165,000	N/A	94,000	94,000	N/A
CHMA	N/A	N/A	298,000	298,000	298,000	298,000
LMHMA	N/A	N/A	N/A	N/A	N/A	53,000
SCHMA	N/A	N/A	N/A	N/A	N/A	37,000
SFA	997,000	*997,000*	N/A	N/A	N/A	N/A
Nevada/California Habitat Management Area Alignments						
PHMA	9,266,000	9,268,000	17,403,000	9,645,000	9,496,000	9,660,000
PHMA with LE	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*3,001,000*
GHMA	5,783,000	5,748,000	N/A	2,904,000	2,580,000	2,443,000
OHMA	4,862,000	4,870,000	N/A	4,853,000	4,127,000	4,098,000
SFA	2,798,000	N/A	N/A	N/A	N/A	N/A

[4] PHMA with limited exceptions are areas within PHMA requiring additional protections to support conservation of GRSG habitat. These areas are included in the PHMA total acreage.

Habitat Management Area[1]	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6	Proposed RMP Amendment
Oregon Habitat Management Area Alignments						
PHMA	4,589,000	4,557,000	10,546,000	5,572,000	5,572,000	5,572,000
PHMA with LE	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*39,000*
GHMA	5,634,000	5,662,000	N/A	4,975,000	4,824,000	4,824,000
SFA	*2,190,000*	2,190,000	N/A	N/A	N/A	N/A
Utah Habitat Management Area Alignments						
PHMA	2,080,000	2,080,000	3,568,000	2,192,000	1,627,000	2,134,000
GHMA	438,000	0	N/A	1,195,000	646,000	645,000
GCHMA	N/A	N/A	N/A	N/A	N/A	295,000
SFA	233,000	N/A	N/A	N/A	N/A	N/A
Wyoming Habitat Management Area Alignments						
PHMA	8,328,000	8,328,000	17,820,000	9,921,000	8,609,000	8,597,000
PHMA with LE	*N/A*	*N/A*	*N/A*	*N/A*	*N/A*	*273,000*
GHMA	9,397,000	9,397,000	N/A	7,905,000	9,193,000	9,206,000
SHMA	N/A	N/A	N/A	N/A	15,000	15,000
SFA	1,914,000	N/A	N/A	N/A	N/A	N/A

Source: BLM GIS 2024

[1] PHMA: Priority Habitat Management Area

SFA: Sagebrush Focal Area

PHMA with LE: Priority Habitat Management Area with limited exceptions. These areas are included in the PHMA total acreage.

GHMA: General Habitat Management Area

LMA: Linkage Management Area

IHMA: Important Habitat Management Area

RHMA: Restoration Habitat Management Area

CHMA: Connectivity Habitat Management Area

LMHMA: Little Missouri Habitat Management Area

SCHMA: South Carter Habitat Management Area

OHMA: Other Habitat Management Area

GCHMA: General Habitat Management Area - Connectivity

SHMA: Stewardship Habitat Management Area

Chapter 3. Affected Environment

3.1 INTRODUCTION

This chapter describes existing conditions, and trends of resources and land uses in the planning area that may be affected by implementing any of the proposed alternatives described in Chapter 2. The affected environment provides the context for assessing potential impacts as described in Chapter 4, Environmental Consequences for the Proposed RMP Amendment and Appendix 10 which provides the effects analysis for Alternatives 1-6.

Information from broad-scale and fine-scale assessments are used to set the context for identifying BLM resources and resource uses.

Existing conditions describe the location, extent, and current condition of the resource in the planning area (described in **Section 1.4**). For each resource, a general description of existing conditions is provided for the planning area, regardless of land status to provide a regional context. More detailed discussion of the existing conditions at various scales may be provided depending on the resource topic and availability of applicable information.

Acreage figures and other numbers are approximate projections; readers should not infer that they reflect exact measurements. Acreages were calculated using Geographic Information Systems (GIS) technology, and there may be slight variations in total acres between resources. Some information presented here has also been incorporated by reference from the individual state GRSG 2015 and 2019 plans and is cited as such.

3.2 GREATER SAGE-GROUSE

3.2.1 Species Background

Status and Distribution

On March 23, 2010, the USFWS determined that rangewide listing of GRSG was warranted but precluded by higher priority listing actions (75 FR 13910). On November 21, 2012, the USFWS assigned GRSG a listing priority number of 8, indicating that the rangewide threat to GRSG was moderate to low (77 FR 699940). On September 22, 2015, a status review conducted by the USFWS determined that the GRSG remains relatively abundant and well-distributed across the species' 173-million-acre range and does not face the risk of extinction now or in the foreseeable future. The species was withdrawn from the candidate species list on October 2015 (80 FR 59857). GRSG remains a BLM sensitive species as defined by the BLM Special Status Species Policy (BLM Manual 6840 - Special Status Species).

The USFWS's decision not to list the bird followed an unprecedented conservation partnership designed to reduce threats to the GRSG across 90% of the species' breeding habitat. In making that decision, the USFWS stated several relatively large GRSG populations were distributed across the landscape and were supported by undisturbed expanses of habitat. The agency acknowledged some habitat loss associated with energy development, infrastructure, wildfire, and invasive plants will continue. However, regulatory mechanisms provided by federal agencies and three states (Montana, Oregon, and Wyoming), as well as mitigation required by the state of Nevada, reduced threats. They also stated wildfire and invasive species continue to occur in GRSG habitats, especially in the Great Basin, but existing management and commitments for suppression, restoration, and noxious weed treatments were in place and could reduce these impacts.

Since 2015, additional states have added GRSG protection plans, amendments, laws, or executive orders. Federal land use plans, executive orders, or laws for the states of Idaho, Montana, North Dakota, Nevada, Oregon, South Dakota, Utah, and Wyoming build upon the progress made during past planning processes. The plans aim to protect, maintain, and increase GRSG populations and habitats by addressing localized threats, incorporating new science in monitoring and management, and including greater integration of adaptive management into land-use planning.

GRSG are considered a sagebrush ecosystem-obligate species; they rely on sagebrush on a landscape level and on a micro-habitat scale for their survival. Prior to 19th century European settlement, GRSG habitat is estimated to have covered 296,526,080 acres ranging from 4,000 feet to over 9,000 feet in elevation in the Great Basin and Colorado Plateau regions (Schroeder et al. 2004). In 1965, state wildlife agencies began to standardize lek surveys, so they were able to be analyzed with statistical rigor, therefore 1965 provided the most reliable baseline for GRSG population comparisons (Schroeder et al. 2004). Since European settlement of the West began, the amount, distribution, and quality of sagebrush habitats and GRSG populations have declined by approximately 50% (Schroeder et al. 2004; Homer et al. 2015; Doherty et al. 2022a). Populations have been extirpated from Nebraska and British Columbia, and the species is now absent from almost half of its estimated historic distribution (Connelly et al. 2004; Schroeder et al. 2004; Knick and Connelly 2011a; Hanser et al. 2018).

Population abundance has declined significantly over the last six decades, with rangewide declines of approximately 80% since 1965 and nearly 41% since 2004 (Prochazka et al. 2024). Although continued population declines over the entire species range are the overall trend, rates of change vary regionally (Coates et al. 2021b). Declines in GRSG numbers and distribution are attributed primarily to the loss and degradation of sagebrush habitats (Connelly et al. 2000b; Schroeder et al. 2004; Knick and Connelly 2011; Hanser et al. 2018). The recent trends and condition of GRSG populations and habitat are further described below in **Section 3.2.2**, Conditions and Trends within the Planning Area.

Life History and Habitat Characteristics

GRSG persistence is linked to functioning sagebrush ecosystems containing minimal levels of human land use (Knick et al. 2013). Areas of occupation can range in size from 640 to over 64,000 acres to provide all seasonal life requirements (Beever and Aldridge 2011; Connelly et al. 2011a; Connelly et al. 2011b; Leu and Hanser 2011; Stiver et al. 2015). Sagebrush ecosystems are comprised of sagebrush–steppe and Great Basin sagebrush and contain various plant species composition (shrubs, perennial grasses, and forbs), essential for food, cover, and nesting habitat (Connelly et al. 2000b). General habitat characteristics for rangelands supporting GRSG were reported by Braun et al. (1976) and later updated by Connelly et al. (2000b) and others. These include local consideration of sagebrush shrub cover, annual precipitation (e.g., arid, mesic), herbaceous understory and soils (Connelly et al. 2000b). GRSG distribution is strongly correlated with the distribution of sagebrush habitats (Schroeder et al. 2004; Connelly et al. 2011b; Doherty et al. 2016), especially with big sagebrush (e.g., Wyoming big sagebrush, mountain big sagebrush, and basin big sagebrush) (Braun et al. 1976; Connelly et al. 2000b; Connelly et al. 2004; Miller et al. 2011). The behavioral complexity of the species (e.g., migratory or resident population), local variability of ecological sites, and quality and quantity of sagebrush and herbaceous understory influence population structure, which is thought to be highly clustered (Doherty et al. 2016; Coates et al. 2021b). Landscape cover of sagebrush was identified as an important predictor of GRSG habitat, whereas conifer canopy cover and anthropogenic development were correlated with reductions in habitat selection across the GRSG range (Doherty et al. 2016). Additionally, GRSG within fragmented habitats (e.g., agricultural conversion, conifer encroachment) had lower tolerance to disturbances, suggesting effects vary across the range.

As a landscape-scale species, GRSG move between habitats seasonally, requiring large, interconnected wintering, breeding, nesting, and summering areas to sustain a population (Connelly et al. 2011b; Doherty et al. 2016; 2022; Cross et al. 2018; Oyler-McCance et al. 2022). These habitat requirements increase their vulnerability to habitat loss, fragmentation and degradation from development, infrastructure, improper grazing management, and other disturbances (Connelly et al. 2011b; Doherty et al. 2016). GRSG populations have been found to be both non-migratory and migratory in their spatial and temporal distribution. Non-migratory populations often move 5 to 6 miles between seasonal habitats and use home ranges no more than 25,600 acres in size, while annual movements of migratory populations may be 9 to 60 miles and have home ranges that cover hundreds of square miles. Seasonal population movements also vary by the amount of GRSG habitat available and year-to-year conditions. Populations in areas with a large amount of contiguous habitat move longer distances than those in isolated habitats (Dahlgren et al. 2015). There was significant variation in movement distances within and among sites across Wyoming (Fedy et al. 2012).

GRSG have a strong site fidelity to established nesting habitat and other seasonal habitats, suggesting resistance of individuals to adjust to changing habitat conditions (Holloran and Anderson 2005; Doherty et al. 2010; Holloran et al. 2010). Individuals may use currently unsuitable seasonal habitats, reflecting their fidelity to previous conditions in that area (Connelly et al. 2004; Knick and Connelly 2011; Dahlgren et al. 2015, 2016; Fremgen et al. 2016; Caudill et al. 2016).

During the spring breeding season males congregate at leks, traditional strutting grounds, to perform courtship displays to attract females. GRSG leks are generally found in areas with low, sparse vegetation with higher amounts of bare ground, surrounded by adjacent sagebrush habitat (Scott 1942; Patterson 1952, Klebenow 1985; Bradbury et al. 1989). Leks also include old fire scars, sparse hillsides, roads or pipeline scars. Lekking sites remain fairly consistent year-to-year and there is evidence that some leks have been in use for up to 130 years.

Productive nesting areas are typically characterized by sagebrush with an understory of native grasses and forbs, with horizontal and vertical structural diversity that provides an insect prey base, herbaceous forage, and cover for the hen while incubating eggs (Gregg et al. 1994; Connelly et al. 2000b; Connelly et al. 2004; Connelly et al. 2011a). These areas also provide GRSG chicks with insects and forbs, essential nutritional components for chick survival and development (Klebenow and Gray 1968; Johnson and Boyce 1990; Connelly et al. 2004). Some recent studies have shown mixed support for relationship between grass height and GRSG nest survival (Smith et al. 2018). After correcting for plant phenology (i.e., the timing of vegetation surveys), successful nests had high horizontal cover and total shrub cover during nesting and late brood rearing (Gibson et al. 2016). Taller perennial grasses (>12.1 centimeters) were associated with successful nests in xeric but not mesic sites because grasses were less available in xeric sites (Coates et al. 2017). In areas where grass heights are reduced by livestock grazing, such as parts of the Great Basin, GRSG may select the best available habitat, even if it does not provide optimal conditions for long-term survival and reproduction. Habitat conditions for GRSG also vary widely across their range, depending on regional environmental factors, such as moisture availability, grazing pressure, and site potential. Thus, the relationship between grass height and nest success must be considered within the broader context of site potential, habitat availability, and management practices, such as the need to limit grazing impacts to meet habitat objectives for GRSG conservation. Shrub canopy and grass cover provide concealment for GRSG chicks (Barnett and Crawford 1994; Gregg et al. 1994; Connelly et al. 2004).

Summer use areas include sagebrush habitats as well as riparian areas and wet meadows that provide an abundance of forbs and insects for both hens and chicks (Schroeder et al. 1999). GRSG gradually move from

sagebrush uplands to more mesic areas (moist areas, such as streambeds or wet meadows) during the late brood-rearing period in response to summer desiccation of herbaceous vegetation in the sagebrush uplands (Connelly et al. 2000b; Knick and Connelly 2011; Donnelly et al. 2016). Late brood-rearing habitats are often associated with sagebrush, and selection is based on shrub cover as well as the availability of forbs, correlated to a shift in the diet of chicks as they mature (Connelly et al. 1988 and references therein; Connelly et al. 2011a; Coates et al. 2017).

In the fall, GRSG transition to winter habitats. The timing of this transition depends largely on the weather. GRSG generally remain in summer habitat until plant phenology or frost eliminates the succulent vegetation. Currently, they move to their winter habitat and transition their diet to mostly sagebrush (Knick and Connelly 2011). These movements may include migrations of less than 37 miles (60 km), with the longest known migration occurring is approximately 75 miles (120 km) (Smith 2012). GRSG select winter-use sites based on sagebrush availability above the snow, which is influenced by snow depth, topographic factors (e.g., slope, aspect, elevation), environmental factors (e.g., wind speed, snow hardness), and vegetation characteristics (e.g., canopy cover, shrub height) (Smith et al. 2016).

Threats

Proximate reasons for population declines differ across the GRSG distribution, but ultimate underlying causes are loss, fragmentation, and/or degradation of suitable sagebrush habitat, as well as the effects of predation and drought. In many areas of the West, predation and drought have a very high impact on GRSG population size and distribution compared to other factors. The quality and quantity of sagebrush habitat has declined over the last 50 years to the extent that expanses of unfragmented sagebrush are rare across the landscape (Connelly et al. 2000b; Miller and Eddleman 2001; Aldridge and Brigham 2003; Pedersen et al. 2003; Connelly et al. 2004; Schroeder et al. 2004; Leu and Hanser 2011; Homer et al. 2015). Habitat loss is attributed to large-scale conversions to cultivated croplands or pastures, increasing wildfire frequencies facilitating annual nonnative grass and noxious weed dominance at lower elevations, conifer encroachment, improper livestock grazing management, herbicide use and chaining to reduce sagebrush, crested wheatgrass seedings, mineral and energy development, wild horse grazing, and recreational activities related to urban growth and increased human populations (Manier et al. 2013; USFWS 2013). Currently, sagebrush communities and GRSG continue to be at risk from multiple stressors acting across multiple scales (Manier et al. 2013; Hanser et al. 2018; Connelly et al. 2011b; Doherty et al. 2022a).

Parts of the planning area have experienced severe habitat degradation from undesirable annual invasive species, including cheatgrass (*Bromus tectorum*), medusahead wildrye (*Taeniatherum caput-medusae*), and ventenata (*Ventenata dubia*). Invasive plants, including cheatgrass, alter plant community structure and composition, productivity, nutrient cycling, and hydrology and may competitively exclude native plant populations. The presence of invasive annual grasses can also change wildfire cycles, creating a positive feedback loop between wildfire frequency and invasive annual grass persistence, precluding reestablishment of sagebrush and reduce or eliminate vegetation that GRSG use for food and cover (Manier et al. 2013; Hanser et al. 2018). Warming trends may further exacerbate this cycle, preventing natural recovery in those areas and requiring active management approaches (Hanser et al. 2018; Pyke 2011). While wildfire is a primary factor facilitating annual grass invasion, annual grasses are also able to invade landscapes that have not been burned for decades (Smith et al. 2023).

The expansion of native juniper (*Juniperus* spp.) and pinyon (*Pinus* spp.) woodlands (pinyon-juniper) can also contribute to GRSG habitat loss. Pinyon-juniper expansion and infill occurs from low to high elevations, especially in Nevada's Basin and Range GRSG habitats (Miller et al. 2011). Pinyon-juniper expansion intensifies

avian predation threats by providing perch sites and nesting substrate for raptors and corvids (Prochazka et al. 2017), as well as changing vegetative understories. Studies have shown that GRSG incur population-level impacts as low as 4% of conifer encroachment (Baruch-Mordo et al. 2013). In addition, Douglas-fir (*Pseudotsuga menziesii*) expansion into GRSG habitat has occurred in Montana (USGS 2011).

Predation is a common cause of mortality for GRSG (Connelly et al. 2011b; USFWS 2013; Conover and Roberts 2017), but it is not considered a threat to the persistence of the species in areas where habitat is not limited and of good quality (USFWS 2010a). However, predation may limit population growth in fragmented habitats or areas where predator populations have supplemental food sources, such as landfills (Coates 2007), or where electrical transmission or other human-made structures facilitate nesting and perching by avian predators such as ravens (Howe 2012; Hagen 2011).

In particular, increased common raven (*Corvus corax*) populations as a result of anthropogenic subsidies (Boarman et al. 2006, USFWS 2023) have caused elevated predation rates on GRSG, which may have contributed to the declining GRSG populations in some areas in recent decades (Conover and Roberts 2017; Coates et al. 2016). In one study the majority (64%) of projected GRSG breeding concentration areas across the Great Basin and adjoining ecoregions had raven densities associated with below average GRSG nest survival, suggesting predation as a result of elevated raven numbers is a more widespread and greater threat than wildfire (Coates et al. 2020). Anthropogenic factors that contribute to greater raven occurrence include livestock presence, increased road density, presence of transmission lines, agricultural activity, and presence of roadside rest areas (O'Neil et al. 2018; Coates et al. 2016). While ravens are a significant concern, other predators also impact GRSG populations. These include, among others, other corvids, golden eagles (*Aquila chrysaetos*), great horned owls (*Bufo virginianus*), coyotes (*Canis latrans*), badgers, bobcats, red foxes, and hawks, all of which contribute to predation pressure on GRSG.

While populations of golden eagles, great horned owls, and coyotes have remained relatively stable over the past century and are not believed to have significantly contributed to GRSG population declines (Conover and Roberts 2017), the situation with common ravens is different. Populations of golden eagles, great horned owls, and coyotes have not increased during the last century, so they likely have not contributed to GRSG population declines (Conover and Roberts 2017).

Raven populations in the West have increased due to anthropogenic influences such as habitat changes and food availability (Conover and Roberts 2017; Boarman et al. 2006; USFWS 2023). This rise in raven numbers has led to an elevated predation rate on GRSG, which may contribute to the decline of GRSG populations, particularly in areas where sagebrush habitat is already degraded (Conover and Roberts 2017; Coates et al. 2016; USFWS 2023).

Sagebrush habitats that remain intact typically support high nest success and adult survival rates (Hagen 2011). However, highly fragmented sagebrush landscapes reduce protective cover and can support abnormally large predator populations, including ravens. Recent studies indicate that high raven populations have become a significant factor even in relatively intact landscapes. The challenge of managing raven populations is compounded by limited control measures, further complicating efforts to manage raven populations and mitigate their impact on GRSG.

In addition to ravens, the introduction of red foxes (*Vulpes vulpes*) into central Wyoming, primarily from fox farms that became unprofitable, has further exacerbated predation on GRSG (Baxter et al. 2000). While GRSG survival rates may be higher in areas with intact habitats, egg and chick survival remains a critical issue across all habitats due to predation.

It is important to recognize the natural cycles of predator-prey interactions. Predator populations fluctuate in response to prey availability, and GRSG populations are subject to these natural cycles. Understanding these dynamics is crucial for developing effective management strategies.

Interactions Between Climate Change, Wildfire, and Invasive Species

Over the past century, changing trends in temperature, precipitation, and atmospheric CO_2 have altered vegetation community composition and species distributions across the western U.S. (Polley et al. 2013; Lucht et al. 2006; USGCRP 2018), resulting in changes to the composition and availability of sagebrush (Schlaepfer et al. 2015; Still and Richardson 2014). Research predicting sagebrush responses to changing climate has helped identify areas where climate change poses the greatest threat to GRSG habitat. Projections suggest geographically divergent responses of big sagebrush to climate change with changes in biomass ranging from −20% to +27% (Palmquist et al. 2021; see **Map 3.10** in **Appendix 1**). Decreases in sagebrush cover were projected across much of its range, although some increases were projected in Wyoming, the Northern Great Basin, and eastern Montana (Rigge et al. 2021c; see **Map 3.11** in **Appendix 1**). Warmer, drier sites are likely more susceptible to sagebrush reductions compared with cooler, wetter sites (Rigge et al. 2021c; Adler et al. 2018; Flerchinger et al. 2019; Palmquist et al. 2021). GRSG may have the ability to move to areas that are currently cooler and wetter, as long as the new regions are suitable and available for sagebrush expansion (BLM 2013a; Knick et al. 2013).

Within the planning area, California, Colorado, Eastern Montana, Eastern Oregon, Nevada, Southern Idaho, Utah, and Wyoming have experienced particularly severe and prolonged drought (NOAA 2022; Belmecheri et al. 2015; Griffin and Anchukaitis 2014), which, based on climate models, are expected to become more intense rangewide (BLM 2020a; NOAA 2022; see **Section 3.13.1**, Air Resources, *Climate Change and Greenhouse Gases*). In August 2021, nearly the entire planning area experience severe or greater drought with similar conditions in 2022 (NOAA 2022). This drought has caused changes to vegetation conditions, including lower sagebrush canopy cover, reduced perennial grass and forb production, and changes to food resource availability (See **Section 3.3**, Vegetation). Such changes could trigger mismatches in timing between resource availability and GRSG life-history needs. Because GRSG population abundance is positively related to mesic availability (Donnelly et al. 2016, 2018), weather-driven productivity has been identified as a key factor influencing GRSG survival (Blomberg et al. 2013; Guttery et al. 2013; Donnelly et al. 2018). A diversity of mesic resources (e.g., rangelands, riparian, and wet meadows) may help sustain GRSG populations over time, but regional drought sensitivity may influence demographic performance differently across the species range (Donnelly et al. 2018).

Sagebrush habitats with low resistance and resilience to invasion by exotic annual grasses are also more likely to be negatively affected by climate changes (Adler et al. 2018). Climate change may worsen the spread of invasive species, such as cheatgrass, medusahead, and ventenata, by increasing the severity of droughts, reducing precipitation, or altering wildfire cycles (BLM 2013a; USGCRP 2018). Climate change models indicate less precipitation may occur from July through August in lower elevation sites; this may favor cheatgrass, which becomes dormant in summer, over native perennials, which depend on summer moisture for growth. Elevated temperatures due to climate change may increase the competitive ability of cheatgrass at higher elevations, expanding its range into sites where it currently is not widespread. Climate change may increase the spread of woody plants such as juniper at higher elevations due to increased precipitation in winter and spring and warmer temperatures, which may increase wildfire risk (BLM 2013a).

Disease Relative to Climate Change

GRSG are highly susceptible to mortality from West Nile virus (*Flavivirus* spp.), the zoonotic disease transmitted by mosquitoes and other anthropods (Clark et al. 2006; Naugle et al. 2004; Clark et al. 2006). Climate change is expected to increase the risk of exposure to West Nile virus because warmer temperatures associated with climate change can lengthen the mosquito breeding season, biting rates, and the incubation of the disease within a mosquito. Climate change may also likely alter GRSG ecology and physiology, as well as the mosquitoes that play a role in disease transmission and maintenance. During periods of drought, which are expected to be more frequent and possibly more intense under climate change, GRSG may also move toward water earlier in the year and, subsequently, come into contact with mosquitoes for longer periods during the transmission season (Naugle et al. 2004). The combined impacts of predicted climate change on sagebrush habitat and West Nile virus transmission are likely to reduce suitable GRSG habitat in the northern Great Plains and northern Rockies (Schrag et al. 2011).

Renewable Energy Development

There has been increasing interest in renewable energy development and many areas that are promising for wind, solar, and geothermal energy development overlap with GRSG habitat (Hanser et al. 2018). There is concern that renewable energy development may have similar negative effects on GRSG habitats and populations as non-renewable energy development (NWCC 2017; Hanser et al. 2018). For example, disturbance associated with existing energy infrastructure and human activity has been linked to reproductive costs incurred by GRSG exposed to diverse energy development. Female GRSG avoided areas where discrete disturbance was high during nesting and brood-rearing, and survival of nests and broods were highest in areas that had the least amount of disturbance. This indicates the importance of minimizing disturbance to maintain viable GRSG populations (Kirol et al. 2020).

Impacts from renewable energy development generally include direct habitat loss and fragmentation due to facilities, access roads, and transmission lines as well as disturbance and habitat avoidance from noise and increased human presence. Solar facilities in particular require a large land area and high water consumption (Hanser et al. 2018). Geothermal power is expanding, and while little is known regarding impacts of geothermal energy on wildlife populations, recent research suggests GRSG are adversely affected. GRSG experienced decreased nest and adult survival near geothermal infrastructure (Coates et al. 2023). Ravens also increased in density around geothermal plants, potentially increasing predation risk to GRSG (Coates et al. 2023).

Research has suggested that the sensitivity of GRSG to wind energy development varies with the life history stage and distance from disturbance (NWCC 2017). Brood site selection and summer habitat selection were both negatively affected by surface disturbance, such as cleared ground related to roads and turbine pads. Females raised broods in habitats with lower densities of turbines and access roads out to 1.2 km from the facility. At a wind facility in Wyoming, lek counts declined more severely near wind infrastructure after a 3- or 5-year time lag and the relative probability of GRSG selecting brood-rearing and summer habitats was negatively correlated with the percentage of surface disturbance associated with the facility infrastructure (LeBeau et al. 2017a, 2017b). Effects of wind infrastructure on lek attendance were weakly evident within 1.5 km from a turbine. However, survival rates were higher on the wind facility site relative to the undisturbed site, possibly due to lower numbers of avian predators (LeBeau et al. 2017b). Further research is needed to increase the understanding of the relationship between wind energy development and GRSG populations.

Wild Horses and Burros

The Wild Free-Roaming Horses and Burros Act of 1971 was created to manage population levels of herds to facilitate and protect "a thriving natural ecological balance" (Coates et al. 2021a). The BLM was tasked to establish appropriate management levels (AMLs) for each herd management area to balance the multiple use and sustained yield mandate (Coates et al. 2021a; BLM 2010). Over the past decade, the population of wild horse and burro populations on public land has greatly increased. When they are found at densities greater than the AML, wild horses can reduce GRSG population trends (Coates et al. 2021a) and demographic rates (Beck et al. 2024). In Nevada, the current population estimate is 46,974 wild horses, which exceeds the BLM's AML upper limit of 11,987 by 367% (Munoz et al. 2021). The estimated population of wild burros in Nevada as of March 1, 2024, on BLM lands is 4,685 (BLM 2024a). The BLM does not manage wild horse and burro grazing like it does for livestock grazing.

Recent research suggests wild horses can directly and indirectly disrupt native wildlife populations within sagebrush ecosystems (Munoz et al. 2021). Wild horse presence causes fragmented and reduced shrub cover, increase soil compaction and erosion, and may contribute to the spread of invasive grasses (Coates et al. 2021a; Munoz et al. 2021; Henning et al. 2021). Wild burros can have grazing and trampling impacts that are similar to wild horses (Carothers et al. 1976; Douglas and Hurst 1993; Hanley and Brady 1977) and can substantially affect riparian habitats (e.g., Tiller 1997) and native wildlife (e.g., Seegmiller and Ohmart 1981). Where wild burros and GRSG co-occur, year-round use by burros in low elevation habitats may lead to a high degree of overlap between burros and GRSG (Beever and Aldridge 2011; Griffin et al. 2019). Wild horses may be a particular threat during the lekking season. Research suggests that male GRSG respond differently when native (pronghorn and mule deer) and non-native (wild horses and cattle) ungulates are on established leks (Munoz et al. 2021). GRSG continue to display at leks when native ungulates are present, but they are not usually detected when non-native ungulates are present (Munoz et al. 2021).

3.2.2 Conditions and Trends within the Planning Area

Population, Abundance, and Trends

Lek count data have been widely used to monitor GRSG population trends and are considered a reasonable index to relative abundance (Reese and Bowyer 2007; Doherty et al. 2010, 2016). Because demographic properties, such as rates of population change, are affected by environmental and intrinsic factors that operate on different spatial and temporal scales (Gurevitch et al. 2016), clustering leks into hierarchical levels can help detect changes in abundance that are more likely driven by demographic rates. Pronounced clustering has been documented in GRSG populations Doherty et al. 2016). This suggests the species is vulnerable to those landscape-level risks that occur in high-density areas because they could negatively affect large proportions of the populations (Doherty et al. 2016).

New research incorporated lek count variation and habitat selection into population estimates to more accurately reflect abundance and changes across different spatial and temporal scales (Baumgardt et al. 2017; Fremgen et al. 2016; Fremgen et al. 2017; McCaffery et al. 2016; Monroe et al. 2016). Coates et al. (2021a) clustered GRSG leks to develop a multi-scale hierarchical population structure that can be used to assess population trends. Estimated trends show 37.0%, 65.2%, and 80.7% declines in abundance rangewide during short (17 years), medium (33 years), and long (53 years) temporal scales, respectively (see **Map 3.1** in **Appendix 1**). However, trends varied spatially, and some areas exhibited evidence of increasing trends in recent decades. In general, population clusters at the periphery of the species range showed higher probabilities of extirpation relative to interior clusters (see **Map 3.2** in **Appendix 1**).

The use of statistical models applied to time series lek count data have also improved the understanding of GRSG population fluctuation. There is substantial variation in how GRSG populations fluctuate across space and through time. Populations in core range (Great Basin and Wyoming Basin) exhibited the most consistent fluctuation but with smaller differences between population highs and lows (Row and Fedy 2017). Trends for marginal populations did not follow expected fluctuations, and large-scale spatial synchrony among populations weakened as fluctuations weakened. Length between fluctuation for most populations also decreased with time.

Genetic Structure and Connectivity

Genetic variation and the dispersal of individuals are necessary to maintain GRSG resilience to current and future environmental and demographic stochasticity and anthropogenic effects. Several studies have used genetic network models to delineate subpopulations, which theoretically represent the core of each distinct genetic group and identify areas of increased importance to GRSG genetic connectivity (Cross et al. 2023; Cross et al. 2018; Oyler-McCance et al. 2022; see **Map 3.3** in **Appendix 1**). Areas outside of subpopulation centers are likely important for maintaining overall connectivity by allowing different genetic groups to converge (Cross et al. 2018; Oyler-McCance et al. 2022). However, subpopulation centers that help maintain genetic diversity, as well as other "hubs" important for connectivity (Cross et al. 2018; Oyler-McCance et al. 2022) were identified as high priority for targeted conservation efforts. Areas outside subpopulation centers are also priorities for conservation to protect areas where different genetic groups converge to maintain overall connectivity. Translocations have been recommended to reestablish and sustain genetic diversity in declining GRSG populations. Low genetic diversity has been shown to be coupled with declining population trends, suggesting relatively high conservation concern.

Gene flow is greater, and genetic differentiation less in areas of contiguous habitat in eastern Montana, most of Wyoming, much of Oregon, Nevada, and parts of Idaho. In contrast, areas of fragmented habitat such as in Utah exhibited the greatest genetic differentiation and lowest effective migration (Oyler-McCance et al. 2022). Migration rates were lower than expected and functional connectivity was constrained in central Wyoming east of the Continental Divide (Row et al. 2018; Oyler-McCance et al. 2022; see **Map 3.5** in **Appendix 1**).

Empirical evidence on the mechanisms governing the exchange of genetic information among populations shows that affinity to breeding leks can inherently restrict gene flow and provide a mechanism for maintaining localized genetic structure (Cross et al. 2016, 2017; Jahner et al. 2016). Additionally, landscape and habitat features, such as terrain ruggedness, may cause dispersing GRSG to avoid certain areas and affect connectivity between populations (Row et al. 2018). However, increased habitat suitability, especially during nesting and winter periods, decreased anthropogenic effects on the landscapes, and increased landscape connectivity can facilitate higher rates of gene flow that are important for population persistence (Cross et al. 2017; Jahner et al. 2016; Knick et al. 2013; Row et al. 2015, 2016). Research suggests minimum thresholds for sagebrush land cover across the landscape for GRSG persistence. One study showed 90% of active leks occurred on landscapes that were at least 40% dominated by sagebrush, while others have shown 25% to 30% sagebrush within 18- and 30-km scales (Aldridge et al. 2008; Wisdom et al. 2011). The rangewide map of habitat and genetic connectivity indicates areas that are important to genetic exchange and population persistence (see **Map 3.4** in **Appendix 1**).

Habitat Conditions and Trends

The distribution of GRSG is closely aligned with the distribution of sagebrush-dominated landscapes (Schroeder et al. 2004), and occupancy is associated with measures of sagebrush abundance and distribution.

Sagebrush area (percentage of 18-km radius composed of sagebrush cover types) was the single best discriminator between occupied and extirpated ranges among 22 variables evaluated by Wisdom et al. (2011). Across the planning area, sagebrush vegetation communities still occur on approximately 109,131,000 acres (**Table 3-2**, Vegetation Communities within GRSG HMAs by State in **Appendix 9**).

Existing Habitat Management Areas

Currently, the BLM delineates GRSG habitat into management areas to help prioritize habitat and conservation activities while providing management flexibility. GRSG habitat management areas (HMAs) were identified during previous land use plan amendments based on considerations of GRSG occupancy, landscape, habitat and land use/adaptive management opportunities as described below. HMAs have been revised in some instances through plan maintenance actions.

Priority Habitat Management Areas (PHMAs) are considered those areas with the highest value for maintaining sustainable GRSG populations. Management within PHMAs is the most restrictive, designed to promote GRSG conservation. Sagebrush Focal Areas (SFAs), as defined in the 2015 plans are "Areas identified by the USFWS that represent recognized "strongholds" for GRSG that have been noted and referenced by the conservation community as having the highest densities of GRSG and other criteria important for the persistence of GRSG." Remaining suitable habitat are designated as General Habitat Management Areas (GHMAs), which are either occupied seasonally or provide year-round habitat where some special management would apply. The GHMA designation is the least restrictive due to generally lower occupancy of GRSG and more marginal habitat conditions.

The 2015 Resource Management Plan (RMP) Amendments for several states include additional habitat management area categories. These are described further in Appendix 3 and the corresponding management for these other HMA categories is discussed in the previous RMPAs.

All states except Montana and the Dakotas adjusted their HMA boundaries in the 2019 RMP amendments. Idaho, Nevada/California, Wyoming and Utah also removed SFAs through the 2019 efforts.

Habitat Assessment Framework

The Habitat Assessment Framework (HAF, Stiver et al. 2015) provides a multiple-scale, GRSG habitat assessment tool that can be easily integrated into the BLM landscape monitoring approach. The HAF established indicators to determine the status of sage-grouse habitat needs at multiple scales and for seasonal habitats. The results of these assessments provide necessary information to evaluate whether the BLM managed lands are meeting the sage-grouse land health habitat standard.

GRSG occupy large geographic extents and experience a high degree of spatial heterogeneity in biotic and abiotic variables across their range (Doherty et al. 2016; Coates et al. 2021b). The general condition and trend of habitats on BLM-administered lands varies by geographic area within the region and is a result of various threats that are currently occurring or have occurred historically. The HAF was established to account for this variation and describes habitat suitability at different spatial scales (Stiver et al. 2015). The orders of habitat selection are hierarchical, in which each higher order is dependent on the previous order (Johnson 1980; Stiver et al. 2015):

- First-order (broad-scale): The physical or geographical range of a species (Johnson 1980). GRSG range is defined by populations of GRSG associated with sagebrush landscapes (Connelly et al. 2003).
- Second-order (mid-scale): Population areas; dispersal between subpopulations. These may include as many as 39 discrete populations (USFWS 2013).

- Third-order (fine-scale): Home range of isolated populations, subpopulations, or an individual, which is determined in part by the quality and the comparison of resources within and between seasonal habitats. Relevant ecological processes are those that may affect movements between seasonal habitats within a home range.
- Fourth-order (site-scale): The use of a particular nesting, feeding, or roosting site within one particular seasonal habitat. Ecological processes consider seasonal habitat needs related to the life requisites of shelter, food, and breeding.

Space is a significant life requisite for GRSG at all scales – pathways for movement within and between populations are critical for maintaining population viability, while access to well-connected sagebrush patches that provide dispersal and movement among subpopulations is essential for GRSG population viability and long-term persistence. At the fine scale, habitat availability, security, and connectivity within home ranges are important for securing seasonal movements to shelter and food needs. Shelter and food availability at the site-scale directly affects individual fitness, survival, and reproductive potential (Stiver et al. 2015).

The GRSG mid-scale HAF areas are shown in **Map 3.6** in **Appendix 1**, and the fine-scale HAF areas are shown in **Map 3.7** in **Appendix 1**.

Sagebrush Ecological Integrity

Advances in research have built upon the emerging understanding of the importance of multiscale habitat selection (Johnson 1980) and how landscape context affects GRSG habitat selection, survival, and population persistence (Aldridge and Boyce 2007; Aldridge et al. 2008; Doherty et al. 2008; Connelly et al. 2011b; Wisdom et al. 2011; Knick et al. 2013; Doherty et al. 2016; Coates et al. 2021a). This work has identified the need for large intact sagebrush landscapes with minimal disturbance that provide all seasonal components required to meet GRSG life history needs. Geographical patterns in sagebrush ecological integrity were positively linked to GRSG population performance (Doherty et al. 2022a). Therefore, conservation actions in those areas identified as having high sagebrush ecological integrity may be most beneficial.

Probability of Breeding Habitat and Lek Persistence

Breeding habitat is highly condensed within GRSG occupied range and comprises 26% of the current range (see **Map 3.8** in **Appendix 1**). General habitat variables and climatic gradient variables were more important than disturbance variables in predicting occupied breeding habitat across the species' range. However, human disturbance resulted in the sharpest probability distribution declines once identified thresholds were crossed (Doherty et al. 2016). GRSG response to sagebrush varies across the range with strong selection for landscape-level sagebrush and a strong avoidance of tree cover. Thresholds of disturbance factors (i.e., tillage, conifer, human disturbance index) also varied across the range (Doherty et al. 2016).

Rangewide lek persistence was modeled as a function of environmental covariates, including sagebrush cover, pinyon-juniper cover, topography, precipitation, point and line disturbance densities, and landscape configuration metrics (Wann et al. 2023). Five of these covariates showed significant regionally varying responses: sagebrush clumpiness (a measure of habitat aggregation), pinyon-juniper cover, point disturbance of anthropogenic features such as energy infrastructure and communication towers, elevation, and a topographic index associated with mesic habitats. The highest quality habitat (capturing 50% of active leks) was estimated as covering 25.5% of the occupied range, while the combined lowest through highest quality habitats (capturing 95% of active leks) covered 65.0% (see **Map 3.9** in **Appendix 1**). These results suggest

that habitat management planning should consider regional environmental differences in addition to broader-scale habitat requirements (Wann et al. 2023).

3.3 VEGETATION

Vegetation provides many ecosystem services, including, but not limited to, stabilizing soils, preventing erosion, absorbing carbon dioxide, releasing oxygen, increasing species diversity, and providing habitat and food for animals and products for human use. Many land management policies are directed toward maintenance of healthy vegetation communities (Fattet et al. 2011; Yapp et al. 2010; Lawler et al. 2014).

Landscape Monitoring Framework (LMF) and field office collected Assessment, Inventory, and Monitoring (AIM) data provide estimates for consistent contextual information about habitat conditions (Herren et al. 2021). AIM data represent one of the largest available datasets to inform resource management decisions on BLM lands. The LMF is a component of the AIM strategy and is used to assess and monitor renewable resources on BLM-administered rangelands in 13 western states (Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, North Dakota, Oregon, South Dakota, Utah, Washington, and Wyoming). LMF and AIM would be used to evaluate whether quantitative habitat objectives are met within seasonal habitats within HMAs.

GRSG rely on sagebrush ecosystems for all aspects of their life cycle. Typically, a range of sagebrush community composition within the landscape (including variations in sub-species composition, co-dominant vegetation, shrub cover, herbaceous cover, and stand age), along with the use of riparian and wet meadow areas, is needed to meet seasonal requirements for food, cover, nesting, and wintering habitats. Since GRSG require large landscapes, the ecology, management, and conservation of large, intact sagebrush ecosystems goes hand-in-hand with managing for the dynamics and behaviors of the populations themselves (Connelly et al. 2004; Crawford et al. 2004). Intact sagebrush does not imply uniform coverage of sagebrush across the ecosystem, but a mosaic of shrub, grassland, and riparian cover across the landscape that allows for migration of GRSG between seasonal habitats (Connelly et al. 2011b). In addition, riparian and wetland areas provide important seasonal habitat, water, and forage for GRSG. See section 3.2.1 *Life History and Habitat Characteristics* for an in-depth discussion of GRSG habitat characteristics and requirements.

Historically, sagebrush-dominated vegetation was one of the most widespread habitat types in the US, but its expanse has been fragmented, lost, or altered by invasive plant species and anthropogenic disturbance (NTT 2011). Current protection of GRSG habitat involves restrictions and limitations on activities that contribute to the spread of invasive plant species, wildfire, and habitat fragmentation, reducing other surface disturbances, and management of vegetation to promote healthy sagebrush and understory vegetation to support GRSG. Some habitat loss associated with energy development, infrastructure, wildfire, and invasive plants will likely continue into the future.

There are two main sagebrush dominant vegetation communities: sagebrush steppe and sagebrush shrublands (Kuchler 1970). The sagebrush steppe resembles a semiarid grassland and is characterized by a mosaic of perennial bunchgrasses and forbs with sagebrush shrubs. Sagebrush shrubland resembles more of an arid, desert ecosystem with fewer grasses and forbs and sagebrush dominates (Arizona 2023). The open density, erosive soils, and low herbaceous cover of the sagebrush shrubland type contribute to the vulnerability of this sagebrush type to plant invasions (Barbour and Billings 2000).

Within both the sagebrush steppe and sagebrush shrubland types there are several different community types. The dominant vegetation community types are calculated and presented in acres by state within HMAs (**Table 3-2** [**Appendix 9**]), **Map 3.12** [**Appendix 1**]).

Table 3-2 (**Appendix 9**) and **Map 3.12** (**Appendix 1**) presents LANDFIRE Existing Vegetation Type (EVT) acres, which captures a number of different sagebrush, sagebrush-associated, and non-sagebrush communities. Several representative vegetation community types within each of those three categories are discussed below, but LANDFIRE EVT includes more communities included in the numbers above.

3.3.1 Representative Sagebrush Vegetation Communities

Wyoming Big Sagebrush/Grassland

The Wyoming big sagebrush (*Artemisia tridentata* spp. *wyomingensis*)/grassland occurs in shallow-to-moderately deep soil at lower elevations, giving way to basin big sagebrush (*Artemisia tridentata* spp. *tridentata*) in deeper soils and to mountain big sagebrush (*Artemisia tridentata* spp. *vaseyana*) above 6,500 feet in elevation and within the 9- to 16-inch annual precipitation zones (Knight 1994). Shrub height varies from as little as six inches on shallow sites to around 30 inches in deeper soils. Canopy cover is usually under 30% which is generally lower than observed in either basin or mountain big sagebrush.

Wyoming big sagebrush often appears as the dominant plant in mosaic communities intermixed with Gardner saltbush (*Atriplex gardneri*) and open grasslands. In shallow, rocky-to-gravelly soils, Wyoming big sagebrush may co-dominate with black sagebrush (*Artemisia nova*), green rabbitbrush (*Chrysothamnus viscidiflorus*), and sometimes winterfat (*Krascheninnikovia lanata*). Grass and forb species vary depending on soil texture, aspect, and slope (Knight 1994). Common grass and grass-like species include bluebunch wheatgrass (*Pseudoroegneria spicata*) and thickspike wheatgrass (*Elymus lanceolatus*), Sandberg bluegrass (*Poa secunda sandbergii*), mutton bluegrass (*Poa fendleriana*), Indian ricegrass (*Achnatherum hymenoides*), needle-and-thread (*Hesperostipa comata*), threadleaf sedge (*Carex filifolia*), and bottlebrush squirrel tail (*Elymus elymoides*). Common forbs include phlox (*Phlox spp.),* Hooker sandwort (*Arenaria hookeri*), onion (*Allium* spp.), goldenweed (*Pyrrocoma* spp.), sego lily (*Calochortus nuttallii*), buckwheat (*Eriogonum* spp.) penstemon (*Penstemon* spp.), Indian paintbrush (*Castilleja* spp.), globemallow (*Sphaeralcea* spp.), and prickly-pear cactus (*Opuntia* spp.).

Basin Big Sagebrush Shrubland

Basin big sagebrush shrubland is found in moderately deep-to-deep soils of all soil textures, in zones of ten to 16 inches of annual precipitation (Beetle 1960). It occurs as pockets within Wyoming big sagebrush and Gardner saltbush communities, as the dominant plant type along valley bottoms and canyons, and along ephemeral washes. This subspecies of big sagebrush may reach 12 feet in height, with canopy cover reaching 70%.

Basin big sagebrush mixes with serviceberry *(Amelanchier spp.),* green and rubber rabbitbrush (*Ericameria nauseosa*), snowberry (*Symphoricarpos* spp.), bitterbrush (*Purshia tridentata*), silver sagebrush (*Artemisia cana*), and mountain mahogany (*Cercocarpus* spp.), depending on the soil depth, annual precipitation, and elevation. Grasses occurring in these communities include basin wildrye (*Leymus cinereus*), green needlegrass (*Nassella viridula*), Idaho fescue (*Festuca idahoensis*), thickspike wheatgrass, Kentucky bluegrass (*Poa pratensis*) and mutton bluegrass, and bottlebrush squirrel tail. Common forbs include bluebell (*Mertensia* spp.), groundsel (*Senecio vulgaris*), onion, violet (*Viola* spp.), buttercup (*Ranunculus spp.*), sagebrush false dandelion (*Nothocalais troximoides*), buckwheat, penstemon, Indian paintbrush, lupine (*Lupinus* spp.), locoweed (*Oxytropis* spp.), *Agoseris* spp., and prickly-pear cactus (Decker et al. 2020).

Basin big sagebrush can provide important cover and habitat for wildlife species. In some areas it also provides critical winter habitat for GRSG when snow covers most other shrubs. Basin big sagebrush increases in density and cover as the dominant plant species, and to even a greater degree when associated

with poor livestock management and/or interruptions in the wildfire cycle. The natural wildfire recurrence interval in the sagebrush type is approximately 30 to 75 years.

Mountain Big Sagebrush/Grassland

Mountain big sagebrush is located in shallow or moderately deep soils at elevations above 6,500 feet, in 9- to 20-inch annual precipitation zones (Innes and Zouhar 2018). This is one of the largest homogeneous communities of this sagebrush type in the United States. Mountain big sagebrush also occurs as smaller plant communities at the lower mountain elevations, intermixed with aspen (*Populus* spp.) and conifer woodlands. Shrub height will vary from eight to 60 inches, with canopy cover reaching 50% to 60%.

Mountain big sagebrush is usually the dominant shrub in foothill and mountain sage communities, with bitterbrush, serviceberry, snowberry, and mountain mahogany providing subdominant brush diversity. Grasses include Idaho fescue, king spike fescue (*Leucopoa kingii*), needlegrass (*Achnatherum* spp.), muttongrass, and Kentucky and big bluegrass; elk sedge (*Carex geyeri*), and Ross' sedge (*C. rossii*). Common forbs found in these areas include Indian paintbrush, phlox, balsamroot (*Balsamorhiza* spp.), locoweed, lupine, larkspur (*Delphinium* spp.), penstemon, hawksbeard (*Crepis* spp.), and Oregon grape (*Mahonia aquifolium*) (MTNHP 2024).

Mountain big sagebrush is limited as a food source for GRSG during the winter when these habitats become unavailable because of snow.

Silver Sagebrush/Grasslands

Silver sagebrush/grasslands have two subtypes with very different habitats. The most common is found in deep sandy soils and consists of silver sage as the dominant species. It is associated with basin big sagebrush, green rabbitbrush, serviceberry, chokecherry (*Prunus* spp.), and wood rose (*Rosa woodsii*). Herbaceous species include needle-and-thread, Indian ricegrass, poverty oatgrass (*Danthonia spicata*), sand dropseed (*Sporobolus cryptandrus*), scurfpea (*Pediomelum* spp.), and prickly-pear cactus.

A second type of silver sagebrush is located in riparian habitat along streams above the wet sedge and willow riparian zone. This second riparian terrace is also habitat for basin wildrye, Kentucky bluegrass, streambank wheatgrass (*Elymus lanceolatus psammophilus*), redtop (*Agrostis gigantea*), Baltic rush (*Juncus balticus*), clover (*Trifolium* spp.), checkermallow (*Sidalcea malviflora*), malva (*Malva sylvestris*), and, occasionally, cottonwood (*Populus* spp.) and willow (*Salix* spp.).

Low Sages—Alkali, Birdsfoot, Black, and Wyoming Three-Tip Sagebrush/Grassland

Alkali sagebrush (*Artemisia arbuscula longiloba*) is found growing in clay soils and can withstand soils of higher alkalinity than can other sagebrush species (Beetle and Johnson 1982; Knight 1994). It reaches six to 12 inches in height and occurs in relatively pure communities because of the high clay content and high cation exchange capacity in the soils in areas below 7,500 feet in elevation. Understory grasses include bluebunch wheatgrass, western wheatgrass (*Pascopyrum smithii*), mutton bluegrass, bottlebrush squirreltail, and Indian ricegrass. Forbs noted at this site include wild buckwheat (*Eriogonum ovalifolium*), biscuit root (*Lomatium* spp.), and wild onion.

Birdsfoot sagebrush (*Artemisia pedatifida*) is found in alkaline soils, where pH ranges from 8.5 to 11, and below 7,500 feet. It is a mat species, reaching only three to six inches in height. At lower pH levels, birdsfoot sage mixes with Gardner saltbush, and it appears with a mixture of grasses and forbs on windswept ridges and hills. At higher pH levels, birdsfoot sagebrush occurs as a monoculture.

Black sagebrush occurs on gravelly-to-rocky soils that have a "shallow effective" rooting depth (less than 15 inches) and various textures from sandy loams to clay loams. As a result, plant heights may vary between four and 12 inches. On the plains north of the Ferris and Seminoe Mountains, it is the principal shrub present, but it will often be intermixed with Wyoming big sagebrush. Above 7,400 feet, it gives way to Wyoming three-tip sagebrush. It also has been observed as an understory shrub in true mountain mahogany stands. On sandy sites, it is commonly found with needle-and-thread, threadleaf sedge, Junegrass (*Koeleria macrantha*), sandwort, and buckwheat, whereas on loamy soils it will occur with wheatgrasses, bluegrasses, Indian ricegrass, phlox, onion, paintbrush, and penstemon.

Wyoming three-tip sagebrush (*Artemisia tripartita*) occurs above 7,000 feet in the foothills and at the higher elevations of the mountain ranges. It normally grows between four inches and 15 inches tall in moderately deep, well-drained soils (Beetle and Johnson 1982). It is often found intermixed with mountain big sagebrush and black sagebrush. Understory grasses and forbs include Idaho fescue, king spike fescue, Columbia needlegrass, elk sedge, Ross' sedge, Indian paintbrush, prairie clover (*Dalea* spp.), larkspur, balsamroot, phlox, and buckwheat. Wyoming three-tip sagebrush-dominated areas are often used as forage for wildlife.

3.3.2 Representative Sagebrush-Associated Vegetation Communities

Sagebrush-Associated Vegetation Communities are typically grasses and forbs species in shrub-dominated overstories and grass/forb-dominated understories that vary with geographic location, topography, soil, elevation, and climate throughout sagebrush ecosystems. Sagebrush steppe and shrublands vegetation follow a gradient of temperatures and moistures that may have perennial herbaceous species dominate or be co-dominant with sagebrush, depending on the last wildfire, insect outbreak, or climatic changes. (Arizona 2023).

Inter-Mountain Basins Mixed Salt Desert Scrub

Inter-mountain basins mixed salt desert scrub contains soils that are shallow to moderately deep, poorly developed, and often alkaline or saline. Salt desert shrubland is perhaps the most arid vegetation type in the intermountain West (Knight 1994). Gardner saltbush (*Atriplex gardneri*) dominates the salt desert shrub community type and in some instances occurs as up to 90% of the vegetation cover. Gardner saltbush normally grows no higher than 12 inches and may grow along the ground, forming a mat. These areas are characterized by accumulations of salt in poorly developed soils. Soils of these areas usually have a pH of 7.8 to 9, which restricts the uptake of water by all but the most salt-tolerant plants (halophytes). Soil textures can be sandy loam, sandy clay loam, or loam and clay. Salt desert shrublands occur at elevations between 5,000 and 7,600 feet within the lowest precipitation areas in the planning area (Arizona 2023). These areas are typically flat or rolling hills.

Rocky Mountain Gambel Oak-Mixed Montane Shrubland

The Rocky Mountain Gambel oak-mixed montane shrubland occurs in mountains, plateaus and foothills of the southern Rocky Mountains and Colorado Plateau, including the Uinta and Wasatch ranges and the Mogollon Rim. These shrublands are most commonly found along dry foothills, lower mountain slopes, and at the edge of the western Great Plains from approximately 6600 to 9500 ft in elevation and are often situated above pinyon-juniper woodlands (NatureServe 2022). Vegetation types in this system may occur as sparse to dense shrublands composed of moderate to tall shrubs. In many situations of this system, the canopy is dominated by the broad-leaved deciduous shrub Gambel oak (*Quercus gambelii*), which occasionally reaches small tree size. Climate is semi-arid and characterized by mostly hot-dry summers with mild to cold winters and annual precipitation of 10 to 25 inches (Natureserve 2022).

Northwestern Great Plains Mixed Grass Prairie

Mixed-grass prairie is characterized by needle-and-thread (*Hesperostipa comata*), western wheatgrass (*Pascopyrum smithii*), blue grama (*Bouteloua gracilis*), Sandberg bluegrass (*Poa secunda*), threadleaf sedge (*Carex filifolia*), needleleaf sedge (*Carex duriuscula*), prairie junegrass (*Koeleria macrantha*), Indian ricegrass (*Achnatherum hymenoides*), prickly-pear cactus (*Opuntia* spp.), globemallow (*Sphaeralcea* spp.), fringed sagebrush (*Artemisia frigida*), sand dropseed (*Sporobolus cryptandrus*), threeawn (*Aristida purpurea*), little bluestem (*Schizachyrium scoparium*), and various species of milkvetch (*Astragalus* spp.) and locoweed (*Oxytropis* spp.). Summers in this area are cool, reducing evapotranspiration. Frequent thunderstorms in July and August maintain this grassland.

3.3.3 Nonsagebrush Vegetation Communities

Nonsagebrush communities are typically grasses and forbs species in pinyon-juniper dominated overstories and grass/forb-dominated understories that vary with geographic location, topography, soil, elevation, and climate throughout sagebrush ecosystems.

Pinyon-Juniper

Pinyon-juniper woodlands occupy dry woodland sites and grow on foothills, low mountains, mesas, and plateaus, depending on precipitation and soil conditions. These areas typically include portions of black sagebrush and Wyoming big sagebrush communities occupying the cooler and moister end of their range. It also includes cool and moist mountain big sagebrush and low sagebrush (*Artemisia arbuscula*) communities with moderately deep soils (Miller et al. 2013).

Plant species present in these areas vary widely. Typically, juniper dominates at lower elevations, and pinyon dominates at higher elevations. Pinyon-juniper woodlands are similar to semiarid communities where water and soil retention or losses are governed by structure, amount and cover of vegetation, inherent soil and topographic attributes, and climate. These semiarid woodlands occupy precipitation zones between 8 and 20 inches, elevations of less than 1,000 to over 8,000 feet, and a wide variety of soils and parent materials (Miller et al. 2019). In general, pinyon-juniper communities do not provide suitable habitat for GRSG, and further, mature trees displace shrubs, grasses, and forbs through direct competition for resources that are important components of GRSG habitat (Manier et al. 2013).

Pinyon-juniper woodlands naturally spread into sagebrush and perennial grass communities and have expanded across the landscape over the last 120 years (Miller et al. 2008; Rowland et al. 2008). Expansion has been greatest in cooler and/or moister portions of the landscape (Miller et al. 2013, Johnson and Miller 2006; Weisberg et al. 2007). Expansion largely coincides with soil temperature and moisture regimes that are cool to warm and moist, to cool and moist. Three phases of juniper succession are identified by Miller (2005). In Phase I, juvenile trees are present on site, with an occasional mature, seed-producing tree present, but shrub and herbaceous vegetation still maintain dominance of ecological processes (hydraulic, nutrient, and energy cycles). As juniper saplings develop in Phase I, GRSG use declines rapidly. In Phase II, trees are established on site and contribute an equal influence on ecological processes along with shrub and herbaceous species. Trees are increased in size and density in this phase. In Phase III trees have established dominance on the site and are the primary plant group influencing ecological processes. The expansion of pinyon-juniper communities has been attributed to the reduced role of wildfire, introduction of livestock grazing, increases in global carbon dioxide concentrations, climate change, and natural recovery from past disturbance (USFWS 2010a).

Map 3.13[1] (**Appendix 1)** shows PHMA and GHMA acreage found within the percentage of the project area that is covered by conifer species in the states of California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, and Wyoming.

Riparian and Wetlands

Riparian vegetation includes plants requiring higher amounts of available water than those found in adjacent upland areas and are generally associated with water courses and wet meadow areas (Decker et al. 2020). Riparian areas, wetlands, and wet meadows provide valuable GRSG late summer brood rearing habitat because these areas provide succulent forbs and insects later in the summer when most forbs in upland habitats have dried out and are senescent (Connelly et al. 2011b). These communities make up a small percentage of the vegetation in relation to other types but are important in providing seasonal habitats.

Invasive Annual Grasses

All invasive plant species adversely affect GRSG habitat quality by competing with and displacing native species (Dardis et al. 2016). Invasive annual grasses are the most problematic due to the expense and low success rate in restoration and the dramatic shortening of wildfire frequencies where these grasses dominate. Invasive plants were present on nearly 70% of GRSG habitat in 2018 (Herren et al. 2021).

Cheatgrass and medusahead are the two most aggressive non-native invasive species found in the planning area and comprise about 15% of vegetation on average (Herren et al. 2021). These species are prolific seed producers and can out-compete native plants for valuable resources such as water and nutrients. These grasses germinate in the fall and early spring and are adapted to thrive in low moisture conditions (Tilley 2023). Throughout the west, the number and size of infestations have increased in size and density over the last 20 years.

Cheatgrass is usually matured and cured by early to mid-June, while most native herbaceous species cure in late July and early August. In areas where cheatgrass has replaced native species, earlier and more frequent wildfire can occur, causing further damage to native plant species. With an increased wildfire frequency, conversion to annual grasslands is likely and an increase in other invasive species such as Russian-thistle (*Salsola* spp.) and rush skeletonweed (*Condrilla juncea*), can replace native plants in previously sagebrush dominated ecosystems.

The invasive annual grass ventenata, including North Africa grass (*Ventenata dubia*), is an emerging concern that is spreading quickly through the planning area. Ventenata differs from cheatgrass in that it prefers wetter conditions (Scheinost et al. 2008). Ventenata is beginning to replace perennial grasses and forbs along roadsides and in hay, pasture, rangeland, and fields in the western U.S. It has minimal forage value for wildlife and may cause the soil to be more prone to erosion. Over time, infestations of ventenata will cause a decline of productivity and land value (Scheinost et al. 2008).

3.3.4 Climate

As described in **Section 3.2.1**, Species Background, *Threats*, changing trends in temperature, precipitation, and atmospheric CO_2 over the past century have resulted in changes in the composition and availability of sagebrush. Climate change scenarios for the sagebrush region predict a decline in sagebrush communities across most of its range, although some increases were projected in Wyoming, the Northern Great Basin, and eastern Montana (Rigge et al. 2021c). Changing environmental conditions may also favor invasive species (e.g., cheatgrass) expansions and result in increased wildfire sizes and frequencies. In addition, climate change

[1] The Falkowski et al. 2017 data used to create **Map 3.13** does not cover the entire planning area.

may exacerbate the expansion of woody vegetation (e.g., pinyon (*Pinus* spp.) and juniper (*Juniperus* spp.)) into sagebrush communities (Shriver et al. 2022).

3.4 WILDLAND FIRE ECOLOGY AND MANAGEMENT

Wildfires played an important role historically in creating a mosaic of areas of herbaceous species and mature sagebrush. However, human influences have changed wildfire return intervals, altering their historical ranges of variability. Human factors include wildfire ignitions, wildfire suppression, grazing management, and invasive annual grass expansion, which alters the fuel composition. Sagebrush ecosystems have among the most altered wildfire regimes due to these factors (Shinneman et al. 2018).

3.4.1 Role of Wildfire in Sagebrush Vegetation Communities

Wildfire is an important component and functional natural disturbance of all sagebrush-dominated plant communities. Depending on the nature of the site, the wildfire return interval can be between 33 and 130 years (Innes 2019). Historic wildfire seasons in sagebrush communities usually occur between July and September, with the most extreme wildfire conditions being in August (Bunting et al. 1994). Wildfire can be particularly damaging to sagebrush ecosystems. Big sagebrush does not resprout after a wildfire but is replenished by wind-dispersed seed from adjacent unburned stands or seeds in the soil. Depending on the species and the size of a burn, sagebrush can reestablish itself within five years of a burn, but a return to a full pre-burn community cover can take 15 to 30 years or longer (Manier et al. 2013).

Following wildfire, mountain big sagebrush reestablishes as the dominant species more quickly than do other sagebrush types, often resuming dense canopy cover after approximately 40 years. Immediately after wildfire, perennial grasses, forbs, and sprouting shrub species dominate for up to 20 years (Innes and Zouhar 2018). The natural wildfire recurrence interval in this sagebrush type is approximately 25 to 75 years. Reduced wildfire frequency in mountain big sagebrush types has allowed for the encroachment of conifer species such as lodgepole pine (*Pinus contorta*) and Douglas-fir (*Pseudotsuga menziesii*).

In contrast to big sagebrush, silver sagebrush readily resprouts following wildfire, which facilitates post-fire recovery and potential use of prescribed fire as a management tool under favorable spring moisture conditions (White and Currie 1983; Howard 2002). However, any disturbance in the silver sagebrush community may result in less desirable species increasing in prevalence due to the transition of soil types or low-moisture regime. Black sagebrush sites rarely burn, probably because of the low production and shrub cover these sites support. Wyoming three-tip sagebrush (*Artemisia tripartita*) does burn, but because of a lack of fuel continuity, large, resource-damaging wildfires are rare.

3.4.2 Invasive Annual Grasses

Increasing exotic annual grasses, primarily cheatgrass, are resulting in sagebrush loss and degradation (USFWS 2010a). Cheatgrass can more easily invade and create its own feedback loop in areas that are dry with understory vegetation cover that is not substantial or that are experiencing surface disturbance, such as road construction. Cheatgrass facilitates short wildfire return intervals by outcompeting native herbaceous vegetation with early germination, early moisture and nutrient uptake, prolific seed production, and early senescence (Hulbert 1955; Mack and Pyke 1983; Pellant 1996). By providing a dry, fine fuel source during the peak of wildfire season, cheatgrass increases the likelihood of wildfire and thus increases the likelihood of further cheatgrass spread (Pellant 1990; Pellant 1996). By reducing the spread of cheatgrass and restoring native vegetation communities, the frequency and intensity of wildfires would be reduced. Without wildfire, cheatgrass dominance can exclude sagebrush seedlings from establishing. With wildfire, areas can be converted to annual grasslands.

Wyoming big sagebrush communities are one of the most susceptible to cheatgrass invasion (Bunting et al. 1987; Miller and Eddleman 2000; Schlatterer 1972) and tend to be most susceptible to wildfire compared to the other big sagebrush subspecies (Tisdale 1994). Cheatgrass introduction to the big sagebrush ecosystem has increased wildfire frequency about 12 to 22 times (Whisenant 1990). Recent research found that invasive annual grasses are also capable of substantial spreading in the absence of wildfire (Smith et al. 2023).

Another invasive annual grass, ventenata, tends to dry out earlier than associated perennial grasses and remains highly flammable throughout the wildfire season. Ventenata invasion can increase fine fuel loads and continuity by establishing in typically bare interspaces between shrubs and perennial grasses, increasing the risk of wildfire spread in areas that historically had discontinuous fuels. Models suggest that ventenata invasion can increase wildfire severity, annual area burned, wildfire intensity, and burn probability. Similar to cheatgrass, a grass wildfire cycle may establish in some communities invaded by ventenata, such as sagebrush steppe (Innes 2022).

3.4.3 Climate

Changing climatic conditions have resulted in higher temperatures and more severe droughts, which have led to longer wildfire seasons and larger, more frequent wildfires in the western U.S. (Jolly et al. 2015; Dennison et al. 2014). More wildfires facilitate the spread of invasive annuals, which results in a positive feedback cycle between wildfire and grasses (D'Antonio and Vitousek 1992). Further, potential climatic shifts may enhance the spread of invasive annuals such as cheatgrass into resistant ecosystems (Bradley et al. 2016). The combined interactions of invasive plant species, uncharacteristic wildfire events, and climate change will likely continue to change sagebrush communities (USGCRP 2018).

3.4.4 Resistance and Resilience

The condition of sagebrush vegetation within HMAs can be assessed on the concepts of resistance and resilience (Chambers et al. 2014a, 2014b). Resistance relates to a vegetation community's ability to retain its structure, processes, and function when exposed to stresses, disturbances, or invasive species. Resilience relates to a vegetation community's capacity to regain its structure, processes, and functioning after disturbance, such as wildfire (Chambers et al. 2014a, 2014b). At sites in higher elevations with higher precipitation levels and soil moisture content, sagebrush steppe vegetation is more resistant to cheatgrass invasions and wildfires and more resilient to disturbances (Chambers et al. 2014b). Sagebrush shrublands occur at lower elevations and are more arid, resembling deserts with open shrub density, erosive soils, and low herbaceous cover, contributing to the vulnerability for annual plant invasions.

Vegetation types were analyzed by state to determine the acres of HMAs consisting of sagebrush steppe and sagebrush shrubland and their levels of resistance to disturbances. These levels of resistance to disturbances range from high and medium-high, medium, medium-low, and low, with additional acreage for areas not analyzed in the HMA. Not all acres within HMAs were analyzed by Chambers et al. (2023) and they are noted in a column as such.

3.4.5 Wildfire Occurrence and Risk

Susceptibility to wildfire occurrence, which results from fuel loading, vegetation characteristics, or as a natural condition of the environment (for example, drought). The introduction of invasive grasses such as cheatgrass and the expansion of pinyon-juniper into sagebrush systems have resulted in changes in the frequency, size, and severity of wildfires in some communities. Low-elevation Wyoming sagebrush communities in sagebrush shrublands have been especially susceptible to such changes due to their low resistance to disturbances. Acres burned in areas with low resistance and resilience may not recover after

larger wildfires and could be dominated by invasive annuals, resulting in a loss of habitat functions for GRSG. **Figure 3.1** (**Appendix 9**) and **Map 3.14** (**Appendix 1**) show the acres of mapped occupied GRSG habitat between PHMA and GHMA that have burned since 2012 (regardless of land ownership) and between 2012 to 2021 throughout the states of Wyoming, Montana, North Dakota, South Dakota, Idaho, California, Nevada, Colorado, Oregon, and Utah.

The data for **Figure 3.2** (**Appendix 9**) were sourced from the National Interagency Fire Center (NIFC) 2023 GIS data regarding acres burned in HMA boundaries. In **Figure 3.2** (**Appendix 9**) acres burned were analyzed by year of total acres burned in PHMA and GHMA boundaries between all states. In both PHMAs and GHMAs, 2012 experienced the most significant impact with 1,500,500 acres burned for PHMA and 949,900 acres for GHMA. In 2013, there was a sharp drop in acres burned with 90,400 acres in PHMA and 304,900 acres in GHMA impacted by wildfire.

3.5 FISH AND WILDLIFE

A wide variety of fish and wildlife occur within the planning area. Species distributions are influenced by vegetation, cover, elevation, soil, and other factors. Some species have similar habitat requirements as GRSG while others overlap in distribution but require different habitats. A high-level summary of the types of species that may occur in the planning area is presented below but should not be considered a complete list.

3.5.1 Ungulates

Primary ungulate species found in the planning area include elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), white-tailed deer (*Odocoileus virginianus*), and pronghorn (*Antilocapra americana*). Moose (*Alces alces*), bighorn sheep (*Ovis canadensis*), and bison (*Bison bison*), also occur in lower numbers throughout the planning area. These ungulate species are supported by the diversity of habitat and availability of essential resources throughout the planning area. For most ungulate species in the planning area, habitat management challenges include habitat degradation (particularly browse forage), habitat fragmentation, and loss, invasive annual grasses, impairment of migratory and other seasonal movements by incompatible fences (e.g., excessive wire heights, spacings, wire type, net wire, etc.), incompatible land use practices (land conversion, industrial activities, and intensive recreational activities), incompatible stock management (domestic sheep grazing in or near bighorn sheep habitat that can spread disease to bighorn sheep), and impacts from human disturbance during sensitive periods and barriers to animal movement.

The BLM's Instruction Memorandum 2023-005, Habitat Connectivity on Public Lands, ensure habitat connectivity, permeability and resilience is restored, maintained, improved, and/or conserved on public lands, particularly for ungulate animals. The BLM is working with state and Tribal wildlife managers as well as other stakeholders to assess data regarding connectivity, permeability, and resilience and, based on that assessment, to identify where to focus management that best supports priority species.

3.5.2 Small Mammals

Terrestrial small mammals, such as ground squirrels, cottontail rabbits, bats, and mice, are common throughout much of the sagebrush range in the planning area. Sagebrush range in good condition supports an abundant understory of protein rich bunchgrasses and forbs providing habitat for by small mammals. Examples of species are associated with sagebrush vegetation communities include black-tailed jackrabbits (*Lepus californicus*), white-tailed jackrabbits (*L. townsendii*), desert cottontails (*Sylvilagus audubonii*), mountain cottontails (*S. nuttallii*), deer mice (*Peromyscus* spp.), sagebrush voles (*Lemmiscus curtatus*), Merriam's shrew (*Sorex merriami*), and kangaroo rats (*Dipodomys* spp.) (McAdoo et al. 2003). Bats include the little brown myotis (*Myotis lucifugus*), fringed myotis (*M. thysanodes*), long-eared myotis (*M. evotis*), pallid bat (*Antrozous*

pallidus), spotted bat (*Euderma maculatum*), and Towsend's big-eared bat (*Corynorhinus townsendii*). Many of these bat species use aquatic and riparian habitats for foraging opportunities (McAdoo et al. 2003).

Some small mammals that rely on pinyon-juniper woodlands within the sagebrush planning area include mountain cottontail, cliff chipmunks (*Tamisas dorsalis*), rock squirrels (*Spermophilus variegatus*), brush mice (*Peromyscus boylii*), pinyon mice (*P. truei*), rock mice (*P. difficilis*), deer mice, white-throated woodrats (*Neotoma albigula*), desert woodrats (*N. lepeda*) and Mexican woodrats (*N. mexicana*) (Findley et al. 1975, in Gottfried et al. 1995). Bat species commonly found in pinyon-juniper habitats include eight species of myotis, big brown bats (*Eptesicus fuscus*), spotted bats, western pipistrelles canyon bats (*Pipistrellus hesperus*), and pallid bats (Findley et al. 1975, in Gottfried et al. 1995). Native mammalian predators in the project area include red fox (*Vulpes vulpes*), striped skunk (*Mephitis mephitis*), racoons (*Procyon lotor*), American badger (*Taxidea taxus*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), and long-tailed weasel (*M. frenata*) (Conover and Roberts 2017; Hagen 2011).

3.5.3 Migratory Birds

Migratory birds cross international borders to meet seasonal habitat requirements and are protected under the Migratory Bird Treaty Act. Examples include passerine songbirds, flycatchers, vireos, swallows, thrushes, warblers, and hummingbirds. In addition to GRSG, sagebrush-obligate migratory birds include the sagebrush sparrow (*Artemisiospiza nevadensis*), and sage thrasher (*Oreoscoptes montanus*). Other migratory birds associated with sagebrush habitats include Brewer's sparrow (*Spizella breweri*), loggerhead shrikes (*Lanius ludovicianus*), and Cassin's sparrows (*Aimophila cassinii*). Pinyon-juniper expansion into sagebrush alters range structure negatively impacting migratory birds reliant on sagebrush (e.g., GRSG, sagebrush sparrow). However, several species of migratory birds depend on pinyon-juniper habitats, including the pinyon jay (*Gymnorhinus cyanochephalus*) which is being reviewed by the USFWS for potential listing under the Endangered Species Act.

Common raven (*Corvus corax*) populations have nearly doubled in the past 50 years (USFWS 2023) and they are extremely adaptable to human-altered environments and disturbance (Howe et al. 2014). Ravens are known to predate GRSG nests and chicks and in some areas, they have been documented to influence lek behavior at a similar magnitude as golden eagles, and other predators (Kobilinsky 2021). Raven densities are higher in areas associated with livestock production (Coates et al. 2016) and will readily use anthropogenic structures for nesting (Howe et al. 2014), particularly in areas like sagebrush habitats where features such as power poles were historically uncommon. The continued expansion human-related structures in sagebrush will likely drive increases in common ravens (USFWS 2023).

Raptors

Raptors are important indicators of overall ecosystem health because they are keystone species at the top of the food web. Raptors are found throughout the planning area and include bald eagles (*Haliaeetus leucocephalus*), golden eagles (*Aquila chrysaetos*), peregrine falcons (*Falco peregrinus*), prairie falcons (*F. mexicanus*), red-tailed hawks (*Buteo jamaicensis*), Swainson's hawks (*B. swainsoni*), rough legged hawks (*B. lagopus*), ferruginous hawks (*B. regalis*), Cooper's hawks (*Accipiter cooperii*), sharp-shinned hawks (*A. striatus*), American kestrels (*F. sparverius*), northern harriers (*Circus cyaneus*), great-horned owls (*Bubo virginianus*), and burrowing owls (*Athene cunicularia*). Nests of all raptors are protected under the Migratory Bird Treaty Act (16 U.S.C. 703–712). Bald and golden eagles are also protected under the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. 668-668d).

Waterfowl and Shorebirds

The numerous streams, rivers, reservoirs, ponds, associated riparian areas, and wetlands vegetation provide habitat for a wide variety of waterfowl and shorebirds. Canada geese (*Branta canadensis*), mallards (*Anas platyrhynchos*), northern pintail (*Anas acuta*), gadwall (*Anas strepera*), green-winged teal (*Anas crecca carolinensis*), American wigeon (*Anas americana*), and other waterfowl species winter along many of the major rivers within the planning area. Waterfowl production also occurs throughout the planning area. Important foraging areas include primarily lakes and ponds found on public or private lands in agricultural areas and within the river corridors.

Wading birds such as great blue heron (*Ardea herodias*), cattle egret (*Bubulcus ibis*), snowy egret (*Egretta thula),* and white-faced ibis (*Plegadis chihi*) are found throughout the planning area. Great blue heron foraging and breeding areas are primarily along rivers, streams, and ponds throughout the planning area. Killdeer (*Charadrius vociferus*), American avocet (*Recurvirostra americana*), willet (*Tringa semipalmata*), and Wilson's phalarope (*Phalaropus tricolor*) are also commonly found within the planning area.

3.5.4 Upland Game Birds

Upland game birds are common within the planning area, but few share the same sagebrush habitats with GRSG. For example, dusky grouse (*Dendragapus obscuru*) are widely distributed throughout higher elevation woodlands, and wild turkeys (*Meleagris gallopavo* can be found in riparian areas, mixed mountain shrub, and pinyon-juniper woodlands. California quail (*Callipepla californica*) occur in foothill woodlands, chaparral, and sagebrush along the western side of the planning area. Sharp-tailed grouse (*Tympanuchus phasianellus*) while native to GRSG habitat occur primarily in grasslands and shrub-dominated slopes. Small flocks of the non-native chukar (*Alectoris chukar*) can also be found in the western portion of the planning area.

3.5.5 Reptiles and Amphibians

Reptiles in the planning area mostly occur in lower elevations and in dryer habitats, such as semi-desert shrub, sagebrush, greasewood, and pinyon-juniper. The sagebrush lizard (*Sceloporus graciosus*) and short-horned lizard (*Phrynosoma hernandesi*) are two of the most common species associated with sagebrush habitats. Other species found in the planning area include Great basin gopher snake (*Pituophis catenifer*), western terrestrial garter snake (*Thamnophis elegans*), collared lizard (*Crotaphytus collaris*), and the side blotched lizard (*Uta stansburiana*). Predatory snakes, such as gopher snakes, are unable consume GRSG eggs but have been observed constricting and consuming a 19-day juvenile GRSG chick (McIntire et al. 2020).

Amphibians, specifically frogs and toads, are important indicators of ecosystem health because they are highly sensitive to environmental changes. Widespread population declines in the western United States are be attributed to disease, pollution, exposure to toxins from energy development, habitat loss and degradation, and the effects from climate change. Examples of amphibians that may occur in GRSG habitat include Columbia spotted frogs (*Rana luteiventris*) and Great Basin spadefoot (*Spea intermontana*).

3.5.6 Invertebrates

Insects provide important food sources for many species of wildlife, including adult and juvenile GRSG. Although there are thousands of species of insects in sagebrush, and riparian and wetland habitats, species in the Scarabaeidae and Tenebrionidae (beetle) families, Formicidae (ants) family, Tettigoniidae family (including Mormon crickets), and Orthoptera (grasshopper) family are a high protein food source of many wildlife species, including GRSG (Klebenow and Gray 1968; Peterson 1970; Johnson and Boyce 1990; Pyle 1993; Fischer 1994; Drut et al. 1994).

Invertebrates are the primary pollinators of forbs, thus helping to proliferate important components of the GRSG diet. GRSG brood-rearing and chick survival are highly dependent on diverse and abundant forbs and insects necessary for early GRSG development. Insect diversity can be attributed to large, diverse, and relatively undisturbed areas of sagebrush habitat.

3.5.7 Fish

The condition of aquatic habitats and fisheries is related to hydrologic conditions of the upland and riparian areas associated with, or contributing to, a specific stream or water body, and to stream channel characteristics. Riparian vegetation reduces solar radiation by providing shade and thereby moderates water temperatures, adds structure to the banks to reduce erosion, provides overhead cover for fish, and provides organic material, a food source for macroinvertebrates. Intact vegetated floodplains dissipate stream energy, store water for later release, and provide rearing areas for juvenile fish. Water quality (especially factors such as temperature, sediment, and dissolved oxygen) also greatly affects fisheries and aquatic habitat.

Higher elevation waters support cold water fishes, consisting primarily of brook trout (*Salvelinus fontinalis),* rainbow trout (*Oncorhynchus mykiss*)*,* brown trout (*Salmo trutta*), and cutthroat trout (*Oncorhynchus clarkii* spp.). Lower elevation waters support primarily cool water and warm water fishes including such species as nonnative northern pike (*Esox lucius*), yellow perch (*Perca flavescens*), smallmouth bass (*Micropterus dolomieu*), largemouth bass (*Micropterus salmoides*), black crappie (*Pomoxis nigromaculatus*), bluegill (*Lepomis macrochirus*), common carp (*Cyprinus carpio*), and walleye (*Sander vitreus*).

Native warm water fish within the planning area include but are not limited to black bullhead (*Ameiurus melas*), channel catfish (*Ictalurus punctatus*), green sunfish (*Lepomis cyanellus*), Johnny darter (*Etheostoma nigrum*), long-nose dace (*Rhinichthys cataractae*), bluehead sucker (*Catostomus discobolus*), flannelmouth sucker (*Catostomus latipinnis*), roundtail chub (*Gila robusta*), razorback sucker (*Xyrauchen texanus*), creek chub (*Semotilus atromaculatus*), Colorado pikeminnow (*Ptychocheilus lucius*), plains killifish (*Fundulus zebrinus*), bonytail chub (*Gila elegans*), and humpback chub (*Gila cypha*).

3.5.8 Pollinators

Pollinators in the planning area include invertebrates and some bird and bat species. Because of the large diversity of species may serve as pollinators, habitat use by these species is also diverse and are generally described above. A diversity of pollinators is a direct indicator of plant diversity and overall ecosystem health. Declines in native and managed pollinator populations have been linked to habitat loss, fragmentation, invasive species, disease, and pesticides (Xerces Society 2021). North American bumble bee species are generally threatened by habitat loss, pesticides, and climate change. Some species are additionally threatened by pathogens and parasites they may acquire from managed bees.

3.6 SPECIAL STATUS SPECIES

Special status species include both animals and plants requiring specific management due to their listing status under the Endangered Species Act (ESA) and population and habitat concerns. BLM management policy is described in the BLM 6840 Manual, Special Status Species Management. Categories of special status species are the following:

- Species listed as threatened and endangered under the ESA and designated critical habitats
- Species proposed for listing under the ESA and proposed critical habitats
- Candidate species for listing under the ESA
- BLM sensitive species

The BLM will consult with the USFWS in accordance with Section 7 of the ESA for any listed or proposed species or designated or proposed critical habitat that may be affected by the RMPA. A summary of consultation is included in **Chapter 4**.

3.6.1 Federally Listed Species

Threatened and Endangered Species

Species are listed as either threatened or endangered under the ESA. Some listed species have critical habitat designated as essential to species conservation or requiring special management consideration or protection. Under the ESA, all federal agencies must participate in the conservation and recovery of listed threatened and endangered species (USFWS and NMFS 1998). The ESA also states that federal agencies shall ensure any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat.

The mission of the USFWS is to work with other federal, state, and local agencies to conserve, protect, and enhance fish, wildlife, and plant species and their habitats. USFWS manages threatened and endangered species and designated critical habitat, in cooperation with other federal agencies to support recovery. The BLM cooperates with USFWS identify and properly manage recovery habitats.

ESA-listed species that have been documented to occur in the planning area are included in **Appendix 11**, Special Status Species.

Proposed and Candidate Species

Proposed species are plant and animal taxa proposed in the Federal Register to be listed under the ESA. These are species that USFWS has sufficient data on biological vulnerability or threats to support a potential to list but issuance of a proposed rule is precluded by higher priority listing actions. Proposed and candidate species that have been documented to occur in the planning area are in **Appendix 11**, Special Status Species.

BLM Sensitive Species

The BLM's objectives for special status species are to conserve and recover ESA-listed species and the ecosystems on which they depend so that ESA protections are no longer necessary, and to initiate proactive conservation measures that reduce or eliminate threats to minimize the need for listing these species under the ESA. The BLM 6840 manual directs the BLM to "work cooperatively with other agencies, organizations, governments, and interested parties for the conservation of sensitive species and their habitats to meet agreed on species and habitat management goals." The 6840 Manual also requires managers to determine to the extent practicable, the distribution, abundance, population condition, current threats, and habitat needs for sensitive species, and evaluate the significance of actions in conserving those species.

All federal candidate species, proposed species, and delisted species in the 5 years following delisting will be conserved as Bureau sensitive species. State lists of BLM sensitive species for states in the planning area are available in **Appendix 11**.

Current Conditions

The BLM continues to implement actions that further the conservation, protection, and recovery of ESA-listed threatened and endangered species. Consultation with USFWS under the ESA is a key part of these activities. Habitat for proposed, candidate, and BLM sensitive plant and animal species continue to be managed in such a manner that actions authorized, funded, or carried out by the BLM reduce the likelihood for special status species to become listed under the ESA.

The BLM maintains some spatial data on special status species but mostly relies on state agencies for data stewardship and data are also available from NatureServe for wide ranging species that cross jurisdictional boundaries. State natural heritage programs provide location and natural history information on special status plants, animals, and natural communities. These data help drive conservation decisions, aid in the environmental review of projects and land use changes and provide baseline data helpful in recovering listed species.

In managing special status species, the BLM also considers the role of wildlife corridors in connecting habitats. Biological corridors within and adjacent to the analysis area are reviewed to understand their contribution to broader ecosystem connectivity. This understanding helps minimize habitat fragmentation and supports broader conservation goals for special status species.

Species Accounts

Activities within the decision area will primarily affect sagebrush habitat. Areas of conifer encroachment targeted for sagebrush restoration to benefit GRSG may also be affected. Therefore, special status species dependent on sagebrush habitat or strongly associated with pinyon-juniper woodlands may be directly or indirectly affected by proposed management actions to protect and enhance GRSG habitat. An expanded discussion of several key special status species follows. For other special status species accounts, please see **Appendix 11**.

Mammals

Black-footed ferret

In 1967, the black-footed ferret (*Mustela nigripes*) was listed as endangered in early legislation prior to the ESA; the ferret was officially listed as endangered under the ESA in 1973 (USFWS 2013d). The black-footed ferret is intimately tied to prairie dogs (*Cynomys* spp.) and is only found in association with prairie dog colonies. Historically, the black-footed ferret range overlapped with prairie dog habitat throughout the North American Great Plains, mountain basins, and grasslands. Declines in occupied prairie dog habitat in the early twentieth century coincided with the rapid decline of the ferret (USFWS 2013d). Black-footed ferrets currently occur in both captive and wild populations. Captive ferrets have been reintroduced at 29 sites in the western United States, Canada, and Mexico, including at multiple locations in the planning area (see Table 3 in USFWS 2019). Four primary stressors to black-footed ferrets are disease, drought, declining genetic fitness including increased inbreeding and a reduction in genetic diversity, and prairie dog poisoning and shooting (USFWS 2019). The main disease concern for wild and captive populations is non-native sylvatic plague. The white-tailed prairie dog (*C. leucurus*) is the primary diet for black-footed ferrets in the planning area (USFWS 2017). White-tailed prairie dogs generally inhabit dry landscapes with shrub land vegetation, such as the high desert scrub community of Utah and sagebrush steppe of western Wyoming. Sagebrush management that negatively impacts white-tailed prairie dogs could affect black-footed ferrets.

Pygmy rabbit

On January 25, 2024, the USFWS announced they will conduct a status review of the pygmy rabbit (*Brachylagus idahoensis*) in consideration of listing under the ESA. This BLM sensitive species is patchily distributed throughout sagebrush habitat and alluvial fans in the planning area where plants occur in tall dense clumps (Smith et al. 2019). The only native rabbit species in North America to excavate their own burrows, pygmy rabbits require deep, crumbly, loamy-type soils are required for burrow excavation although they may occasionally use burrows excavated by other species and, therefore, may occur in areas that support shallower, more compact soils (Janson 1946; Weiss and Verts 1984; USFWS 2010c).

Big sagebrush is the primary food and may comprise up to 99% of food in winter and 51% in summer. Grasses and forbs make up the remaining diet during the summer (Shipley et al. 2009, Schmalz et al. 2014). Pygmy rabbits likely select for percent cover and composition of grasses and forbs at different habitat scales (i.e., patch vs. burrow). Cover and height of woody vegetation appear to be critical habitat features (Green and Flinders 1980), and Larrucea and Brussard (2008) found pygmy rabbits occupied clusters of sagebrush that were taller than the sagebrush shrubs in the surrounding area (i.e., sagebrush islands that range from 4.7 to 46.0 inches in height).

Pygmy rabbits avoid edge habitats and open areas such as Rights of Way (ROWs), roads, and other areas cleared of sagebrush (Crowell et al. 2016, Carr et al. 2013, Edgel et al. 2018.) The size of pygmy rabbit home ranges fluctuates seasonally with smaller home ranges during winter and larger home ranges during spring and summer. Annual home ranges in southeastern Oregon and northwestern Nevada differed between the sexes and ranged from 1.2 to 25.8 acres for males and 0.27 to 18.7 acres for females. Juvenile dispersal in Nevada and Oregon was greater than 0.3 mile, with a maximum long-distance movement of 5.3 miles recorded for a juvenile female (Weiss and Verts 1984).

Utah prairie dog

The Utah prairie dog (*Cynomys parvidens*) was listed as an endangered species under the ESA in 1973 and reclassified to threatened status in 1984 (49 FR 22330–22334). Historically, the Utah prairie dog was found in portions of Beaver, Garfield, Iron, Juab, Millard, Piute, Sanpete, Sevier, Washington, and Wayne Counties in Utah (USFWS 2012b). Current dog distribution is now limited to the southwestern quarter of Utah (USFWS 2012b). Significant concentrations of Utah prairie dogs occur in three areas that are identified as recovery units in the Recovery Plan (USFWS 2012b), including the Awapa Plateau, Paunsaugunt, and West Desert recovery units. There are nearly 60,000 acres of Utah prairie dog habitat among the three Recovery Units, and over 48% of these acres are BLM-administered or National Forest System lands.

The Utah prairie dog inhabits elevations from 6,200 feet on valley floors up to 9,180 feet (USFWS 2012b) in mountain mesa habitats. Preferred habitats include grasslands and semiarid shrub-steppe. Open habitats are important for foraging and avoiding predators. Livestock grazing practices that reduce shrub height and density or vegetation treatments that remove encroaching conifers may enhance prairie dog habitat.

Since 1976, the Utah Division of Wildlife Resources has performed annual (spring) counts of Utah prairie dogs designed to monitor population trends over time. Based on the spring counts, rangewide population trends for the Utah prairie dog are stable to increasing since the time of listing, though populations vary annually and the numbers across the range have decreased in recent years. The rangewide count in 2020 (6,217 dogs) is approximately 54% of the count in 2016 (11,478 dogs; USFWS 2021). Population numbers have declined from historic highs primarily due to habitat loss and fragmentation, sylvatic plague, drought, poisoning, and other factors.

Migratory Birds and Raptors

Brewer's sparrow

Brewer's sparrow is a BLM sensitive species strongly associated with sagebrush over most of its range, in areas with scattered shrubs and short grass, though it can also be found in mountain mahogany, rabbitbrush, bunchgrass grasslands with shrubs, bitterbrush, and openings in pinyon-juniper (Knopf et al. 1990; Sedgwick 1987). Brewer's sparrow places nests in sagebrush, and may also use other shrubs, from a few inches to about three feet from the ground, though higher nests in taller sagebrush have been documented (Rich 1980). In migration and winter, Brewer's sparrow uses low, arid vegetation, desert scrub, sagebrush, and

creosote bush (NatureServe 2023d). Brewer's sparrow is vulnerable to loss and fragmentation of sagebrush habitats, and even though it is typically one of the most abundant songbirds in sagebrush habitats, it is declining across its range (NatureServe 2023d).

Ferruginous hawk

The ferruginous hawk, a BLM sensitive species, occurs in grassland and shrublands year-round throughout the planning area. Ferruginous hawks often nest on the ground, lone trees, topographic high points, or cliffs. Ferruginous hawks occur in areas with abundant prey, typically small mammals such as rabbits, prairie dogs, and ground squirrels. Ferruginous hawk density and productivity are closely associated with cycles of prey abundance (NatureServe 2023e). Ferruginous hawks are easily disturbed during the breeding season; nest abandonment from disturbance is most likely during early nesting stage (Tesky 1994).

Golden eagle

The golden eagle is a BLM sensitive species and is protected under the Bald and Golden Eagle Protection Act, which prohibits unpermitted "taking" of bald or golden eagles, including their parts, nests, or eggs. Golden eagles generally inhabit open and semi-open country such as prairies, sagebrush, savannah or sparse woodland, and barren areas, and in areas with sufficient mammalian prey base and suitable nesting sites. Nests are most often on rock ledges of cliffs but sometimes in large trees, on steep hillsides, on electrical transmission towers, or on the ground. While a pair may have multiple alternate nests, they may use the same nest in consecutive years (NatureServe 2023f). Diet consists primarily of small mammals (e.g., rabbits, marmots, ground squirrels) but sometimes also includes large insects, snakes, sage-grouse, other bird species, juvenile ungulates, and carrion.

Golden eagle declines in the early 1900s were due to eradication campaigns, frequently encouraged by the use of bounties (eagle was believed to be a major predator on livestock). Golden eagles are also susceptible to powerline electrocution given their large wingspan. Other threats include ingestion of poison intended for coyotes; ingestion of toxic water from mining activities; occasional shootings; habitat loss to agriculture, suburban land uses, and energy development and loss of potential food resources as a result of habitat degradation. Human disturbance or activity may cause nest abandonment, render a nest site less productive, or prevent a suitable nest site from being utilized, but direct disturbance of nests appears to be infrequent (GBBO 2010).

Pinyon Jay

Pinyon jay, a BLM sensitive species, is a resident of the foothills and lower mountain slopes of western and southwestern U.S. and Mexico in pinyon juniper woodland habitats (AOU 1983). The pinyon jay status is currently being reviewed by the USFWS for potential listing under the Endangered Species Act. Pinyon jays do not migrate but may forage long distances to find food during years with a low pinyon pine seed crop. Flocks may also migrate altitudinally – up or down in elevation – to find food (NatureServe 2023g). Pinyon jay flocks have complex social organization. Flocks are made of multiple breeding pairs and offspring. While flocks tend to have established home ranges, they move in search of food as described above.

Pinyon jays prefer a mixed-age mosaic of woodland interspersed with sagebrush shrubland. Although they roost and nest within relatively dense groves of older trees, they typically locate their nests within 1.2 miles of the habitat edge (GBBO 2010). Pinyon jays' nest when and where enough food is available – which predominately includes seeds from pinyon pines. Studies have indicated that large expanses of homogenous, closed-canopy pinyon-juniper woodland, which have become more common over the past century, are largely unsuitable for the birds (GBBO 2010, 2012).

This species has undergone significant declines over the last 50 years and faces ongoing threats from habitat alteration due to climate change and wildfire suppression (NatureServe 2023g). Pinyon-juniper habitats in the southwest have been impacted by climate change, including widespread pinyon mortality and probable reduction in pinyon seed crops, the primary food source for pinyon jays (Gaylord et al. 2013). Further loss and distributional shifts of pinyon juniper woodland habitats in response to climate change are likely (Gaylord et al. 2013, Meddens et al. 2015). Habitat has also been altered through thinning of pinyon-juniper for fuels reduction, and perceived wildlife management benefits, including habitat improvements for GRSG. Breeding Bird Survey data show a decline of 2.1% per year from 1966-2021 (Ziolkowski et al. 2023).

Sagebrush Sparrow

Sagebrush sparrow habitat is dry brushy foothills, chaparral, and sagebrush and in winter deserts (Audubon 2023). In the northern and eastern part of the range, sagebrush sparrows mainly inhabit stands of big sagebrush, whereas farther southwest, they mainly use saltbush and other low shrubs of arid flats. Nests are either on the ground or in shrubs. In the Great Basin, the species usually nests in living sagebrush, where cover is sparse, but shrubs are clumped (Petersen and Best 1985). Placement may be related to density of vegetative cover over the nest, as sagebrush sparrows will nest higher in a taller shrub (Rich 1980). The species migrates to, and winters in, arid plains with sparse bushes, grasslands, and open situations with scattered brush, mesquite, and riparian scrub, preferring to feed near woody cover (Audubon 2023; Meents et al. 1982; Repasky and Schluter 1994).

Sagebrush sparrows are negatively affected by factors that fragment sagebrush habitat or alter its basic structure, including wildfire, cheatgrass invasion, heavy livestock use, nest predation, expansion of pinyon-juniper woodland into shrubland, heavy off-highway vehicle (OHV) use (GBBO 2010), urban and suburban development, and road and power line ROWs.

Sage Thrasher

Sage thrasher is a BLM sensitive species. In the northern Great Basin, the sage thrasher breeds, and forages in tall sagebrush/bunchgrass, juniper/sagebrush/bunchgrass, mountain mahogany/shrub, and aspen/sagebrush/bunchgrass communities. The species is positively correlated with shrub cover, shrub height, bare ground, and horizontal patchiness and negatively correlated with spiny hopsage (*Grayia spinosa*), budsage (*Artemisia spinescens*), and grass cover (Rotenberry and Wiens 1980; Wiens and Rotenberry 1981). The species usually nests within 3 feet of the ground in the forks of shrubs (almost always sagebrush) and sometimes nests on the ground (Reynolds 1981; Rich 1980). In winter, the sage thrasher uses arid and semiarid scrub, brush, and thickets. The species feeds on a wide variety of insects, including grasshoppers, beetles, weevils, ants, and bees, as well as fruits and berries. Loss, degradation, or fragmentation of high-quality sagebrush shrubland suitable for sage thrasher is attributed to wildfire, invasive plants, expansion of pinyon-juniper woodland into sagebrush, heavy livestock grazing, and heavy OHV use (GBBO 2010).

Fish

Lahontan Cutthroat Trout (LCT)

LCT (*Oncorhynchus clarkii henshawi*) is an inland subspecies of cutthroat trout (Salmonidae). The species may be either riverine or lacustrine and is endemic to the Lahontan Basin of northeast California, southeast Oregon, and northern Nevada. As with all cutthroat trout, LCT is an obligate riverine spawner. This species spawns in riffles over gravel substrate when water temperatures are between 41 and 60˚F. Intermittent tributaries are sometimes used as spawning sites during high-water years. Fry may develop in the tributary stream until flushed into the mainstream during high runoff.

The decline of LCT has been primarily attributed to the loss and degradation of habitat. Agricultural and municipal uses of water from streams and lakes have reduced or altered the stream discharge in this species' range. Grazing has altered the physical characteristics of stream channels and increased the sediment loads in many LCT habitats. Mining, urban development, logging, road construction, and dam building have also been associated with changes in stream channel morphology and water quality (USFWS 1995). LCT competes with nonnative trout species that were historically stocked for recreational fishing opportunities. Updated recovery goals include removing threats from nonnative trout, ensuring ecological functions in habitats, including carrying out restoration and management changes where needed, and maintaining existing isolated populations (LCTCC 2019).

Bull Trout

Bull trout (*Salvelinus confluentus*) occur in the Columbia River and Snake River basins in Washington, Oregon, Montana, Idaho, and Nevada. Other populations outside the planning area include Puget Sound and Olympic Peninsula watersheds in Washington, Saint Mary basin in Montana, and Klamath River basin of south-central Oregon. Historical habitat loss and fragmentation (including from climate change), interaction with nonnative species, and fish passage issues are widely regarded as the most significant primary threat factors affecting bull trout (USFWS 2015a).

Of all the native salmonids in the Pacific Northwest of the United States, bull trout generally have the most specific habitat requirements, including cold water temperatures (often less than 54 degrees Fahrenheit), clean water quality conditions, complex stream habitat including deep pools, overhanging banks and large woody debris, and connectivity between spawning and rearing areas and downstream foraging, migration, and overwintering habitats (USFWS 2015a).

Invertebrates

Monarch butterfly

The monarch butterfly (*Danaus plexippus*) was identified as a candidate species for listing under the ESA in 2020 (USFWS 2020). Based on past annual censuses, the western North American population has been declining over the last 23 years, despite an increasing number of sites being counted. Primary drivers affecting North American migratory populations are loss or degradation of breeding, migratory, and overwintering habitat, continued exposure to insecticides, and effects of climate change. Milkweed availability is essential to monarch reproduction and survival and reductions in milkweed due to habitat loss and conversion are also a key driver in monarch declines (USFWS 2020).

During the breeding season, monarch butterflies lay their eggs primarily on milkweed host plants (*Asclepias* spp.). In western North America, nectar and milkweed resources are often associated with riparian corridors, and milkweed may function as the principal nectar source for monarch butterflies in more arid regions. Additionally, monarchs rely on mostly native forb species within GRSG habitat that are also GRSG preferred forbs (Dumroese et al. 2015).

Most adult butterflies live approximately 2 to 5 weeks, but overwintering adults enter reproductive diapause (suspended reproduction) and live 6 to 9 months. In the fall, monarch butterflies west of the Rocky Mountains fly south and west to overwintering groves along the California coast into northern Baja California (USFWS 2020). During breeding and migration, adult monarch butterflies require a diversity of blooming nectar resources, which they feed on throughout their migration routes and breeding grounds.

3.7 WILD HORSES AND BURROS

The Wild Free-Roaming Horses and Burros Act of 1971, as amended by FLPMA and the Public Rangeland Improvement Act of 1978, directs the protection and management of wild horse and burro populations on BLM-administered lands. Responsibility for wild horse and burro management is governed by 43 CFR Part 4700. One of the BLM's top priorities is to ensure the health of the public lands so that the species depending on them, including the nation's wild horse and burro, can thrive. The BLM policies and regulations also direct that wild horses and burros are to be managed as self-sustaining populations of healthy animals.

The 53.8 million acres where wild horses or burros were found when the 1971 Wild Free-Roaming Horses and Burros Act was passed are known as herd areas. Approximately 26.9 million BLM-administered acres (32.6 million acres among all landowners) have been determined suitable for long-term management of wild horses and burros and are known as herd management areas. Wild horse and burro populations within wild horse and burro herd management areas are managed with the goal of maintaining sustainable ecological conditions and multiple-use relationships on federal lands. Both herd areas and wild horse and burro herd management areas can include private or state lands, but the BLM has management authority only over public lands.

The BLM periodically evaluates each HA to determine if it has adequate food, water, cover, and space to sustain healthy and diverse wild horse and burro populations over the long-term. The BLM may designate an appropriate management level (AML) and specifies an allowable range in horse numbers for each wild horse and burro herd management areas based upon available forage and other resources necessary to sustain the horse or burro populations, as well as resource objectives and other designated uses of the BLM-administered lands.

The estimated population size of wild horses and burros within each wild horse and burro herd management areas is based on helicopter, fixed-wing, or by ground-based inventories, which occur every 2 to 3 years. These population inventories provide information pertaining to population numbers, foaling rates, distribution, and herd health. When the AML is exceeded, populations of wild horses and burros are examined to determine if population control methods are required. Historically, it has been a challenge for the BLM to maintain AML in all herd management areas.

Wild horses and burros are a long-lived species with annual survival rates estimated between 80% and 97% (Wolfe 1980; Eberhardt et al. 1982; Garrott and Taylor 1990). In addition, wild horses can increase their numbers by 18% to 25% annually, resulting in the doubling of wild horse populations about every 4 years (Wolfe et al. 1989; Garrott et al. 1991). Wild horse and burro numbers appear to be limited principally by water availability and winter forage, as predation and disease have not substantially regulated wild horse and burro population levels. This has resulted in the BLM shifting program emphasis beyond just establishing an AML and conducting wild horse and burro gathers to including a variety of management actions that further facilitate the achievement and maintenance of viable and stable wild horse and burro populations and a "thriving natural ecological balance" (Public Law 92-195). Methods of herd population control include periodic gathers and removal to short-term holding and adoption or long-term holding, as well as methods of population growth suppression, including treatment with fertility control drugs where approved. Gathering or other population growth suppression activities are based on inventory data, herd health, rangeland health, climatic conditions, and occurrence of catastrophic events such as wildfire and drought.

3.7.1 Current Conditions

In the planning area, there are approximately 15 million acres of wild horse and burro herd management areas. The BLM administers 168 wild horse and burro herd management areas within California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, and Wyoming. Current herd area, herd management areas, and estimated population of wild horse and burro within the project area by state are listed in **Table 3-3** (**Appendix 9**). Wild horse and burro populations within the planning area continue to grow, often exceeding AMLs and this trend is expected to continue. Due to a lack of predators, and limited management authority, wild horse and burro populations will continue to increase in size. As a result, the agency will continue to remove animals from the range each year and will continue to administer various methods of fertility control.

Currently, the AMLs are being exceeded by an average of 3.6 times greater than the "high" AML value across the planning area (**Table 3-3** [**Appendix 9**]). Wild horse and burro populations have increased since 2012 and are 2.78 times over AML. The total number of herd management area acres which overlap with GRSG HMAs is displayed in **Table 3-4** (**Appendix 9**). Wild horses and burros can be found outside of WHB herd management areas as they are not fenced, and horses and burros may leave in search of water and forage and enter onto non-herd management area BLM-administered or other lands. Wild horses and burros can be causal factors for failing to meet applicable Land Health standards.

Climate change may affect the availability of wild horse and burro forage or water resources as well as rangeland health; AMLs for herds were established based on past conditions, including vegetation and water resources. Should available forage or water resources be reduced due to a change in climate, current AMLs may no longer be appropriate, rangeland conditions may be impacted, and herd health impacted due to a lack of resources.

3.8 LIVESTOCK GRAZING

The BLM administers public land grazing primarily in accordance with the 1934 Taylor Grazing Act, 1976 Federal Land Policy and Management Act, and 1978 Public Rangelands Improvement Act. Grazing use on public land is administered through grazing authorizations issued by field offices to qualified applicants, who are assigned grazing preference. Forage use is identified in allotments, which are areas of land designated and managed for livestock grazing. The amount and length of use is described in the terms and conditions of the grazing authorization, which is usually a permit or lease, normally issued for 10 years. More prescriptive management and flexibility may be used to achieve resource and operational goals and objectives through Allotment Management Plans (AMP) or their functional equivalents. When grazing permits/leases expire, they may be renewed based on continued availability of the grazing area, grazing preference, and satisfactory record of performance.

3.8.1 Current Conditions

The species (kind) and age (class) of livestock that graze across the planning area varies across field offices but are primarily cow-calf pairs or yearling cattle. Some allotments graze other kinds of livestock, including sheep, goats, bison, and horses. Livestock grazing allotments across the planning area range in size, with some less than 1,000 acres, and others exceeding 100,000. Allotments may be completely fenced but are often located along geographic features such as canyons, streams, and rivers that can restrict the movement of livestock in lieu of fencing.

The BLM grazing administration regulations were revised in 1995 to include Fundamentals of Rangeland Health and Standards and Guidelines for Grazing Administration (43 CFR Part 4180). Standards provide for

the conformance with the Fundamentals of Land Health at 43 CFR Part 4180.1 BLM State Directors are responsible for developing or modifying Standards and Guidelines specific to areas under their jurisdiction. This is done in consultation with affected Resource Advisory Councils and in coordination with applicable Indian Tribes, other state/federal land management agencies, and the public. Standards (of Land Health) are expressions of levels of physical and biological condition or degree of function required for healthy lands and sustainable uses and define minimum resource conditions that must be achieved and maintained. Guidelines are a practice, method or technique determined to be appropriate to ensure that standards can be met or that significant progress can be made toward meeting the standard. Guidelines are tools such as grazing systems, vegetative treatments, or improvement projects that help managers and permittees achieve standards.

In BLM policy, Standards (i.e. Land Health Standards) are applicable to all ecosystems and management actions. They are expressed as goals in the Land Use Plan. Public lands are managed to achieve or make significant progress toward achieving Land Health Standards developed for an area unless specified otherwise in the Land Use Plan. Practices and activities subject to standards and guidelines by regulation include the development of grazing-related portions of activity plans, establishment of terms and conditions of permits, leases and other grazing authorizations, and range improvement activities such as vegetation manipulation, fence construction and development of water.

Livestock grazing can be causal factors for failing to meet applicable Land Health standards. In accordance with 43 CFR Part 4180, the BLM must take appropriate action as soon as practicable but not later than the start of the next grazing year upon determining that existing grazing management practices or levels of grazing use on public lands are significant factors in failing to achieve the standards and conform with the guidelines. Appropriate action means implementing management that will result in significant progress toward fulfillment of the standards and toward conformance with the guidelines.

The number of allotments with at least 15% PHMA in Alternative 1 by Land Health Standard Category is shown in **Table 3-5** (**Appendix 9**). Across the planning area, grazing management has been improved by a variety of actions. One example is changing the terms and condition s in grazing permits/leases to improve riparian areas and wetlands through utilization, herding requirements, and strategic placement of salt and supplemental feed. Furthermore, improvements through additional water developments and pasture fencing, along with following compliance inspections to ensure assigned range improvement maintenance is completed for grazing authorizations.

Climate change may impact the availability of forage or water resources, which are crucial for both livestock and rangeland health. Grazing allotments were established based on past conditions, including vegetation and water resources. However, should available forage or water resources be reduced due to a changing climate, current grazing levels may no longer be sustainable. Reduced forage availability could lead to decreased rangeland health, negatively affecting livestock productivity. This would necessitate reevaluation of grazing permits or leases to ensure that land health standards are met under changing environmental conditions. In addition, improper livestock grazing practices have been identified as contributing factors in the decline of GRSG habitat, particularly in areas where overgrazing reduces the vegetation cover needed for GRSG nesting and brood-rearing. Additionally, the reduction in available forage due to improper grazing or changing climate conditions can further exacerbate habitat degradation for GRSG.

3.9 LANDS AND REALTY (INCLUDING RENEWABLE ENERGY)

The lands and realty program consists of (1) land use authorizations, including ROWs; (2) land tenure adjustments, including disposals and acquisitions of lands; (3) Official Surveys of Federal Interest Lands,

Management of Land Boundary (MLB) Plans, Standards for Boundary Evidence (SBE), Public Lands Survey System Data Set (PLSSDS), Surface Management Agency (SMA), and Land Status Records System; and (4) withdrawals. Changes to land tenure and the cadastral survey will not be affected by the proposed actions in the alternatives and will not be discussed further. The lands and realty program also processes renewable energy applications related to wind, solar, and geothermal energy. Geothermal energy is managed as a fluid leasable mineral (see **Section 3.10.1**, Fluid Minerals [Including Geothermal]). Utility-scale wind and solar resource facilities are permitted with ROW authorizations through the lands and realty program. The management actions identified in the alternatives could affect ROWs and renewable energy applications related to wind, solar, and geothermal energy.

3.9.1 Conditions within the Planning Area

Land use authorizations include granting ROWs, permits, leases, and temporary use permits (TUPs). A ROW is most often authorized by a grant or lease under 43 CFR Part 2800 and 2880 and are appropriate for facilities constructed for long-term use, generally 30 years. Short-term ROWs are typically used during construction, maintenance, and other seasonal or short duration uses involving minimal improvement and investment. Additional land use authorizations are issued as leases, permits, and easements under 43 CFR Part 2920. Leases are usually long-term authorizations that use public lands for a fixed term involving considerable capital investments. TUPs are authorized under the Mineral Leasing Act (see 43 CFR Part 2881.5(a)) and short-term ROWs may be issued under FLMPA. TUPs can be reauthorized at the discretion of the authorized officer. Easements are authorizations for a non-exclusive interest in lands that specifies the right to the holder the obligation of the BLM to use and manage the lands in a manner consistent with the terms of the easement. A lease grants less than the interest given by an easement and provides for more direct control by the authorized officer. ROW grants are used for wind and solar development and testing.

Granting ROWs

ROW grants are used for oil and gas pipelines, electric transmission and distribution lines, roads, wind and solar development, communication sites such as telephone and fiber optic, and non-linear features such as carbon capture and storage sites. Generally, ROWs are granted for the term of a project. A ROW authorizes the holder to construct, operate, maintain, and/or terminate a new or existing facility over, under, upon, or through BLM-administered lands. The majority of ROWs are authorized under Title V of the FLPMA (90 Stat. 2743; 43 U.S.C. 1715, 1761-1771) and the Mineral Leasing Act (Section 28 of the Mineral Leasing Act of 1920, as amended, 43 U.S.C. 185). The BLM will authorize ROW applications at the discretion of the authorized officer in a responsible, efficient, and economically feasible manner.

Acres of disturbance associated with existing transmission lines, railroads, and roads on BLM-administered lands within the planning area are listed in **Table 3-6** (**Appendix 9**) and **Map 3.15** (**Appendix 1**) shows disturbance associated with transmission lines, railroads, and roads. Of the approximately 679,300 acres of transmission lines on BLM-administered lands in the planning area, approximately 33% are within mapped occupied habitat (**Table 3-6** [**Appendix 9**]).

ROW Avoidance and Exclusion Areas

Areas identified as unsuitable for surface disturbance or occupancy are generally identified as avoidance or exclusion areas for ROWs. Restrictions and mitigation measures could be modified on a case-by-case basis for avoidance areas, depending on impacts on resources, while exclusion areas are prohibited from ROW development with limited exceptions.

Communication Sites

The BLM typically issues communication site ROWs or leases for communication facilities. Communication towers, transmission lines, and other vertical structures that provide additional perching opportunities for ravens and other birds of prey can result in habitat fragmentation, habitat avoidance, and increased vehicle traffic during maintenance operations (USFWS 2013a).

Roads and Railroads

Roads and railroads can fragment GRSG habitat (Knick and Rotenberry 1995). Within the BLM-administered lands in the planning area there are 46,600 acres of railroad and 2,197,200 acres of road ROWs, of these 24% and 42% respectively are located in occupied habitat (**Table 3-6** [**Appendix 9**]).

Solar Energy

Acres of solar facilities and ROWs in the planning area are presented in **Table 3-7** (**Appendix 9**). For ROW applications to support non-utility-scale solar facilities (i.e., less than 5 MWs), the BLM will consider requests on a case-by-case basis and may require a land use plan amendment to analyze an otherwise nonconforming proposal.

Wind Energy

Based on 2023 U.S. Energy Information Agency data, sites with an average annual wind speed greater than 5.8 meters per second are candidates for utility-scale generation (EIA 2023a). Acres of wind turbines and wind ROWs in the planning area are listed in **Table 3-8** (**Appendix 9**). Acres of wind potential in mapped occupied habitat within the planning area are listed in **Table 3-9** (**Appendix 9**). See **Map 3.16** (**Appendix 1**) for an overview of existing wind potential within the planning area.

3.9.2 Trends within the Planning Area

Land Use Authorizations

Land use authorization requests are customer driven. Within the planning area most authorizations processed are primarily for roads, electric distribution lines, and communication sites. Renewable energy land use authorization requests including wind and solar development have increased and are expected to continue to increase due to the growing demand for renewable energy.

3.10 MINERAL RESOURCES

3.10.1 Fluid Minerals (Including Geothermal)

Fluid leasable minerals include oil, gas, coalbed natural gas, and geothermal resources. Oil and gas are most often found in the porous spaces of sedimentary rocks (e.g., sandstone and limestone), having migrated there from source rocks (e.g., marine shales) rich in organic material. Coalbed natural gas is methane gas that can be extracted from coal seams. Since most coalbed natural gas is associated with coals at shallow depth, exploration, well drilling, completion, and production costs are considerably lower than for conventional deep gas production. Geothermal resources are a source of energy that uses the natural heat of the Earth's interior, carried to the surface by steam or hot water.

Leasable minerals are governed by the Mineral Leasing Act of 1920, as amended, which authorized specific minerals to be disposed of through a leasing system. Geothermal is also governed by the Geothermal Steam Act of 1970, as amended. The rights to explore for and produce fluid minerals on public land may only be acquired through leasing. Leases are issued through a competitive process and are offered through a bid in areas nominated by interested parties. The BLM issues competitive leases for oil and gas exploration and development on lands owned or controlled by the federal government. Currently, the BLM holds quarterly

competitive sales but not in every state. Leases are issued for a term of ten years and expire unless they are extended, suspended, or held by production. If the lessee establishes hydrocarbon production, leases are held as long as oil or gas is produced.

During the leasing process, the BLM may apply lease stipulations to leases in order to protect other resource values or land uses (e.g., cultural resources, boundary line markers and corners and wildlife) by establishing authority for timing delays or the denial of operations in the terms of the standard lease contract. There are four types of additional stipulations defined as follows:

- No Surface Occupancy (NSO). On lands covered by the NSO stipulation, use or occupancy of the land surface for fluid mineral exploration or development is prohibited to protect identified resource values. Fluid minerals could be leased, but the leaseholder/operator would have to use off-site methods, such as directional drilling to access the mineral resource.
- Controlled Surface Use (CSU). Under the CSU stipulations, use and occupancy is allowed (unless restricted by another stipulation) but identified resource values require special operational constraints that may modify the lease rights. While less restrictive than an NSO, a CSU stipulation allows the BLM or surface managing agency to require special operational constraints, to shift the surface-disturbing activity, or to require additional protective measures (e.g., special construction techniques for preventing erosion in sensitive soils) to protect the specified resource or value.
- Timing Limitations (TLs). A TL stipulation prohibits surface use during specified periods to protect identified resource values. This stipulation does not apply to the operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need and that less stringent, project-specific mitigation measures would be insufficient.
- Protection of Survey Corner and Boundary Line Markers. Under the boundary marker protection stipulation, the responsible party will identify and protect evidence of federal interest land boundary markers.

Most but not all stipulations attached to leases at the time of sale have a provision, specified in the individual Land Use Plans, for granting exceptions, modifications, or waivers. An exception is a case-by-case exemption from a lease stipulation. The stipulation continues to apply to all other sites in the leasehold to which the restrictive criterion applies. A modification is a fundamental change to the provisions of a lease stipulation, either temporarily or for the term of the lease. A modification may, therefore, include an exemption from or alteration to a stipulated requirement. Depending on the specific modification, the stipulation may or may not apply to all other sites in the leasehold to which the restrictive criteria applied. A waiver is a permanent exemption from a lease stipulation. The stipulation no longer applies anywhere in the leasehold.

The issuance of a lease does not, in and of itself, authorize any surface-disturbing activities. If a lessee wishes to conduct exploratory drilling, an application for permit to drill (APD) must be submitted to the BLM for approval. These protections are accomplished through the attachment of Conditions of Approval (COAs) to each project in conjunction with the National Environmental Policy Act (NEPA) process and during review. For geothermal resources, some exploratory drilling can be done under a Notice of Intent and does not require an APD.

The federal fluid mineral regulations do not allow the BLM to attach new stipulations to a lease after its issuance, without the consent of the lessee. Similarly, the BLM may not apply COAs and other post-leasing restrictions that result in a de facto application of a new lease stipulation.

Existing Conditions in the Planning Area

Oil and Gas

Major oil and gas producing basins in the planning area are located primarily in Colorado, Utah, Wyoming, Montana, and the Dakotas. The most prolific oil and gas producing basins include the Powder River, Greater Green River, Unita-Piceance, North Park, and Williston, and are described further below.

The Powder River Basin, with an area of 43.5 thousand square miles, covers northeastern Wyoming and southeastern Montana (EIA 2023b). The Powder River Basin is a deep, northerly trending, asymmetric, mildly deformed trough, approximately 250 miles long and 100 miles wide. The thickness of the sedimentary section exceeds 17,000 feet along the basin axis (Lawrence 2010). The Eastern Powder River Basin in northeast Wyoming is one of the most prolific oil producing basins in the Rocky Mountain region. Coalbed natural gas is one of the largest contributors to total natural gas production in Wyoming, and coals of the Powder River Basin are the largest source of coalbed natural gas (WOGCC 2023).

The Greater Green River Basin, with an area of 25.9 thousand square miles and the largest oil shale deposits, covers areas in southwest Wyoming, northwest Colorado, and northeast Utah (EIA 2023b). Oil and gas exploration of the Overthrust Belt dates back to the 1890s. This area has been the focus of intense exploration, including seismic and drilling programs, since the mid-1970s (BLM 2003).

Uinta-Piceance Basin, which encompasses an area of 29.2 thousand square miles, extends from eastern Utah into northwestern Colorado and currently has production in conventional gas, tight sands, shale gas and oil (EIA 2023b). The Piceance Basin within the greater Unita-Piceance Basin is an elongated structural depression trending northwest - southeast located in western Colorado. The basin is more than 100 miles long and has an average width of over 60 miles, encompassing an area of approximately 8.6 thousand square miles (EIA 2023b). The Piceance Basin contains six of the top one hundred natural gas reserves in the US one of the top one hundred oil reserves (Colorado Geological Survey – online).

The North Park Basin occupies approximately 1.3 thousand square miles in north-central Colorado (EIA 2023b) and includes oil and natural gas resources primarily in the form of coalbed natural gas, carbon dioxide, and recent interest in the oil and gas potential of the Niobrara shale formation.

The Williston Basin, with an area of 69.8 thousand square miles extending from northwest South Dakota to western North Dakota and eastern Montana (EIA 2023b), has a long history of oil and gas production. Conventional oil production from the Williston Basin became significant during the 1970s, peaking in the mid-1980s, and then declining in the 1990s. Technological advances in horizontal drilling and hydraulic fracturing in the early 2000s have allowed development of unconventional zones (methane-bearing coal zones, oil or gas bearing shale zones, gas hydrates or "tight gas" in low porosity or low permeability traditional zones), that were once considered as uneconomic. As a result, oil and gas production in the region increased beginning in early 2000 and peaking in 2008. While production has slowed, interest and potential continue to exist in the region.

In addition to the above regions, Railroad Valley and Pine Valley in Nevada have areas of high and moderate potential for petroleum. Railroad Valley is an elongated valley trending north to south, approximately 80 miles long and up to 20 miles wide. The Grant Canyon No. 3 Well in Railroad Valley was one of the most prolific onshore oil wells in the continental United States, flowing up to 4,300 barrels of oil per day (Nevada Bureau of Mines and Geology, undated). Pine Valley is an elongated valley, trending north to south, approximately 30 miles long and 15 miles wide, in Eureka County. Production of oil in Pine Valley has been declining over recent years. Oil and gas operators have not indicated an interest in drilling new wells there.

Swings in the natural gas market are the likely driver in the industry's interest for oil and gas leases and the resulting requests for leasing and for filing of APDs. As demand rises, more interest in oil and gas development is expected (BLM 2009). In areas with moderate to high potential in several areas in the planning area, drilling is expected to increase.

Geothermal

Geothermal resources are a source of energy that uses the natural heat of the Earth's interior, carried to the surface by steam or hot water. Most of the geothermal power plants in the US are in western states, where there are large areas with medium to high potential for geothermal resources. More than 90% of the US geothermal power generation is from California and Nevada, with additional contributions from plants in Idaho, New Mexico, Oregon, and Utah (as well as Alaska and Hawaii; National Renewable Energy Lab [NREL] 2021).

In Nevada, geothermal resources are substantial in portions of the planning area. Based on US Geological Survey (USGS) data, there is particularly high potential in northeastern Nevada (Williams et al. 2008). Nevada currently has 26 operating geothermal power plants in 17 locations (State of Nevada Commission on Mineral Resources 2023). Between 2015 and 2019, geothermal project development growth in Nevada surpassed all other states with 5 new geothermal plants (NREL 2021). Nevada's geothermal electricity generation is the second highest in the US, after California. In 2021, geothermal power plants in Nevada collectively produced 825 megawatts of electricity (State of Nevada Commission on Mineral Resources 2021).

Geothermal resources in Utah are plentiful in the middle and northwest portions of the state, although a lack of transmission capacity may hinder development. Geothermal resources in Utah have the potential to supply 15,000 MW of electricity. As of 2019, there were four geothermal power plants in Utah with capacity of 90 MW (NREL 2021). Currently, there are no geothermal energy production facilities within GRSG habitat in the planning area in Utah. Future development of geothermal resources within GRSG habitat in the planning area is also highly unlikely.

In 2019, Oregon and Idaho had 4 and 1 operating geothermal power plants with a total capacity of 38 MW and 18 MW, respectively (NREL 2021). Between 2016 and 2019, Oregon had 4 developing projects and Idaho had 5 (NREL 2021).

3.10.2 Nonenergy Leasable Minerals

Nonenergy solid leasable minerals include sodium, phosphate, potassium, sulfur, and gilsonite. Similar to fluid leasable minerals (discussed above), nonenergy leasable minerals are governed by the Mineral Leasing Act of 1920, as amended, which authorized specific minerals to be disposed of through a leasing system. A prospecting permit provides the exclusive right to prospect and explore for leasable mineral deposits. There are three ways to obtain a mineral lease for nonenergy solid leasable minerals:

- Competitive lease: A competitive lease can be issued where there is an existence of a valuable mineral deposit. The BLM can designate such lands as Known Leasing Areas.
- Preference Right Lease: This is a noncompetitive lease. A prospecting permit application is filed and an exploration plan is approved. The plan must show how the existence and workability of a valuable deposit will be determined. If a valuable mineral deposit has been discovered, and other mineral-specific determinations are made in the positive, the BLM may issue a Preference Right Lease.
- Fringe Acreage Lease: This is a noncompetitive lease. A Fringe Acreage Lease application can be filed if the applicant has control over adjacent lands. The leased area must meet certain requirements,

including demonstration that the deposit continues from the lands controlled by the applicant and that the mineral deposit is not in an area of competitive interest.

Existing Conditions in the Planning Area

The discussion of nonenergy leasable mineral resources in the planning area focuses on gilsonite, phosphate, and sodium. Although the discussion for these minerals is planning area wide, each of these resources exists primarily in limited areas, described in detail below.

Sodium

The world's largest known trona deposit, a hydrous sodium carbonate mineral refined into soda ash, sodium bicarbonate, sodium sulfite, sodium tripolyphosphate, and chemical caustic soda (Gregory 2014) is located in southwestern Wyoming. Soda ash is the trade name for sodium carbonate, a chemical obtained from trona and sodium-carbonate-bearing brines. Primary uses are by the glass and chemical industries (USGS 2023a), which contribute to renewable energy components. This trona is found in the Green River Formation of Eocene age. The Wilkins Peak Member of the Green River Formation includes at least 42 trona beds, occurring from 400 to 3,500 feet below the surface. Trona is Wyoming's top export, and in the US, 90% of trona production comes from southwestern Wyoming. At current production rates of approximately 18 million tons per year Wyoming's estimated recoverable reserves would last over 2,000 years (Wyoming Mining Association 2023). A federally designated Known Sodium Leasing Area covering a 1,085 square mile area, almost entirely in Sweetwater County, Wyoming, is within the planning area and largely within HMAs.

The Piceance Basin of northwestern Colorado and adjacent states contains the world's largest and most economically significant deposit of a nahcolite, an evaporite mineral consisting of naturally occurring sodium bicarbonate. Within the planning area in Colorado, all of the sodium resources are found in the Parachute Creek Member of the Green River Formation, a small part of this area is within HMAs. The sodium resource in the basin was estimated at 32 billion short tons (Dyni 1974) and 29 billion tons by Beard et al. (1974; Brownfield et al. 2010).

In Utah, there are approximately 175,200 acres of planning area federal mineral estate in the population areas on which sodium occurs. All sodium deposits in the population areas are within the Rich and Box Elder population areas. The Rich Population Area has 158,900 acres with sodium deposits, all of which is within the decision area. The Box Elder Population Area has 16,300 acres of federal mineral estate on which sodium occurs, of which 2,500 acres (16%) is within the decision area. In Utah, there are no federal sodium leases in the planning area (BLM 2015a).

Phosphate

Phosphate is primarily contained in phosphate rich sedimentary rock deposits, typically deposited in shallow marine or low energy environments (Delaney 1998). Phosphate is primarily used in ammonium phosphate fertilizers and animal feed supplements (USGS 2023b). The BLM manages phosphate leasing and development on most public land.

Phosphate is currently mined in North Carolina, Florida, Idaho, and Utah. Production from Idaho and Utah has been steady while eastern production has been decreasing, leading to an increasing reliance on western deposits for domestic production. In the west, the richest phosphorite accumulations are found in southern Idaho and northern Utah. A deposit does exist in Wyoming but is currently unavailable due to existing withdrawals. Mining for phosphate primarily occur using surface mining methods where large quantities of waste rock are typically moved to extract the ore. Lands known to have a valuable phosphate resource have been designated as Known Phosphate Leasing Areas and are leased through a competitive leasing process.

Lands outside a Known Phosphate Leasing Area may also be leased, but the existence of a valuable phosphate resource must first be demonstrated, through prospecting. Leasing is a discretionary action; however, when issued, a federal phosphate lease conveys to the lessee the exclusive rights to explore for and extract the phosphate resources contained in the lease, subject to existing laws and regulations.

Phosphate mining in Utah occurs primarily in the Meade Peak Member of the Phosphoria Formation (Rupke 2015). HMAs overlap this formation in some areas. There are currently four federal phosphate mining leases in the state.

Idaho has 8 known phosphate leasing areas, totaling 80,168 acres and approximately 86 federal leases covering approximately 43,000 acres. Approximately half of the leases have been mined. There are currently 3 active producing phosphate mines; 2 permitted mines under construction that will replace producing mines as they are depleted; and 1 mine being permitted. The known phosphate leasing areas in Idaho have some overlap with HMAs. The phosphate industry has been an important industry in southern Idaho since about 1907. As a result, average wages in Caribou County are among the highest in the State of Idaho. The ore produced from the federal leases is an important source of phosphate fertilizer and elemental phosphorus produced at industrial plants in Pocatello and Soda Springs, Idaho. Currently, 10 unmined leases and one mine in permitting, encompassing 4 of the unmined leases, are located in GRSG HMA.

Gilsonite

Gilsonite is a solid hydrocarbon formed in veins or dikes that is mined primarily underground. Gilsonite is a unique industrial mineral found only in the Uinta Basin in eastern Utah. Gilsonite areas have some overlap with HMAs. The main markets for gilsonite are the oilfield and printing ink industries. In the oilfield industry, gilsonite is used as a fluid loss control agent and shale stabilizer for oil-based drilling fluids and water-based drilling fluids. It is also used as a loss circulation material and slurry density reducer for cementing fluids (Boden and Tripp 2012).

3.10.3 Coal

Leasing and developing federal coal resources is described in the federal regulations at 43 CFR Part 3400. Coal leases are made available for sale through a competitive bidding process in each BLM state office. Provisions of the lease documents in relation to surface and subsurface resources and resource uses are dictated by the current RMPs for each field office within which leases are offered. In general, these RMPs specify types of restrictions on coal leasing within each field office boundary based on identification of lands with potentially developable coal resources and determination of lands found suitable for coal leasing using the 20 criteria listed in Section 522 of the Surface Mining Control and Reclamation Act.

Coal leases are subject to readjustment of their stipulations. The first readjustment could occur 20 years after the initial date of issuance and then every 10 years thereafter. For lands found suitable for leasing, analysis of acceptability for leasing would consider protective measures identified in the then-current RMP. Depending on the field office, these protections may include design, reclamation, and mitigation of proposed measures.

Most but not all protections are attached to leases at the time of sale, and the protections may identify exception criteria for granting temporary or permanent relief from a specific measure. In addition, federal regulations give the BLM the authority to ensure coal is developed in a manner that minimizes impacts on other resources and uses and is protective of human health and safety. These protections are accomplished through the attachment of COAs to each project in conjunction with the NEPA process and during review of individual permit application.

BLM-administered lands are acceptable for coal leasing only after the lands have been evaluated through the BLM's multiple-use planning process (43 CFR Part 3420.1-4). In areas where development of coal resources may conflict with protection and management of other resources or land uses, the BLM may identify mitigating measures as either lease stipulations or operational restrictions.

Existing Conditions in the Planning Area

Coal resources within the planning area are primarily found in eastern Utah, northwestern Colorado, southwestern and northeastern Wyoming, and many parts of Montana.

Wyoming has the largest federal coal program in the BLM and is the nation's largest producer of coal at 34% of national production. Most Wyoming coal is used for steam generation in the electrical utility industry. The planning area contains bituminous and sub-bituminous deposits. The Powder River Basin, which extends into northern Converse County, contains some of the largest low-sulfur coal deposits in the world. In 2022, Wyoming produced a total of 244 million short tons of coal with 237 million short tons produced from the Powder River Basin on federal and non-federal Lands (Mine Safety Health Administration 2023).

Other coal formations and fields in Wyoming with significant historic and projected coal production include Adaville, Evanston, and Frontier formations in southwest Wyoming, and the Hanna Field in southcentral Wyoming. Reserves in the Adaville Formation are estimated at 1 billion tons, and currently is being mined at Chevron Mining, Inc.'s surface mine near Kemmerer. Within the Rawlins Field Office, there are six significant coalfields containing coal resources of sub-bituminous to bituminous rank: Hanna Basin, Carbon Basin, Great Divide Basin, Rock Creek, Kindt Basin, and Little Snake River (Berryhill et al. 1950).

Colorado coal has the second highest quality (low impurity content) in the nation. Most Colorado coals are bituminous and subbituminous. The Green River Coal Region, which occupies most of Moffat County and the western portion of Routt County, is the largest coal-producing region in Colorado (Carroll 2005).

A recent USGS report determined that more than 162 billion short tons of available coal resources are within the Montana portion of the Powder River Basin with about 35 billion short tons recoverable by surface mining methods. An additional 42 billion short tons of underground coal resources are within the Montana portion of the Powder River Basin and 80% (34 billion short tons) are within 500 to 1,000 feet of the surface, (Haacke et al. 2008). Four mines (Absaloka, Decker, Rosebud, and Spring Creek) mine sub-bituminous coal beds within the Tongue River member of the Fort Union formation in the Montana portion of the Powder River Basin. Most of the coal mined in the planning area is shipped out of state and the remainder of the coal is burned at local power plants. A small amount of coal is trucked in state to power plants and manufacturing facilities.

Coal resources occur throughout Utah, with an estimated 15 billion tons of recoverable coal. The most notable coal-bearing formation in the planning area is the Blackhawk Formation in central and eastern Utah, a lower middle unit of the Mesaverde Group. Coal beds in this formation are up to 25 feet thick, with most mined seams in the 6- to 13-foot range. The high-quality coal in this formation is bituminous with a relatively high heat content and low sulfur content. The Ferron Sandstone member of the Mancos Shale in central and eastern Utah also contains coal beds. Coal in the Ferron Sandstone member is bituminous but has higher sulfur and ash contents and slightly lower heat content than coal in the Blackhawk Formation. There are significant reserves of sub-bituminous C to high-volatile A bituminous coal in the Kiaparowits Plateau Late Cretaceous Straight Cliffs Formation (Hettinger et al. 2000). Much of the coal in central Utah has been extracted, and the remaining coal resources in this area are difficult to access or extract and some is of lower quality. The Dakota Formation in southern Utah contains coal beds up to 27 feet thick with

subbituminous coal. These coal beds are higher in sulfur and ash contents and lower in heat content than coal mined in the Blackhawk Formation. The Carbon Population Area contains most of the coal operations in the planning area. Most mines in that area are deep underground mines, primarily in the Wasatch Plateau and Book Cliffs region.

3.10.4 Locatable Minerals

Locatable minerals are minerals for which the right to explore or develop the mineral resource on federal land is established by the location (or staking) of lode or placer mining claims and is authorized under the General Mining Law of 1872, as amended. Locatable minerals include metallic minerals such as gold, silver, copper, lead, zinc, molybdenum, uranium, and non-metallic minerals such as fluorspar, asbestos, talc, mica, and lithium.

Acquisition of locatable minerals is done by staking a claim over the deposit and acquiring the necessary permits to explore or mine, or the mineral rights can be acquired by purchase. For operations other than casual use, the claimant is required to submit a Notice or a Plan of Operations. Regulations require the claimant to prevent unnecessary or undue degradation of the land. Only the Secretary of the Interior may withdraw areas from further location of mining claims or sites. Mining claims located after the Surface Resources Act of 1955, remain open to the public for other multiple uses which do not materially interfere with exploration, mining, and reasonably incident activities.

Existing Conditions in the Planning Area

Locatable mineral exploration and production occurs throughout the planning area. Locatable minerals found in the planning area are listed in **Table 3-11** (**Appendix 9**). Because locatable minerals are governed under the requirements of the Mining Law of 1872, as amended, the BLM has limited baseline data on the production and revenue associated with locatable mineral development in most of the states in the analysis area. Many locatable mineral prospecting and exploration activities fall under the definition of casual use and thus can occur without notifying the BLM. Required filings of claims, notices of intent or plans of operations do not require the identification of the particular locatable minerals being sought or developed. There is also no requirement to report the locatable mineral commodities produced or amounts produced each year. As a result, information regarding the existing conditions of locatable mineral development in the planning area is not available.

3.10.5 Mineral (Saleable) Materials

Saleable minerals, also referred to as mineral materials, include common construction materials and aggregates, such as sand, gravel, limestone aggregate, building stone, cinders, moss-covered rock (moss rock), roadbed, decorative rock, clay, and ballast material. The Materials Act of 1947, as amended (61 Stat. 681), authorizes disposal of mineral materials on BLM-administered lands through a sales system and provides for free use of material by government agencies, municipalities, or nonprofit organizations, if the material is not used for commercial purposes. Permitting removal or extraction (i.e., disposal) of mineral materials on BLM-administered lands is a discretionary activity. An operator and permittee may request use of mineral materials, but the BLM has no obligation to provide mineral materials for commercial and free use operations. The BLM will not authorize the disposal of mineral materials if it is determined that the damage to BLM-administered lands and resources would exceed the public benefits expected from the proposed disposal; nor will the BLM dispose of mineral materials from areas identified in Land Use Plans as not appropriate for mineral materials disposal (43 CFR Parts 3601.11 and 3601.12).

Sand and gravel are extremely important resources and their extraction varies directly with the amount of development nearby – road building and maintenance, and urban development. The proximity of both transportation and markets are key elements in the development of a deposit. Future demand for mineral materials will vary depending upon market conditions, which differ according to economic conditions and construction activity. One major driver of construction activity is road and well pad construction for oil and gas exploration and development and residential and commercial construction projects. As new oil and gas development continues to occur, it is expected that mineral materials activity will continue.

Community pits are sites established by governmental agencies for the public to acquire mineral materials through sales contracts. Local government agencies and nonprofit organizations may obtain these materials free of cost for community purposes. County and state road construction agencies are the largest users of gravel and sand resources through free use permits. A negotiated sale is an exclusive site proposed by a single party, often commercial, and the party must pay for the BLM to process the permit.

The number of sales out of a community pit varies by site, from less than one to more than 50 per year. Most of these sales are for less than one ton. Free Use Permit sites are used sporadically and may be scattered throughout a field office or district office, to reduce hauling costs. A pit may be inactive for several years before it is needed for a road project in the area.

A gravel pit is initially developed by scraping off the vegetation and topsoil, which is then stockpiled for future reclamation. Most gravel pits are 5 to 15 acres in size. No infrastructure other than an access road is generally needed for mineral materials disposals. Most mineral material removal activity occurs during the summer months and during daylight hours.

Existing Conditions in the Planning Area

Mineral materials are the largest single mineral resource present across all the states with the largest potential for development. The volume of material sold and used varies by state. Specific closures of areas to saleable mineral materials, such as in Areas of Critical Environmental Concern (ACECs) or crucial or essential wildlife habitat, exist throughout much of the planning area. Some Land Use Plans apply use and development restrictions in terms of seasonal timing limitations to protect GRSG habitat and leks, similar to oil and gas leasing; however, this is not consistent across the planning area. Many of the LUPs in the planning area encourage the use of existing disposal sites until the material is depleted.

3.10.6 Oil Shale and Tar Sands

Oil shale is an organic-rich sedimentary rock consisting of calcareous shale with a large amount of organic material consisting of shale with a large amount of mixed organic compounds known as kerogen. Kerogen may be converted to oil through destructive distillation and exposure to heat. The U.S. holds more than half the world's oil shale, with the largest deposits located in the Green River Formation in Colorado, Utah, and Wyoming. Tar Sands are sedimentary rocks containing a heavy hydrocarbon compound called bitumen, which can be refined into oil. The Mineral Leasing Act of 1920, as amended, authorizes the leasing of federal lands for the development of oil shale and tar sands and the Energy Policy Act of 2005 authorizes the BLM to accelerate development of oil shale and tar sands in those states. Pursuant to Section 369 of that Act, the BLM issued a Final Programmatic Environmental Impact Statement (PEIS) in 2008 amending 10 RMPs in Utah, Colorado, and Wyoming to make approximately 2 million acres of public lands potentially available for commercial oil shale leasing and development and 430,000 acres potentially available for tar sands leasing and development. Because of litigation, the BLM released another Final PEIS/Proposed RMP Amendment in November 2012 and accompanying Record of Decision (ROD) in March 2013. The ROD reduced the areas

available in Utah, Colorado, and Wyoming for potential development of federal oil shale and tar sands to approximately 800,000 acres. Areas open to oil shale leasing are for research, development, and demonstration leases only. The BLM would issue a commercial lease when the lessee satisfies the conditions of its research, development, and demonstration leases and applicable regulations. Preference right acreage in addition to the research, development, and demonstration lease acreage may be included in the commercial lease if specified. The Oil Shale and Tar Sands ROD removed federal mineral estate within all GRSG HMAs in Utah from potential oil shale and tar sands leasing, subject to valid existing rights.

Existing Conditions in the Planning Area

The most prospective oil shale deposits in the US are within the Green River Formation in the greater Green River Basin (including Fossil Basin and Washakie Basin) in southwestern Wyoming and northwestern Colorado, the Piceance Basin in northwestern Colorado, and the Uinta Basin in northeastern Utah (BLM 2013c). The resource potential of these shales is estimated to be the equivalent of 1.5 to 1.8 trillion barrels of oil in place (Bartis et al. 2005). Although resource potential within the Piceance Basin totals approximately 1.2 trillion barrels of oil in place, only part of it can be recovered depending on accessibility of the oil shale for development and method of mining used (Taylor 1987). The Green River Basin, which covers a large area in southwest Wyoming, northwest Colorado, and northeast Utah, contains an estimated 244 billion barrels of shale oil in the Tipton Shale Member, Wilkins Peak Member, and Laney Member of the Green River Formation. Oil shale occurs throughout most of the Green River Basin and in thin beds (less than 4 feet thick) in Fossil basin. The beds in the upper part of the Tipton Shale are up to 75 feet thick and yield up to 24 gallons of oil per ton. Other important oil shale beds in the Wilkins Peak Member and the Laney Member are slightly to the east of the southeast border of the Kemmerer Field Office.

Oil shale areas of interest in southwestern Wyoming lie within the Green River and Washakie Basins. These areas are presently withdrawn from locatable mineral entry to protect the oil shale resource. Although the oil shales within these basins are of lesser quality than Colorado oil shales some of these are estimated to contain several trillion barrels of oil per square mile (Trudell et al. 1973). The Green River and Washakie Basins contain approximately 476 billion barrels of in-place oil within the shale. These oil shale deposits have not been leased, nor have they received major attention from industry, primarily due to high development costs of underground and surface mining methods. Several in-situ research projects and tests conducted west of Rock Springs more than 30 years ago suggested marginal results for extraction of this mineral resource. Final federal regulations governing oil shale leasing and development were published in the Federal Register on November 18, 2008 (43 CFR Parts 3900, 3910, 3920, and 3930). There are currently no federal oil shale leases in the Green River and the Washakie Basins. There are no expressions of industry interest to explore for or to develop oil shale resources in this area.

3.11 ACECs AND RNAs

Areas managed under Special Designations are regulatory or congressionally mandated and are designed to protect or preserve certain resource qualities or uses. Only ACECs and Research Natural Areas (RNAs) are included for analyses in this effort - other designated areas were not analyzed in detail (refer to **Chapter 1, Section 1.5.2**).

3.11.1 ACECs

FLPMA mandates prioritizing the designation and protection of ACECs in the development and revision of land use plans (43 U.S.C. 1712(c)(3)). An ACEC is defined in the FLPMA, Section 103(a), as an area on BLM-administered lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems

or processes, or to protect life and ensure safety from natural hazards. BLM regulations for implementing the ACEC provisions of the FLPMA are found in 43 CFR Part 1610.7-2 *Designation of areas of critical environmental concern*. These regulations were revised as part of the BLM's Public Lands Rule (PLR) in April 2024 and an updated BLM ACEC Manual 1613 was issued in August 2024. Although the Notice of Availability (NOA) for the GRSG RMP Amendment and EIS was published prior to the effective date of the PLR, and is, therefore, not expected to incorporate all elements of the PLR as per BLM IB 2024-048, the GRSG Proposed RMPA/FEIS is largely consistent with the PLR.

ACECs differ from some other special management designations as the designation does not automatically prohibit or restrict other uses in the area. The special management attention for an area designated as an ACEC is designed specifically to protect the relevant and important values and, therefore, may vary from area to area depending on the particular values identified. Management direction for proposed ACECs that meet the relevance and importance criteria are identified and analyzed during the RMP process. ACECs can be nominated at any time, but they are designated through an RMP or relevant RMP amendment process (when ACECs are within the scope of the plan amendment). Nominated ACECs that are found by BLM to meet the relevance and importance criteria must be evaluated in at least one alternative in the EIS or EA for the RMP or relevant RMP amendment (43 CFR Part 1610.7(g)). In the decision record for the planning effort, the BLM must provide justification and rationale for both ACEC designation decisions and decisions not to designate a proposed ACEC (43 CFR Part 1610.7-2(j)(2)). Designated ACECs must be managed, "…in a manner that conserves, protects, and enhances the relevant and important values and only allow causal use or uses that will ensure the protection of the relevant and important values" (43 CFR 1610.2(j)(3)). In order to designate an ACEC it must meet the relevance, importance, and need for special management criteria described in 43 CRF Part 1610.7-2(d). In addition, ACECs are protected by the provisions of 43 CFR Part 3809.11(c), which requires an approved plan of operations for activities resulting in more than five acres of disturbance under the mining laws.

The BLM's Notice of Intent (86 FR 66331) for this greater sage-grouse (GRSG) amendment effort invited the public to nominate or recommend areas for ACEC designation. Because this planning effort is only considering amending RMP actions related to GRSG and its habitat, the invitation clarified that "nominations or recommendation of potential ACECs should be relevant to the preliminary purpose and need of this planning initiative." In other words, any ACEC nomination (or component thereof) that included values other than GRSG and its habitat were not evaluated or included as part of this planning effort. However, ACEC nominations that included GRSG as one of the (potentially many) nominated values were considered. The BLM also received nominations for ACECs during the comment period on the Draft EIS. Nominations that were not related to GRSG will be considered by BLM during the next RMP or applicable RMP amendment process in the area where the ACEC was nominated. The BLM considered the nominations received and if the area met the relevance and importance criteria, it was identified as a potential ACECs in Alternatives 3 and 6 in Draft EIS. The following table lists the potential ACECs that were identified:

Table 3-1. Potential ACECs Identified in Alternatives 3 and 6 in the Draft EIS

State	Potential ACEC	Acreage
Colorado	Case Flats	4,547
Idaho	Owyhee	653,199
	Shoshone Basin	244,935
	Camas-Laidlaw	457,724
	Big Desert	333,528

State	Potential ACEC	Acreage
Montana	South Valley Phillips	615,888
	Carter Crook	110,162
Nevada/California	Warm Springs	89,539
	North Fork O'Neil	937,512
	Grass-Kobeh Valley	852,979
	South Fork Dixie Flats	122,395
	Idaho Border	49,019
	Hays Canyon	340,850
	Vya-Massacre	239,677
	Montana Mountain	314,370
	Butte Long Valley	606,293
	Eureka North and South	66,905
	Monitor Valley	173,507
	Reese River	85,000
	Utah Border	58,650
	Buffalo Skedaddle	182,213
	Owyhee East	487,122
	Owyhee West	704,650
Oregon	None identified	-
Utah	Rich	132,924
	Box Elder	232,258
Wyoming	Golden Triangle/Little Sandy	272,557
	Carter-Crook (border w/ MT)	19,400
	Sagebrush Focal Areas (South Central/Western)	33,166
	Greater South Pass and Upper Green River Basin	311,229

Between the Draft and Final EIS, the BLM removed the Antelope, Mountain Valley Complex, Upper Snake Complex, and Triangle areas in Idaho and the Little Butte Long Valley in Nevada from consideration as ACECs. The BLM also updated the acres analyzed for ACECs in Idaho, Nevada, and Wyoming between Draft and Final. Please refer to **Appendix 5** for additional information and details.

Appendix 5, Evaluation of Areas of Critical Environmental Concern for Greater Sage-Grouse Habitat, provides a comprehensive review of the internal and externally nominated ACECs, the relevance and importance criteria evaluation process that was conducted, and a summary of the relevance and importance values of each of the potential ACECs identified. The appendix also describes changes made in the ACECs analyzed between Draft and Final EIS and the effects of the alternatives and the Proposed RMP Amendment on the potential ACECs considered.

3.11.2 Research Natural Areas (Oregon Only)

RNAs are a unique type of ACEC created to preserve examples of all significant natural ecosystems for comparison with those influenced by humans, provide educational and nondestructive research for ecological and environmental studies, and preserve gene pools of typical and endangered plants and animals. RNAs are areas that are part of a national network of reserved areas under various ownerships that contain important ecological and scientific values and are managed for minimum human disturbance. RNAs are intended to represent the full array of North American ecosystems with their biological communities, habitats, natural phenomena, and geological and hydrological formations, and provide an essential network of diverse habitat types that will be preserved in their natural state for future generations. Under certain circumstances, deliberate manipulation may be used to maintain the unique features for which the RNA was established. RNAs in the planning area have important biological or physical attributes that are identified and designated

in cooperation with the Pacific Northwest RNA Committee (Forest Service, BLM, and Washington and Oregon) following the Oregon Natural Areas plan (Oregon Natural Heritage Advisory Council 2010). Under current BLM policy, research natural areas must meet the relevance and importance criteria of ACECs and are therefore designated as ACECs. Under current guidelines, ACEC procedures also are used to designate outstanding natural areas.

One of the guiding principles in managing RNAs is to prevent unnatural encroachments or activities that directly or indirectly modify ecological processes or conditions. Permitted activities that could impair scientific or education values of the RNAs (e.g., energy development, logging, road building, livestock grazing, and recreation) are generally limited, restricted, or not allowed. These areas can be used for long-term baseline plant community monitoring; they are areas where few management activities have influenced the plant community for which the RNA was established. While management practices necessary to maintain or restore ecosystems may be allowed and perhaps are necessary to sustain values, such as invasive plant control, it is crucial to align these practices with the overall goals and considerations outlined in the alternatives. Notably, certain alternatives may incorporate specific language allowing juniper treatment, and any allowance or necessity for such practices should be consistent with the chosen alternative and its objectives.

Existing Conditions

In Oregon, there are fifteen RNAs with important GRSG conservation values. All fifteen RNAs were designated in the underlying district RMPs and were labeled as key RNAs in the 2015 GRSG Approved Resource Management Plan Amendment (ARMPA). Five of the existing RNAs included GRSG and GRSG habitat relevance and importance values prior to the 2015 GRSG ARMPA. Two of the RNAs (Foster Flats and Guano Creek-Sink Lakes) were closed to livestock grazing prior to the 2015 GRSG ARMPA. Neither the 2015 nor 2019 GRSG plan amendments changed management or decisions on these RNAs. See **Table 17-1** (**Appendix 17**). The 2015 GRSG ARMPA made all or portions of the other thirteen key RNAs unavailable to livestock grazing. BLM Oregon districts with key RNAs have closed all or portions of some key RNAs through the required grazing regulations and NEPA processes, as indicated in **Table 2-26**. The 2015 GRSG Final Environmental Impact Statement estimated that approximately 21,957 acres in these key RNAs would be unavailable to livestock grazing. During the 2019 GRSG amendment process that number was corrected to 21,959 acres. **Tables 3-12 and 3-13** (**Appendix 9**) show the vegetation types by the key RNAs.

3.12 SOCIAL AND ECONOMIC CONDITIONS (INCLUDING ENVIRONMENTAL JUSTICE)

This section includes a summary of social and economic conditions, including identified environmental justice communities, and provides a discussion on updates and changes to key social and economic factors for the relevant states and counties, including population, employment, and income data and trends. Detailed information is included in **Appendix 14**, Socioeconomic Baseline Report. Updated information is also provided for BLM resources, including an overview of nonmarket values pulling from the 2015 discussion with updates from more recent literature. In addition, screening of environmental justice populations at the county level throughout the planning area has been updated based on 2022 BLM guidance (BLM 2022c). The economic data presented in this discussion include annual averages for the most recent reporting periods. These include the widespread economic effects of the recession brought about by the 2020 global COVID-19 pandemic, which might have impacted local and regional economies through short-term reductions in employment and industry output. Effects may be ongoing and may not be evenly distributed across industries.

The planning area includes portions of California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming, regardless of jurisdiction. Due to the nature of social, economic, and environmental justice conditions, the analyses use a different analysis area than is used for other resources. Socioeconomic analysis areas and environmental justice analysis areas have been determined for each state to include counties that contain a larger percentage of the area as GRSG habitat management areas on BLM-administered lands or minerals. These counties make up the areas where there is expected to be the biggest impacts on social and economic conditions due to management actions. An overview of counties included in each state analysis area is included in **Appendix 14**.

3.12.1 Baseline Demographic and Economic Conditions

Historical and projected population growth are important socioeconomic indicators because they aid in estimating future demand for public lands and potential shifts in demand for various land uses. They also provide context for how land use planning changes could affect the local population, further informing associated economic analyses. **Appendix 13** provides an overview of population changes since 2010 and provides a summary of economic data, including trends and current conditions for per capita income and unemployment. The unemployment rate is a key indicator measuring the percentage of unemployed people to the number of people in the labor force and is often used as an indicator of economic health and conditions. A high unemployment rate is a concern for the general economy and likely indicates that many individuals in the labor force are unable to find employment, which could lead to economic distress (Bondarenko 2024). Changes in the unemployment rate from year to year provide a good picture of the relative health of the economy over time. **Appendix 13** also identifies and describes major economic sectors in the socioeconomic study area that can be affected by public land management actions. Economic activities that rely on or could rely on BLM-administered lands, such as livestock grazing or energy development, are the most likely affected. Differences in major sectors since the publication of the 2015 Sage-Grouse Plan Amendment EISs are highlighted below; for all other sectors, please refer to the respective 2015 Sage-Grouse Plan Amendment EIS.

3.12.2 BLM Land and Resource Use Revenue

Details are provided below for revenue and economic contributions associated with BLM lands and resources in the analysis area. Additional details for current and historic levels of resource use are included in the respective resource sections of this document.

Leasable Minerals

Fluid Minerals (Oil and Gas)

Oil and gas extraction is important for supporting the local economies in many communities in the analysis area, especially where a large percentage of employment comes from the fluid mineral industry on federal lands. These areas include northwestern Colorado, southeastern Idaho, southeastern Montana, northeastern Nevada, southwestern North Dakota, central to eastern Utah, and northeastern and southwestern Wyoming. Oil and gas extraction provides funding outside these areas for public services through royalties and taxes distributed to the states where the extraction occurred. The government collects revenues from leasable mineral extraction on public lands through bonuses, royalties, and rents paid by producers which are subsequently distributed to the federal and state government. The Department of the Interior, through the Office of Natural Resources Revenue (ONRR), collects a set percentage of the sales value of federal leasable minerals; this is known as a royalty.

Wyoming had the highest disbursement from oil and gas extractions in 2022, with about $615 million. From 2018 to 2019, oil and gas disbursements made to the states increased in California, Colorado, Montana,

North Dakota, and Wyoming, but decreased in Idaho, Nevada, South Dakota, and Utah. From 2019 to 2021, oil and gas disbursements declined for all states in the planning area. In 2022, disbursements increased and returned to 2019 levels or higher; however, disbursements in 2022 were lower than 2018 levels in Idaho, Nevada, and South Dakota.

Over the 5-year time period, Wyoming and North Dakota saw the largest magnitude increase in oil and gas disbursements, with an increase of about $260 million and $117 million, respectively. Nevada and South Dakota saw the largest magnitude decrease in disbursements of about $123,000 and $98,000, respectively. These decreases in disbursements could impact the local economies and public services such as education. If oil and gas disbursements continue to decline in Nevada and South Dakota, public services that are funded through oil and gas disbursements could be impacted.

See **Appendix 13**, Socioeconomic Baseline Report, and **Section 3.10**, Mineral Resources, for more information on current conditions of fluid mineral extraction and disbursements.

Coal Mines and Production

Although coal accounts for a small percentage of total economic contributions and employment in local communities, jobs associated with coal mining tend to be high paying compared with other types of employment in rural communities. All states, except North Dakota, saw a decline in coal production from 2018 to 2022, with the largest percentage decline occurring in Colorado (with a reduction in production of about 77.9% over the 5-year period). This reduction of coal production was observed globally and was largely driven by the reduction in natural gas prices that increased the demand for natural gas and reduced the demand for coal (EIA 2023b).[2]

Due to the reduction in demand for coal-fired generation, many economies throughout the socioeconomic analysis area could face significant financial impacts from loss of the associated coal mining jobs and tax revenue in the next decade. For example, Moffatt County, Colorado, received over $12 million in *ad valorem* taxes in 2018 from coal power plants and mines in the county (Mesa University, undated). In Wyoming, continued revenue decreases from coal production have spurred the review of funding mechanisms for state school systems and education services (Wyoming Legislative Service Office 2022; Wyoming Consensus Revenue Estimating Group 2023).

All states in the planning area, except Montana and Utah, had stagnant disbursements from coal extraction over the last 5 years. Utah experienced a decline in disbursements of about 48%. Montana had a decline in disbursements from 2018 to 2021, but then disbursements increased from 2021 to 2022. See **Appendix 13**, Socioeconomic Baseline Report, and **Section 3.10**, Mineral Resources, for more information on current conditions of coal extraction and disbursements.

Nonenergy Mineral Extraction

Similar to oil, gas, and coal, the government collects revenue from nonenergy minerals. The BLM determines and discloses the royalty rate for nonenergy minerals before the lease is offered; the minimum royalty rates are 5% of gross value of output for phosphate and sulfur and 2% of quantity or gross value of output for sodium and potassium, and 25 cents per ton for asphalt. Gilsonite and hard-rock minerals have no minimum royalty rate. A portion of the revenues collected by the government are disbursed to the states, and the

[2] Coal and natural gas are substitute goods and compete for the same demand for energy (Abraham 2018). This means that when the demand for one energy source increases (due to factors such as a decrease in price), the demand for the other energy source decreases.

states allocate a portion of the disbursements to counties, local governments, municipalities, and school districts. Wyoming had the highest disbursement from nonenergy mineral extractions, in 2022, with about $8.4 million (all of which came from sodium-based minerals such as trona). However, these disbursements in Wyoming declined from 2019 to 2022 by over $7.7 million, which was the largest decline in magnitude across the planning area. All states, except Idaho and Utah, had either a decline in disbursements or stagnation in disbursements over the 2019–2022 period. Idaho has large deposits of phosphate, and disbursements to Idaho over the last five years ranged from about $3.5 million in 2019 to $5.1 million in 2022. Disbursements to Idaho decreased from 2018 to 2019 but increased from 2019 to 2022, which raised the disbursements above 2018 levels by $863,000. Utah disbursements, which are largely from potassium and gilsonite, fluctuated between a low of about $739,000 in 2018 and a high of about $1.4 million in 2019. In addition to the public services that nonenergy leasable minerals help support, nonenergy leasable mining jobs tend to be some of the highest paying jobs in rural communities, especially in Idaho.

California receives disbursements for nonenergy minerals produced in the state. However, minerals are extracted outside the California socioeconomic analysis area so changes in BLM management decision on GRSG HMAs would likely not impact disbursements for nonenergy minerals in California.

See **Appendix 13**, Socioeconomic Baseline Report, and **Section 3.10**, Mineral Resources, for more information on current conditions of nonenergy mineral extraction and disbursements.

Locatable Minerals

The value of minerals and their contribution to local and regional economies vary based on market conditions and volume extracted. Within the planning area, all the states, except South Dakota and North Dakota, impose taxes on locatable hard-rock mining activities. The taxes in most states are collected regardless of landownership. The type of taxes and amount collected vary across states; however, the distributions of the taxes are important in supporting public services and infrastructure by providing funds for schools; local counties, cities, and towns; highways and road construction; and water infrastructure (State of Wyoming Legislature 2021). In addition to the public services supported by locatable minerals, hard-rock mining jobs tend to be some of the highest paying jobs in rural communities, especially in Nevada.

See **Appendix 13**, Socioeconomic Baseline Report, and **Section 3.10**, Mineral Resources, for more information on current conditions of locatable minerals on federal land.

Mineral Materials

Because mineral materials generally do not represent scare commodities, they can be found throughout the analysis areas, on and off GRSG HMAs. Sand and gravel, used often as construction aggregate, are an extremely important resource and extraction directly with the amount of development—road building and maintenance, and urban development—nearby. The proximity of both transportation and markets are key elements in the potential for deposits to be developed, even more so than for other types of mineral deposits (Burgex Mining Consultants 2016).

Future demand for mineral materials will vary depending on market conditions, which differ according to economic conditions and construction activity. One major driver of construction activity is road and well pad construction for oil and gas exploration and development and residential and commercial construction projects. As new oil and gas development continues to occur, it is expected that mineral materials activity will continue. Another driver is to improve road access for wildfire suppression activities. The construction, maintenance, and effectiveness of fuel breaks can be impacted by availability of mineral material pits.

Community pits are sites established by governmental agencies for the public to acquire mineral materials through sales contracts. Local government agencies and nonprofit organizations may obtain these materials free of cost for community purposes. County and state road construction divisions are the significant users of gravel and sand resources. A negotiated sale is an exclusive site proposed by a single party, often commercial, as the party must pay for the BLM to process the permit. The number of sales out of a community pit varies by site, from less than one to more than 50 per year. Most sales are for less than 1 ton. Free-use permit sites are used sporadically and may be scattered throughout a field office (FO) or district office. A pit may be inactive for several years before it is needed for a road project in the area.

See **Appendix 13**, Socioeconomic Baseline Report, and **Section 3.10**, Mineral Resources, for more information on current conditions of mineral materials on federal land.

Renewable Energy

Geothermal Energy

Industry surveys show geothermal power plants employ about 0.74–1.17 people per MW to maintain and operate a facility; an additional 0.96 secondary jobs per MW are generated for every power plant built. Additionally, there are temporary jobs in the manufacturing and construction sectors created by the construction of new power plants. Over the 17–33 months in which an average plant is constructed, about 3.1 people per MW of full-time employment are needed to construct the plant, and 3.3 people per MW are needed to manufacture the plant equipment (Geothermal Energy Association 2015).

See **Appendix 13**, Socioeconomic Baseline Report, and **Section 3.10**, Mineral Resources, for more information on current conditions of geothermal production and disbursements.

Wind and Solar

As of 2021, five wind projects were operating on public lands in the analysis area (in Nevada, Oregon, Utah, and Wyoming), and one project (in Wyoming) was pending construction (BLM 2021c). As of 2022, there were only two solar projects operating on public lands in the analysis area (in Nevada and Wyoming), and one project (in Utah) was pending construction (BLM 2022d).

Chapter 2, Demographic and Economic Baseline Conditions, of **Appendix 13** discusses the jobs in key sectors for each state in the analysis area, and **Table A-2** through **Table A-21 (Part 3)** in **Appendix 13** show the number of jobs and labor income by sector county in each state of the analysis area, as reported by the US Bureau of Economic Analysis. Renewable energy, such as wind and solar development and operations and maintenance, support jobs in various industries, such as the construction industry, so the US Bureau of Economic Analysis includes the jobs that are supported through renewable energy in the employment numbers for these various industries rather than reporting jobs for renewable energy separately.

See **Appendix 13**, Socioeconomic Baseline Report, and **Section 3.8**, Lands and Realty (Including Renewable Energy), for more information on current conditions of wind and solar on federal land.

Livestock Grazing

The BLM-administered lands and other public and private lands support values to the local economies across the socioeconomic study area by providing forage to permitted ranchers at a price below that of private land forage or purchased feed. Seasonal use of public land forage can offset higher feed cost incurred at other times of the year and lower overall input costs associated with producing livestock for market. These animals can make up a significant portion of farm sales and provide food to the ranchers, their families, and the

surrounding communities. Grazing fees paid by ranchers under their federal grazing permits also generate revenue which is returned to the states or counties where the fees were generated. Under the Taylor Grazing Act, a portion of BLM grazing revenue is returned to the county of origin; 50% of Section 15[3] fees collected are returned to counties, and 12.5% of Section 3[4] fees are returned to counties. Grazing revenue and the disbursement that is returned to the county vary by county and may have a higher level of importance at the local level for some communities. In addition, the lands provide value through the social and cultural connections between public land grazing and ranching lifestyles in the analysis areas.

For the purposes of examining how the BLM management decisions in this effort will affect different ranches in the analysis area, a discussion on the different types of ranches in the analysis area is provided. The USDA Economic Research Service developed a classification, or "typology", of farms and ranches based on annual gross cash farm income (the farm's revenue prior to deducting expenses), primary occupation of the operator, and ownership of the farm or ranch. Ranches are broadly categorized into family and non-family ranches based on whether the majority of the ranch business is owned by the primary operator and relatives of the primary operator (non-family ranches are those where the operator and individuals who are related to the operator do not own a majority of the business). Family ranches are further categorized by size and primary occupation of the operator as described below (USDA Economic Research Service 2024):

- Small family ranches are those that have gross cash farm income of less than $350,000 per year. These ranches are broken into four types based on the primary occupation of the operator and size of the farm: retirement ranches (where the operators are retired but continue to ranch on a small scale), off-ranch primary occupation (where the operators report a primary occupation other than farming or ranching), ranch primary occupation with low sales (where the operators report that farming or ranching is their primary occupation and the gross cash farm income of their ranch is less than $150,000), and ranch primary occupation with moderate sales (where the operators report that farming or ranching is their primary occupation and the gross cash farm income of their ranch is at least $150,000 but less than $350,000).
- Midsize family ranches are those that have gross cash farm income of at least $350,000 but less than $1 million.
- Large family ranches are those that have gross cash farm income of at least $1 million but less than $5 million.
- Very large family ranches are those that have gross cash farm income of at least $5 million.

The BLM management decisions that impact livestock grazing would likely have a greater effect on small family ranches where ranching is the primary occupation than other types of ranches. This is because small family ranches where ranching is the primary occupation rely more heavily on income from their livestock than small family ranches with other sources of income and they tend to have less flexibility and resources to operate on smaller margins or modify business practices based on the BLM management decisions than ranches with higher sales or supplemental forms of income (for example, they have less ability to absorb higher costs, if ranching costs were to increase). See **Appendix 13**, Socioeconomic Baseline Report, and

[3] Section 15 lands are public lands that lie outside a grazing district administered by the BLM under Section 15 of the Taylor Grazing Act. The BLM authorizes livestock grazing on these lands by issuing leases to private parties.
[4] Section 3 of the Taylor Grazing Act concerns grazing permits issued on BLM-administered lands within the grazing districts established under the act. It gave leasing preference to landowners and homesteaders in or adjacent to the grazing district lands.

Section 3.8, Livestock Grazing, for more information on current conditions of livestock grazing on BLM land.

Wild Horse and Burros

In the planning area, there are approximately 15 million acres of wild horse and burro WHB HMAs. The BLM administers 168 WHB HMAs within California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, and Wyoming. Current conditions within the planning area show that wild horse populations continue to grow, often exceeding AMLs. As wild horse and burro populations exceed AMLs, wild horses and burros can be causal factors for failing to meet applicable land health standards.

Wild horses are often termed "living symbols of the historic and pioneer spirit of the West." (16 U.S.C. 1331). As such, some stakeholders place a social value on horses related to this symbolism. Wild horses may also hold value for some due to an emotional connection related to the long history of human-horse interactions throughout civilization (Scasta et al. 2018)

Concerns over increasing wild horse and burro populations and program costs have prompted discussions, studies, and proposals. The BLM uses wild horse and burro funding for a variety of activities, including off-range holding activities, gathers, and other activities. For fiscal year 2021, expenditures totaled an estimated $122.2 million (CRS 2022).

See **Appendix 13**, Socioeconomic Baseline Report, and **Section 3.7**, Wild Horses and Burros, for more information on current conditions of wild horses and burros management and social values associated with wild horses and burros on BLM land.

Public Finances

State and local governments collect a variety of revenues related to the use of natural resources. Many western states and local governments are heavily dependent upon these mineral revenues for a significant portion of their annual budgets and rely on dollars generated from mineral development to fund schools, roads, and other public services. These revenues could be directly impacted by BLM management decisions on GRSG HMAs, if the decisions affect the level of use of natural resources. The following is a description of major sources of revenue and the potential link to BLM resources and resource uses.

Tax revenue at the state level is collected from various sources, including the following:

- State business income taxes and personal income taxes on employee earnings are collected for earnings on employment and industries in certain states (there is no state income tax in Nevada, South Dakota, or Wyoming).
- Severance tax is imposed on nonrenewable natural resources that are removed from the earth. Natural resources that are subject to severance taxation include metallic minerals, molybdenum, oil and gas, oil shale, and coal. Rates of taxation vary by mineral resource and state (see **Appendix 13**, Socioeconomic Baseline Report, for more information on the severance tax, including severance tax rates on oil and gas production for each state in the planning area).
- State sales tax is imposed on purchases directly or indirectly associated with BLM-administered lands and resource uses (for example, purchases of household goods by livestock operators on BLM-administered lands).
- Other state revenue sources include sources such as State Conservation Fees or Wyoming's Impact Assistance Tax Program, which require developers on public lands to pay impact assistance

payments as warranted by the application/plan of development approval (State of Wyoming Legislature 2021).

Tax rates can vary widely across local taxing entities within a state, and a county often includes many different taxing entities (e.g., counties, school districts, municipalities, special districts). At the local level, taxes that can be impacted by BLM-administered land uses include the following:

- Local sales tax is imposed at a variable rate based on jurisdiction. It is imposed on purchases directly or indirectly associated with BLM-administered lands and resource uses.

Ad valorem and other property taxes, which are determined based on local mill levy rates, property valuations, and the gross value of minerals produced within their jurisdiction (including federal minerals located within their jurisdiction).

Payments in Lieu of Taxes (PILT) are federal payments to local governments that help offset losses in property taxes due to nontaxable federal lands within their boundaries.[5] PILT is not guaranteed and are subject to annual congressional budget appropriations. PILT payments are transferred to county or local governments, as applicable, and are in addition to other federal payments, including those from grazing fees. Counties in the Utah analysis area received about $38.2 million in PILT payments in 2023 for nearly 27.9 million acres of federal lands. About 70.5% of the federal land in the Utah analysis area was BLM-administered land. After applying the calculated payment per acre of federal land for each county to the BLM acres, the estimated BLM-related portion of PILT revenue in the Utah analysis area was about $24.7 million. This was the highest BLM-related portion of PILT revenue to counties across all states in the analysis areas (see **Section 3.7.1,** State and Local Revenues, and **Table 3-16** in **Appendix 13**, for more details on PILT by county and state across the analysis area).

3.12.3 Social Setting and Nonmarket Values

Social Conditions and Community Interests

The 10-state planning area encompasses a diverse landscape of social conditions, including both rural and urban populations. The socioeconomic analysis areas for each state where GRSG HMAs are located tend to be more rural; however, attitudes, beliefs, values, opinions, and perceptions about BLM-administered public resources and effects of policies and actions can vary substantially across social and geographic groups around and associated with the socioeconomic analysis area. These views and beliefs of residents, visitors, commercial users, traditional or subsistence users, Tribes, and interest-based or place-based groups reflect different cultural and economic linkages people have with BLM-administered lands. Those with common interests can typically be defined by communities of place or communities of interest, or both. Discussion of communities of place and communities of interest is included in **Appendix 13**.[6]

Nonmarket Values

BLM-administered lands provide a range of goods and services that benefit society in a variety of ways. Some of these goods and services, such as solid and fluid minerals, are bought and sold in markets and have a

[5] Public Law 94-565, dated October 20, 1976, was rewritten and amended by Public Law 97-258 on September 13, 1982, and was codified at 31 US Code 69. The law recognizes that local governments' inability to collect property taxes on federally owned land can create a financial impact. PILTs are in place to help mitigate the financial impact. See Public Law 94-565 and Public Law 97-258 for more details on limits and appropriations.

[6] Additional information on social characteristics of counties in Nevada can be found in the county-level socioeconomic baseline reports published by the Nevada Economic Assessment Project, accessed here: https://extension.unr.edu/neap/about-neap-program.aspx.

readily observed market value. Others have a less clear connection to market activity, even though they provide society benefits. In some cases, goods and services have both market and nonmarket values. This section provides an overview of several nonmarket values associated with GRSG management.

For the purposes of this effort, the BLM defines "value" as the combination of all benefits that people receive from BLM-administered lands and resources. Total value is the sum of market value from economic activities and nonmarket value. However, nonmarket values, in the discussion below, are not directly comparable to the previous sections that describe various resource uses and revenue on BLM-administered lands. The market indicators discussed above describe the effects on economic (market) activity in the region, and the market values of many of the activities are monetized. However, nonmarket values tend to differ across groups and individuals based on preferences, creating challenges with monetizing nonmarket values. Therefore, nonmarket values are discussed qualitatively.

The nonmarket values associated with GRSG management on BLM-administered lands include both use (direct and indirect) and nonuse values (such as existence values and bequest values held by the general public from self-sustaining populations of GRSG; BLM 2013b). Nonmarket values associated with GRSG and GRSG habitat can also be viewed through the lenses of ecosystem services. Ecosystem services, or the benefits that people receive from nature, are commonly classified within four major categories: regulating, provisioning, cultural, and supporting (Millennium Ecosystem Assessment 2005). Sagebrush environments, which support GRSG populations, provide numerous ecosystem services, such as providing services associated with food products from livestock production; hunting; other recreational opportunities; and the provision of water for municipal, industrial, and irrigation uses. In addition, intact sagebrush ecosystems reduce wildfire return intervals and host many species of wildlife, including game animals and other sensitive, threatened, and endangered species. Healthy sagebrush ecosystems sequester carbon, which can be enhanced through conservation efforts on public lands (Bennett and Suhr Pierce 2021). Additional details are included in **Appendix 13**.

People also receive intrinsic benefits from nature that are diverse in inspiration but consistently highly valued. These include benefits from seeing or knowing a flourishing, biodiverse sagebrush ecosystem exists; benefits from feeling secure such habitats will exist for the enjoyment and health of future friends and family members; or benefits from preserving ancestral/heritage/cultural connections established through sagebrush ecosystems and the GRSG species. Comparatively, there are others whose non-market values associated with public lands, including intrinsic and bequest values, are threatened by land use restrictions associated with GRSG HMAs.

3.12.4 Environmental Justice

Environmental justice embodies the principle of fair treatment and meaningful involvement for all individuals, regardless of their race, color, national origin, or income, in relation to the formulation, execution, and enforcement of environmental laws, regulations, and policies. It underscores the essential concept that no specific group, whether defined by race, ethnicity, or socioeconomic status, should disproportionately bear the adverse environmental impacts arising from industrial, municipal, or commercial activities, or the implementation of federal, state, local, and Tribal programs and policies (BLM 2005).

Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994), mandates federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations in the United States. The EO mandates that each federal agency "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately

high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations" (59 *Federal Register* 7629 [1994]). EO 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All, enacted on April 21, 2023, complements EO 12898.

Furthermore, the BLM Land Use Planning Handbook (BLM 2005) and Instruction Memorandum 2022-059, reinforces the BLM's dedication to environmental justice. This commitment is evident in providing substantial opportunities for low-income, minority, and American Indian and Alaska Native populations to meaningfully participate, and considering these populations when developing mitigation measures. Details of the Environmental Justice Screening Criteria and results, including maps and tables of identified communities are included in **Appendix 13**.

Identified populations that met the criteria for further consideration as environmental justice communities are:

- Both counties included in the California analysis area
- Seven of the eight counties in the Colorado analysis area
- In the Idaho analysis area, 25 of the 27 counties
- In the Montana analysis area, 18 of the 26 counties
- The entire Nevada analysis area
- No county in the North Dakota analysis area
- Seven of the eight counties in the Oregon analysis area
- In South Dakota's analysis area, Butte County
- Across the Utah analysis area, 18 of the 23 counties
- In the Wyoming analysis area, 15 of the 21 counties

The findings of areas containing environmental justice populations in the analysis areas for each state were instrumental in evaluating potential disparities in the impacts of various alternatives on minority, low-income, and American Indian and Alaska Native populations. Because counties were identified as containing environmental justice populations, as discussed above, the BLM management decisions on GRSG HMAs could impact environmental justice populations disproportionately.

Environmental Justice Issues of Concern

As discussed above, Environmental justice includes the principle of meaningful involvement for all individuals, regardless of their race, color, national origin, or income. In 2022 through 2024, the BLM initiated formal consultation with tribes and outreach and meetings with the public, including those who meet the criteria for environmental justice consideration that have interests or traditional cultural properties in the analysis area. In January 2022, the BLM held two virtual public scoping meetings at different times during the day to encourage public participation across a wide group of people in various locations and to accommodate various needs. The meetings were recorded and shared on the project's ePlanning website for those who were unable to attend. In 2012, the BLM and the Forest Service conducted an economic strategies workshop to identify public concerns related to potential social, economic, and environmental justice impacts resulting from management alternatives (BLM and Forest Service 2012; BLM 2012; see Chapter 5, Consultation and Coordination, for more detail on government-to-government consultations with tribes as well as meetings and outreach to the public for this effort).

The BLM maintains the project's website as well as a national GRSG conservation website that aims to help the public learn how BLM is working on maintaining and restoring GRSG. These sites provide background information, updated documents, information on public meetings, and contact information.

Comments that the BLM received during these outreach efforts helped guide resource and impact analysis considerations. Additionally, the BLM reviewed the scoping report for the current EIS to identify comments related to environmental justice issues. This section summarizes findings from those efforts and discusses the issues that will be addressed in the impacts analysis on environmental justice populations.

A key issue relating to environmental justice populations for many states, including California, Nevada, Colorado, Idaho, Montana, Oregon, South Dakota, and Utah, pertained to the interests of those who identify as American Indian, the cultural significance of the GRSG to American Indian populations, and the importance of hunting and subsistence. Some concerns revolved around the viability of GRSG populations. Historical records highlight the importance of GRSG to individuals who identify as American Indian across the planning area who traditionally relied on GRSG as a vital food source. GRSG has played a vital role in traditions and customs, and it has served as inspiration for ceremonial dances.

The preservation of GRSG habitat would have beneficial effects for those who identify as American Indian who hold cultural value for the bird (BLM and Forest Service 2012). American Indian populations across the planning area engage in hunting and subsistence activities on federal lands outside the boundaries of their reservations. Access to hunting and subsistence resources is a concern for many environmental justice populations within the state analysis areas, especially for Tribal members. The profound connection between the GRSG habitat and American Indian populations underscores the importance of considering these aspects in the planning and decision-making processes. On the other hand, some comments expressed concern that habitat conservation in some alternatives could negatively impact road realignment projects near their reservation and plans to expand their reservation boundaries where reservations are surrounded by PHMAs.

Another issue of concern includes the economic impacts on environmental justice populations from greater restrictions on livestock grazing and mineral, oil, and gas development. This issue was especially of concern in counties with high poverty rates and declining economic opportunities (BLM 2013b). However, at the time of this analysis, there is a lack of evidence that the types of operations that are most likely to be impacted by BLM management decisions (such as mining, renewable energy, and small family-owned ranching and livestock operations) employ a higher percentage of people who identify as a minority, low-income, or American Indian and Alaska Native. Therefore, there is no evidence that impacts on economic conditions due to BLM decisions will lead to disproportionate impacts on environmental justice populations, and economic impacts on environmental justice populations will not be carried forward in the impacts analysis on environmental justice populations. Impacts on economic conditions may occur across the area, and these impacts on economic conditions will be included in the impacts analysis on social and economic conditions, as it relates to all populations in the surrounding analysis area. Additional screening and consideration of environmental justice populations and analysis of any disproportionate and adverse impacts will occur at the implementation stage at a scale commensurate with the scope and scale of management actions being considered to provide additional protections for local GRSG populations. Depending on conditions at that time, communities with environmental justice concerns may change.

Concerns were identified about impacts on food prices and availability due to restrictions on grazing and mineral development (especially trona mining) in Wyoming and Idaho. These comments were in the context of economic conditions, however, increases in food prices and decreases in food availability tend to

disproportionately impact low-income individuals who have more limited means for finding alternatives. This issue will be carried forward and examined in the impacts analysis on environmental justice populations.

The 2015 EISs identified issues that were not brought up in public comments but were considered important issues for analyzing impacts on environmental justice populations. One was the impact on environmental justice populations from changes in availability for firewood permits. The current BLM management decisions, however, will not change the availability for firewood permits; therefore, this concern will not be carried forward in the impacts analysis.

Visual and auditory impacts on environmental justice populations from mining development and operations and travel management decisions were other issues considered in the 2015 EISs. The 2015 plans included specific management decisions that could impact areas used for spiritual and religious practices, but these types of site-specific decisions are not included in the current effort. Therefore, impacts on environmental justice populations from visual and auditory disruptions will not be carried forward in the impacts analysis. Impacts on visual and auditory resources will be considered for potential inclusion in the implementation-level NEPA analysis.

In addition to issues raised by the public, as discussed above, the BLM will consider and analyze other concerns for environmental justice populations. These issues include impacts from potential changes in water quality, air quality, and climate change from mineral development under alternatives with less restrictions. These issues were not analyzed in the 2015 EISs but are considered important to the analysis in the current efforts.

3.13 Air Resources and Climate

This planning effort is limited to making land use planning decisions specific to the conservation of GRSG habitats. No decisions related to the management of air quality will be made. Impacts on air quality and climate from the alternatives being analyzed are presented in **Section 4.3**.

3.13.1 Air Resources

Air resources involve ambient air quality (measured by the concentration of air pollutants) and air quality-related values such as visibility and atmospheric deposition. Air quality indicators include concentration of criteria air pollutants, hazardous air pollutants (HAPs), and sulfur and nitrogen compounds, which could contribute to visibility impairment and atmospheric deposition.

Regulatory Framework

Clean, breathable air, expansive vistas, and minimal acidification of the lands, streams, and lakes are goals pursued by the BLM air resources program. The Clean Air Act and FLPMA require the BLM to comply with local, state, Native American Tribal, and other federal agency air quality standards and regulations. FLPMA further directs the Secretary of the Interior to take any action necessary to prevent unnecessary or undue degradation of the lands (Section 302 (b)), and to manage the public lands "in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archeological values" (Section 102 (a)(8)). Air resources management is accomplished by establishing desired outcomes (goals and objectives) and allocations for allowable resource uses (management direction) that, at a minimum, must ensure authorized activities are in compliance with regulatory standards.

The U.S. Environmental Protection Agency (EPA) which has the primary responsibility for regulating air quality, has established national ambient air quality standards (NAAQS) under the Clean Air Act for six criteria air pollutants which include: carbon monoxide, lead, nitrogen dioxide, ozone, two classes of

particulate matter (particulate matter with an aerodynamic diameter less than or equal to 10 microns [PM_{10}] and particulate matter with an aerodynamic diameter less than or equal to 2.5 microns [$PM_{2.5}$]), and sulfur dioxide. NAAQS include primary standards established to protect public health, including the sensitive populations (e.g., children, the elderly, or asthmatics), and secondary standards to provide public welfare protection, including protection against decreased visibility and damage to the environment (e.g., crops, vegetation, animals, buildings).

The Clean Air Act requires federal, state, Tribal, and local agencies to work in partnership to manage and regulate air quality. Local governments are responsible to comply with NAAQS but also may establish local air quality standards that are no less restrictive than the NAAQS. The Clean Air Act has established permitting programs, generally implemented by states and local agencies, to carry out the goals of the Act. States are responsible for development of a state implementation plan to ensure standards are met.

In addition to criteria pollutants, the EPA and state air quality management agencies are responsible for controlling air toxics, or HAPs, at all major sources and some area sources in specific source categories (40 Code of Federal Regulation 51). HAPs are those known or suspected to cause cancer or other serious health problems (e.g., respiratory problems, birth defects, or reduced fertility) or environmental effects (e.g., mercury deposition).

In addition to improving air quality, the Clean Air Act addresses maintaining clean air. This program, known as the Prevention of Significant Deterioration program, maintains clean air by limiting emissions of air pollutants so that significant deterioration of air quality will not occur. The program protects air quality within Class I areas by allowing only slight incremental increases in pollutant concentrations. Class I air quality areas include National Parks larger than 6,000 acres and wilderness areas larger than 5,000 acres that existed or were authorized as of August 7, 1977. They receive the highest degree of air quality protection under the Clean Air Act.

Current Conditions and Trends

The Clean Air Act requires each state to identify areas with ambient air quality in violation of the NAAQS using monitoring data collected through state monitoring networks. Areas that violate the NAAQS are designated as nonattainment areas for the relevant criteria air pollutants, while areas that comply with the NAAQS are designated as attainment areas for the relevant criteria air pollutants. Areas of uncertain status due to insufficient monitoring data are generally designated as unclassifiable but are treated as attainment areas for regulatory purposes. Most of the planning area is in attainment/unclassifiable for the NAAQS. As shown in **Table 3-14** (**Appendix 9**), portions of the planning area in California, Colorado, Idaho, Montana, Utah, and Wyoming are nonattainment for one or more of the NAAQS.

In conducting a thorough general conformity applicability review, the BLM has determined that conformity is not applicable. This conclusion is underpinned by the comparison of the Reasonably Foreseeable Development (RFD) outlined in **Appendix 12**, which indicates that the projected development associated with the actions is either the same or less than the No Action alternative. As a result, net emissions are anticipated to remain unchanged.

Areas that have been redesignated from nonattainment to attainment are considered maintenance areas. **Table 3-15** (**Appendix 9**) shows the areas that were redesignated from nonattainment to maintenance areas and the dates of the redesignation. These areas have current attainment of the NAAQS, showing air quality in the planning area has improved over the last two decades.

Emission Inventory

The EPA, in collaboration with state, local, and Tribal agencies, compiles a National Emissions Inventory every 3 years. The total criteria pollutant emissions reported from the planning area counties in the most recent (2020) National Emissions Inventory[7] (EPA 2023b) is shown in **Table 3-16** (**Appendix 9**). Although there is no NAAQS for volatile organic compounds (VOCs), they contribute to ozone formation in the atmosphere. As shown in the table, in the planning area counties, wildfires were the primary emitter of carbon monoxide (72.7%) and $PM_{2.5}$ (62.1%) and the second highest emitter of VOCs (35.9), sulfur dioxide (35.5%), and PM_{10} (27.0%). Biogenics were the number of one source of VOCs (48.3%), while point sources were the number one source of sulfur dioxide (57.5%) and area sources were the number one source of PM_{10} emissions (70.2%). Nitrogen oxides emissions were highest from point sources (23.1%), followed by on-road mobile sources (22.6%).

Air Quality Monitoring Data

The EPA compiles air monitoring data from state monitoring networks and presents annual air pollutant concentration values by county in its Air Quality Statistics Report (EPA 2023b). **Table 3-17** (**Appendix 9**) presents air pollutant concentration values, which are key indicators in assessing air quality and represent a calculated measure that reflects the highest long-term concentrations of pollutants. This information helps evaluate the overall air quality trends and compliance with standards for planning area counties in California, Colorado, Idaho, Montana, Nevada, Oregon, South Dakota, Utah, and Wyoming. There are no monitoring stations in the planning area counties in North Dakota. While monitoring data are available for the range of criteria pollutants, depending on location, **Table 3-17** (**Appendix 9**) focuses on the pollutants of most concern in the planning area, including ozone, PM_{10}, and $PM_{2.5}$, based on the county nonattainment status. Values in bold indicate a level above the NAAQS for that pollutant. However, these bolded values are not direct design values and serve as general indicators. The EPA determines attainment status, and this disclaimer is included for clarity.

All planning area states except Idaho have recorded concentrations for one or more pollutants above the NAAQS in some counties in some years (**Table 3-17** [**Appendix 9**]). In some areas, the elevated concentrations may reflect urban conditions where monitoring stations are located, potentially not accurately representing air quality conditions in more rural BLM-administered lands.

Ozone. Ozone is formed by photochemical reactions of precursor air pollutants, including volatile organic compounds and nitrogen oxides. These precursors are emitted by mobile sources, stationary combustion equipment, and other industrial sources. Ozone formation is enhanced by increased sunlight and higher air temperatures. Ozone exposure can lead to respiratory issues and aggravate pre-existing conditions such as asthma and chronic obstructive pulmonary disease. Elevated ozone concentrations may also occur during winter in snow-covered rural areas. Since 2000, ozone concentrations have decreased by 16% nationally (EPA 2023c). The West (including California and Nevada) has seen a decrease in ozone concentrations of 11%, while the Southwest (including Utah and Colorado) has seen a decrease of 2%. Conversely, ozone concentrations in the Northern Rockies and Plains have increased 14% since 2000, while the in the Northwest (including Oregon and Idaho) concentrations have increased by 2% (EPA 2023c).

Particulate Matter (PM_{10} and $PM_{2.5}$). Particulate matter is a complex mixture of small particles and liquid droplets found in the air. $PM_{2.5}$ consists of both primary particulate matter, generated mostly from combustion-related activities, and secondary particulate matter, which is formed from atmospheric chemical

[7] First released version of the 2020 National Emissions Inventory.

reactions of precursor emissions. Sources of particulate matter include agricultural activities, industrial processes, smoke from wildland fire, fossil fuel development, physically disturbed soils, and dust from unpaved roads. $PM_{2.5}$ emissions are primarily generated by internal combustion diesel engines, soils with high silt and clay content, and secondary aerosols formed by chemical reactions in the atmosphere. Particulate matter affects deposition on plants and surfaces (including on snow, which can contribute to climate change) and visibility. PM_{10}, consisting of larger particles, can irritate the eyes, nose, and throat and may exacerbate respiratory conditions. $PM_{2.5}$, comprising finer particles, poses health risks as it can penetrate deep into the lungs, potentially causing or worsening respiratory and cardiovascular problems.

PM_{10} concentrations have decreased by 36% nationally since 2000 (EPA 2023d). This decrease is observed in annual PM_{10} concentration averages. Over this same period, the West (including California and Nevada) saw a decrease of 66% and the Southwest (including Utah and Colorado) saw a decrease of 22%. Conversely, PM_{10} concentrations in the Northern Rockies and Plains increased 9% since 2000, while in the Northwest (including Oregon and Idaho) concentrations increased 21% (EPA 2023d). $PM_{2.5}$ concentrations have decreased by 37% nationally since 2000 (EPA 2023e). Concentrations decreased 28% in the West (including California and Nevada), 23% in the Northwest (including Oregon and Idaho), 16% in the Northern Rockies and Plains, and 13% in the Southwest (including Utah and Colorado) since 2000 (EPA 2023e).

Climate Change and Greenhouse Gases

The Intergovernmental Panel on Climate Change (IPCC) describes climate change as "a change in the state of the climate that can be identified (for example, by using statistical tests) by changes in the mean and/or the variability of its properties, and persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use" (IPCC 2013, 2021). Current ongoing global climate change is caused, in part, by the atmospheric buildup of greenhouse gases, which may persist for decades or even centuries. Although largely invisible to the short wavelength incoming solar radiation that heats the earth's surface, greenhouse gases absorb a portion of the outgoing long wavelength infrared heat radiated back from the surface, preventing it from escaping out into space. As a result, the buildup of greenhouse gases since the start of the industrial revolution has increased the global mean temperature and has altered the earth's climate in complex ways.

Greenhouse gasses exhibit different speciation characteristics, with each gas having unique properties. CO_2, primarily released from fossil fuel combustion and deforestation, is a major contributor to global warming. Methane, emitted from livestock, agriculture, and energy production, is a potent but short-lived greenhouse gas. Nitrous oxide, originating from agricultural and industrial activities, has a longer atmospheric lifespan. While greenhouse gasses primarily influence climate patterns, they also have direct and indirect health impacts. Climate change resulting from greenhouse gas emissions contributes to extreme weather events, altered disease patterns, and impacts on air and water quality. Additionally, certain greenhouse gasses, like methane, can indirectly affect human health by contributing to ground-level ozone formation (IPCC 2013, 2021).

Warming of the earth's climate since the industrial revolution has been observed to coincide with widespread effects throughout the earth-atmosphere system, including reductions in the extent and duration of polar sea ice and mountain winter snowpack, rising sea levels, increases in mean nighttime minimum temperatures, shifts in historical rainfall patterns, and changes in the frequency, severity, and duration of weather events. These effects, in turn, have affected natural and human systems regardless of cause, implicating the sensitivity of natural and human systems to changing climate (IPCC 2013, 2021).

The IPCC (2021) has concluded that human activities such as the burning of fossil fuels have caused greenhouse gas concentrations to increase since the mid-18th century and that "it is unequivocal that human influence has warmed the atmosphere, ocean and land." The IPCC's (2021) best estimate of the human-caused increase in global surface temperatures between 1850-1900 to 2010-2019 is 1.93 degrees Fahrenheit (°F), and it is "very likely" that well-mixed greenhouse gases were the main driver of this warming since 1979. Evidence of the observed change and the human influence in extreme events such as heat waves, heavy precipitation, and droughts has strengthened since the IPCC Fifth Assessment Report (IPCC 2013). For example, it is "virtually certain" that the frequency and intensity of extreme heat events have increased across most regions since the 1950s, and cold extremes have become less extreme and less severe; there is "high confidence" that human-induced climate change is the main driver of these changes (IPCC 2021).

Across the United States, annual average temperatures have increased by 1.8°F since the beginning of the 20th century and by 1.2°F over the last few decades (BLM 2020a; US Global Change Research Program 2018). According to the National Climate Assessment (US Global Change Research Program 2018), the largest increases in annual average temperatures since the beginning of the 20th century were observed in the western United States, while the southeastern United States had the least warming. Annual precipitation has increased in the northern and eastern United States since the beginning of 20th century and decreased in most of the southern and western United States (US Global Change Research Program 2018). The frequency and intensity of heavy precipitation have increased in most parts of the United States since the 20th century (US Global Change Research Program 2018).

Over the contiguous United States, annual average temperature is expected to increase by 2.5°F over the next few decades compared to present-day, regardless of future emissions (US Global Change Research Program 2018). By the end of the 21st century, the annual average temperature for the contiguous United States is expected to increase by 3 to 12°F depending on future emissions scenarios, and high temperature extremes are expected to increase accordingly (US Global Change Research Program 2018). The frequency and intensity of heavy precipitation are projected to continue increase over the coming century in the United States, and winter and spring precipitation are projected to increase significantly over the Northern Great Plains, the Upper Midwest, and the Northeast (US Global Change Research Program 2018).

The 2021 BLM Specialist Report on Greenhouse Gas Emissions and Climate Trends (BLM 2020a) presents climate trends for many of the western states. Information from that report is incorporated by reference and summarized in **Table 3-18** (**Appendix 9**). Climate trend information is further supplemented by the National Oceanic and Atmospheric Administration's State Climate Summaries (NOAA 2022), among other sources. In the Planning Area greenhouse gas emissions come primarily from the combustion of fossil fuels in energy use. Energy use is largely driven by economic growth, with short-term fluctuations in its growth rate created by weather patterns that affect heating and cooling needs and changes in the fuel used in electricity generation. In 2020, carbon dioxide emissions from combustion of fossil fuel for energy production in the US were equal to 73% of total United States anthropogenic greenhouse gas emissions (US Energy Information Administration 2022). Other major greenhouse gases that are caused by human activity include methane (11%) and nitrous oxide (7%; United States Energy Information Administration 2022).

Different greenhouse gases have different impacts on Earth's warming based on their ability to absorb energy and how long they stay in the atmosphere; therefore, total greenhouse gas estimates use carbon dioxide equivalent (CO_2e) which takes the radiative power of each gas for a given timeframe. In 2022, total GHG emissions from livestock grazing, other agriculture, commercial, industry, residential, and transportation sources was equal to 29,436 million metric tons of CO_2e per year (**Table 3-19** [**Appendix 9**]).

Greenhouse gas emissions are offset to some degree by carbon that is sequestered in terrestrial ecosystems. Carbon sequestration is the process of capturing and storing atmospheric carbon dioxide (e.g., in vegetation and soils). Historically, natural carbon sequestration in plants and soils has been able to lock up about 29% of all human-caused emissions on a global scale (Merrill et al. 2018). Terrestrial ecosystems on federal lands were estimated to have sequestered an average of 195 million metric tons of CO_2e per year nationally between 2005 and 2014, which would offset emissions from extraction and end-use combustion of fossil fuels on federal lands by approximately 15% (BLM 2020a).

3.14 SOIL RESOURCES

BLM's Rangeland Health Standards determine properly functioning physical conditions of soil resources in a planning area. This helps the BLM with soil management because determination on conditions will guide management adjustments and provide direction to make significant progress toward achieving the stated Standards. Since GRSG are dependent on sagebrush, and sagebrush viability is dependent on soil health, soils are a crucial element of GRSG habitat. Soil health is also integral to the BLM's mandate to sustain the health, diversity, and productivity of BLM-administered lands. Many resources and resource uses, including livestock grazing, wildlife habitat, riparian habitat, special status species, fisheries, recreation, water quality, and forestry, depend on suitable soils. Consequently, soil attributes and conditions are important to BLM management direction.

Soils are defined by the interaction of the processes that form them, including parent material (geology), climate, topography and biologic organisms. Through time, these processes form unique soil types and influence what plants may grow upon them. Soil surveys indicate that climate and topography are the primary influences on soil formation. Soil development processes, such as rock weathering, decomposition of plant materials, accumulation of organic matter, and nutrient cycling, are controlled largely by climate. Soil moisture and temperature strongly affect the rates of addition, removal, translocation, and transformation of material within the soil. Topography influences site conditions such as precipitation amounts and effectiveness, drainage, runoff, erosion potential, and temperature (Weltz et al. 2017).

Soils play an integral part in vegetation community development. Plants, including sagebrush, use soil as an anchor, a means to provide water for growth, and a storehouse for the nutrients needed for growth. Plant communities are most noticeably influenced where soil texture and thickness of soil horizons change, depth to restrictive layers including abrupt soil horizon boundaries exist, and by soil drainage, moisture holding capacity, or depth to the water table. Native plant communities require management considerations that include the ability of soil to produce a healthy ecosystem over the long term. Reducing the risk of erosion from water and air processes, limiting compaction from traffic source or grazing, and allowing water to infiltrate at a normal rate for the given soil texture will allow vegetative communities to thrive and further protects the soil resources (Weltz et al. 2017).

3.14.1 Existing Conditions

The discussion of existing conditions contains a description of soil resources for the planning area, regardless of landownership.

Conditions of the Planning Area

Soil Productivity

Soil productivity within the planning area varies widely due to the diversity of soils and site characteristics, including varying climatic, vegetative, topographic, and geologic conditions. The planning area landscape varies greatly from broad valleys to mountains. Average annual precipitation and temperature in the project area

vary by elevation and aspect (NOAA 2022). Due to low soil temperatures in high elevations and rugged mountains, the chemical reactions that release plant nutrients from minerals take place slowly. The rate of biologic activity is also limited by temperature, resulting in a slow rate of biologic decomposition, seed germination, and root growth. These factors combine to give the soils low fertility (Weltz et al. 2017).

Some of the most productive soils in the planning area are found in well drained valley bottoms, toe-slopes, benches, and broad ridge tops. On uplands where rainfall is moderate to low, medium-textured soils may produce favorable conditions, depending on land uses such as livestock grazing. Favorable conditions arise because medium-textured soils have the capacity to retain moisture, supporting vegetation even in less rainy environments. Livestock grazing, as a land use, plays a role by influencing the composition and health of vegetation. The interaction between livestock grazing and vegetation affects soil stability and water retention, contributing to overall suitability of medium-textured soils in uplands with limited rainfall. Soils that feature shallow clay pans, hardpans, or salts pose substantial constraints to land use and land use management. Shallow clay pans and hardpans limit root penetration and water drainage. Additionally, the presence of salts can lead to soil salinity, affecting the suitability of the land for various land uses. Soils in the planning area vary from calcareous to alkaline and surface texture ranges from strongly alkaline loams, sandy loams, loams, to clay loams underlain by sandy loam to clay textures, and rock outcrop complexes. Permeability ranges from very slow to moderately rapid, and erosion hazard for most soils is moderate, with some ranked as severe. Some of these soils are highly saline. Due to the salt content in these soils, vegetative cover can be sparse, resulting in soil particles not being anchored in place; thus, the soil is easily eroded by wind and water (Weltz et al. 2017).

Biological soil crusts are an important component of a broad range of ecological sites in the planning area. They function as a living mulch by retaining soil moisture, increasing organic matter, and discouraging annual weed growth (Belnap et al. 2001). Biological soil crusts also have a preventative effect on cheatgrass germination (Reisner et al. 2013). They are more prevalent at lower elevations, compared to higher elevations with greater precipitation, where vascular plant growth precludes biological crust development (Belnap et al. 2001). Although biological crusts are well adapted to severe growing conditions, they are extremely susceptible to physical disturbances, chronic and heavy domestic livestock grazing, and recreational activities. Such physical disturbances degrade biological soil crusts and eliminates native perennial bunchgrasses, creating conditions that promote cheatgrass invasion (Molvar et al. 2024). Wildfire can also damage the crust, and shrub presence and cheatgrass may increase wildfire intensity, decreasing the likelihood of early vegetative or crust recovery after a burn (Brooks and Chambers 2011). Over the past 30 years, annual herbaceous cover (led by cheatgrass, Ventenata, and medusahead wildrye) has steadily increased, while sagebrush has declined (Rigge et al. 2021c, indicating that current land-use decisions continue to drive cheatgrass expansion, rather than it being solely an artifact of past overgrazing (Rigge et al. 2021c).

Management practices affect the ability of soils to maintain productivity because of displacement, compaction, erosion, and alteration of organic matter and soil organism levels. For instance, when vegetation is removed for specific management purposes, it alters organic matter levels, influencing productivity content of the soil. When soil degradation occurs in semiarid, high desert regions, natural processes are slow to return site productivity. This is because conditions in these areas, with limited water and harsh climates, slow down natural recovery of the soil. The lack of sufficient moisture and the challenging environment make it difficult for the soil to bounce back quickly after degradation. Prevention of soil degradation is far more cost-effective and time effective than remediation or waiting for natural processes. Management practices, such as proper stocking rates for livestock, rotation of grazing, periodic rest from grazing, improved site design, construction

and maintenance of roads, selective logging, rehabilitation of unneeded surface disturbance, restricting vehicles to roads and trails, rehabilitating mined areas, and control of concentrated recreational activities, can reduce erosion effects and improve soil conditions. This encompasses efforts to create a more favorable environment for sustainable and productive soil.

Soil Erosion

Erosion is a continuing natural process that can be accelerated by human disturbances. Factors influencing soil erosion include soil texture, structure, length and percent of slope, vegetative cover, and rainfall or wind intensity. Soils most susceptible to erosion by wind or water are typified by bare or sparse vegetative cover, incohesive soil particles with slow infiltration rates, and moderate to steep slopes. Wind erosion processes are less affected by slope angle but are highly influenced by wind intensity. Semi-arid regions of much of the planning area have a low percentage of natural plant community ground cover, allowing the soils to erode naturally in wind and during infrequent rain events (Al-Hamdan et al. 2015).

While erosion occurs under natural conditions, rates of soil loss may be accelerated if human activities are not carefully managed. Soils are affected by surface uses that loosen topsoil and damage or remove vegetation or other ground cover. Surface-disturbing activities include any authorized actions that disturb vegetation and/or surface soil, thereby increasing erosion potential above normal site conditions. Surface-disturbing activities include construction of well pads and roads, pits and reservoirs, pipelines and power lines, mining, vegetation treatments, livestock grazing, and concentrated OHV cross-country travel.

Soil erosion rates can be controlled by managing vegetation, plant residues, and soil disturbance. Vegetative cover is the most significant factor in controlling erosion because it intercepts precipitation, reduces rainfall impact, restricts overland flow, and improves infiltration (Weltz et al. 2017). Biological soil crusts are especially important for protecting the soil and controlling erosion in desert regions, but are easily disturbed by various factors, including human activities (Weltz et al. 2017).

Wind erosion is particularly hazardous when surface litter and vegetation are removed by wildfire or other disturbances. Soils are considered fragile or of high erosion hazards if they contain the following characteristics: (1) Soils rated as highly or severely erodible by wind or water, as described in soil survey reports; (2) landslide areas, as identified in soil survey reports; and (3) Soils on slopes greater than 35% (Weltz et al. 2017).

Trends

The overall guidance for soil resources is to maintain or improve the ability of the soil to support vegetation and allow water and nutrients to be cycled by either macro or microorganisms, all of which promote and improve the health of the land. Degradation by excessive grazing, overpopulated wild horse and burro herds, recreation, erosion, or land developments have caused a reduction in soil function as one or perhaps many of the soil properties are changed thereby affecting the functions necessary for healthy soils. These essential functions include maintaining adequate fertility, supporting plant growth, promoting water retention, and sustaining a diverse ecosystem. The interconnectedness of soil properties and functions underscores the significance of preserving soil health for overall ecosystem well-being. BLM's rangeland health standards work toward conditions in which vegetation and ground cover maintain soil conditions that can sustain natural biotic communities. By implementing sustainable practices like controlling grazing rates, these standards aim to strike a balance that supports both the health of the land and the diverse ecosystems it sustains.

In the planning area, impacts on soil resources have resulted from various factors, including increasing temperatures, changing precipitation patterns, wildfire seasons, infestations like pine bark beetle, juniper and cheatgrass invasion, compaction from livestock grazing, mineral and energy development, long-term increases in outdoor recreation, as well as natural processes like erosion and weathering, and other activities influencing the soil (NOAA 2022). The potential for maintaining or restoring these ecological communities and conserving the soil resource depends on specific soil types and how resource programs are managed. Different soil types, like sandy or clayey soils, have varying abilities to retain water and nutrients, affecting restoration. Resource program management, involving practices like erosion control, directly influences the success of conserving and restoring the soil.

3.15 WATER RESOURCES

Water quality on public lands is regulated by the Clean Water Act, Safe Drinking Water Act, Public Land Health Standards, the Watershed Conservation Practices Handbook and other laws, regulations, and policy guidance at the federal, state, and local levels. The Clean Water Act (33 U.S.C. 1251 et seq.) mandates the protection, monitoring, and restoration of the physical, biological, and chemical integrity of waters in the United States. Sections 208 and 319 of the Clean Water Act specifically address the importance of implementing control strategies to address nonpoint source pollution. On BLM-administered lands, soil and water conservation practices, such as erosion control and watershed management, along with best management practices like proper grazing management, aim to prevent soil erosion and runoff. These practices reduce transport of pollutants into water bodies, effectively mitigating nonpoint source pollution on BLM-administered lands. The U.S. EPA supports this perspective in their guidance (EPA 1987). The Safe Drinking Water Act presumes aquifers are underground sources of drinking water, unless they are specifically exempted or if they have been shown to fall outside the definition of underground sources of drinking water (Safe Drinking Water Act 1996). Water rights are regulated by state law.

As a designated management agency, the BLM must: (1) implement and enforce natural resource management programs for the protection of water quality on federal lands under its jurisdiction; (2) protect and maintain water quality where it meets or exceeds applicable state and Tribal water quality standards; (3) monitor activities to assure they meet standards and report the results to respective states; and (4) meet periodically to recertify water quality BMPs (Weltz et al. 2017). BMPs include methods, measures, or practices to prevent or reduce water pollution, including but not limited to structural and nonstructural controls, operations, and maintenance procedures. BMPs are applied as needed to projects. BMPs work by using various strategies such as physical barriers and operational changes to prevent water pollution. Each project receives customized BMPs to ensure effective application.

3.15.1 Existing Conditions

The discussion of existing conditions contains a description of water resources for the planning area, regardless of landownership. Where specific to BLM-administered lands the description is limited to describing water resources associated with GRSG and their habitats. Wetlands and livestock water developments are important sources of water that influence GRSG and their habitat. Apart from wetlands and livestock water developments, other important water sources for GRSG include natural springs, creeks, and seasonal ponds.

Conditions within the Planning Area

Within the planning area, major water features are streams, lakes, wetlands, playas, and dry lakes. Streams can be ephemeral, intermittent, or perennial. Ephemeral streams do not flow during an average water year, but they do flow in response to large precipitation events. Intermittent streams flow during spring runoff for

an average water year, but they generally dry up later in the summer. Perennial streams contain some water all year. Lakes can be permanent or temporary. Wetlands and floodplains vary in extent on water inundation onto a floodplain and depth (degree of saturation) throughout the year. Permanent waters can also be in the form of ponds and reservoirs developed for human or livestock consumption. Additionally, snow melt contributes to recharge surface waters, influencing intermittent stream flow. Springs also serve as a source for surface flows.

Stream channels and floodplains play a vital role as their shape and condition significantly impact key aspects of river systems. The configuration and health of these components influence speed of water flow, determining how quickly water moves through the system. Additionally, their morphology contributes to water storage capacity within basins, affecting the retention and release of water. Furthermore, shape and condition of stream channels and floodplains have implications for water quality, as certain features can filter pollutants. The interplay of these factors also connects to erosional impacts, with shape and condition influencing the extent of erosion within the river system. Consequently, these factors have far-reaching effects on fish and wildlife habitat, agriculture, recreation, and the hazard and risk of local communities and landowners to floods. Hazard and risk, or vulnerability of streams and floodplains, also include impacts on water availability (i.e., how much water is stored within the basins) and water quality.

Surface Water

The United States is divided and sub-divided into successively smaller hydrologic units called regions, sub-regions, accounting units (basins), and cataloging units (sub-basins). Each hydrologic unit is identified by a unique hydrologic unit code consisting of two to eight digits. The fourth level of classification (sub-basin) is represented by an eight-digit hydrologic unit code, indicating a more detailed and specific identification compared to the other hydrologic units mentioned above.

Due to the semi-arid nature of BLM-administered lands within the planning area, surface waters are extremely valuable. Surface water flow volumes differ greatly throughout the year and across the planning area. Most surface runoff in the planning area comes from snowmelt or rainfall, producing peak discharges in the spring and early summer. Many streams in lower elevation semi-arid areas are either intermittent, with segments of perennial flow near springs, or ephemeral, with flow only during spring runoff and intense summer storms.

Springs and seeps occur in areas where water from aquifers reaches the surface. Many springs form the beginning of stream channels; others flow into small ponds or marshy areas that drain into channels. Some springs and seeps form their own channels that reach flowing streams, but other springs lose their surface expression and recharge alluvial fill material or a permeable layer. Springs and seeps are important to aquatic habitats because of the perennial base flow they provide to a stream. The outflow from springs in summer usually helps to maintain lower water temperatures because groundwater is of lower temperature by nature. In winter, especially in small streams, base flow helps to maintain an aquatic habitat in an otherwise frozen environment (Weltz et al. 2017).

Riparian areas are ecosystems that exist along rivers, streams, or waterbodies. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. The BLM uses proper functioning condition assessments for evaluating riparian-wetland areas. These assessments provide a comprehensive understanding of the health and functionality of these ecosystems. Proper functioning condition assessments consider factors like vegetation cover, soil stability, and hydrological processes to determine ecological health of riparian-wetland areas.

The historic scarcity of stream flow in the planning area has led to increased flow regulation by the states. Projects for irrigation, livestock, human use, and flood control have significantly altered natural flow regimes. This has changed habitat conditions, channel stability and timing of sediment, and organic material transport. Stream flow has been altered by management activities such as water impoundments, water withdrawals, road construction, energy and mining development, vegetation manipulation, grazing, wildfire suppression, and timber harvesting (Weltz et al. 2017). Water developments are also influential sources of water for GRSG. Water developments can function for multiple uses. They provide additional and alternative sources of water for wildlife and livestock, and can decrease use of riparian areas (Connelly and Doughty 1989). Within the planning area, the BLM maintains an unknown number of water developments.

Groundwater

Groundwater resources in the planning area include local basin-fill aquifers, deep, regional aquifers and, in some areas, geothermal aquifers. Basin-fill aquifers are typically located within local basins, serving as sources of groundwater. Deep, regional aquifers extend over larger areas, providing a broader regional water source. Geothermal aquifers, found in specific areas, contain water with elevated temperatures suitable for geothermal energy extraction. Groundwater recharge primarily occurs at higher elevations where precipitation exceeds evapotranspiration. Excess precipitation either remains at the surface as overland flow or goes beneath the surface, recharging groundwater systems. Groundwater is used for irrigation, domestic use, and livestock use.

Quality of the groundwater is a function of the chemical makeup of the underground formation containing the water. Aquifer properties, such as hydraulic conductivity (the ability of an aquifer to transmit water) and primary and secondary porosity (open spaces in rock or soil), also influence water quality based on the residence time of the groundwater in the subsurface. Longer residence time means more interactions with the surroundings, influencing water quality. In the planning area, much of the geology consists of consolidated sedimentary formations with water-bearing properties that are largely dependent on secondary porosity from faults, fractures, and joints. The mineral content of several sedimentary formations underlying the planning area includes relatively high amounts of soluble minerals and salts. Most of the planning area contains water that is typically suitable for common uses; however, it is considered hard, indicating a higher concentration of minerals like calcium and magnesium. Additionally, it contains moderate levels of dissolved minerals, which may include substances such as bicarbonates, sulfates, and chlorides.

Groundwater near the land surface is available for plants and can contribute to the alluvium of stream systems. This occurs as plants draw water from shallow groundwater and release moisture into the atmosphere. This water movement through plants, known as transpiration, helps transport minerals and sediment from the groundwater into the soil. Over time, these transported materials contribute to the composition of alluvial deposits in stream systems. Alluvial aquifers are found along larger perennial, intermittent, and interrupted flow segments. Interrupted flow segments refer to areas where the continuous flow of water is intermittently disrupted or broken, potentially due to factors such as topography, geological features, or human activities. These interruptions in the flow contribute to the formation of the alluvial aquifers, which are typically composed of alternating coarse sand and gravel deposits with layers of clay, silt, and sand. The alluvial aquifers also serve as either a recharge or discharge zone for underlying bedrock aquifers. Springs and seeps occur in areas where water from aquifers reaches the surface. Such activities as livestock or wild horse grazing and watering, recreation use, mining, road construction, and vegetation management have affected spring systems in the past by disturbing soil, vegetation, and natural drainage patterns, altering water flow, quality, and overall spring conditions. Well drilling or blasting can affect springs by reducing the volume of water in their aquifers or by affecting subsurface flow patterns. Moreover, when

wells are drilled or blasting occurs, natural permeability of the aquifer may be disturbed, potentially causing a reduction in water volume by affecting the ability of the aquifer to store and release water.

Water Quality

Water quality, as defined by the Clean Water Act, includes the physical, biological, and chemical characteristics affecting existing and designated beneficial uses. Beneficial uses in the planning area are public and private domestic water supplies, industrial water supply, irrigation, livestock watering, fish and aquatic life, wildlife, and hunting, fishing, boating, water contact recreation, and aesthetic quality. Section 303(d) of the Clean Water Act is utilized to identify waters which are water quality impaired because they fail to meet standards for criteria. Section 303(d) requires each state develop a list of water bodies that fail to meet water quality standards, along with delineation of those segments and associated listing criteria. The 303(d) list of impaired waters is updated biannually, and each state is required to develop a total maximum daily load allocation for each pollutant of concern.

Water quality typically varies as a function of flow conditions. During high flow conditions, dilution may result in lower concentrations of pollutants. Conversely, low flow conditions can result in higher pollutant concentrations. This variability can be impacted by water uses (e.g., agriculture, oil and gas development, and surface disturbance), vegetation, groundwater interaction, and pollutants discharged into water bodies from point and non-point sources. The quality of runoff in ephemeral and intermittent stream channels is largely dependent upon the amount of salts, sediments, trace elements, and organic materials that accumulate in dry stream channels between flow periods. Periodic flushing of accumulated salts, trace elements, organic materials, and sediments occurs during peak flow events, which often represent the only time water quality samples can be collected. Factors that govern the accumulation of salt, trace elements, organic materials, and sediments include physical properties of the watershed (e.g., topography, geology, and climate), land use, and seasonal fluctuations in temperature and precipitation. Topography influences flow of water, determining the potential for sediment transport. Geology contributes to the types and amounts of minerals in the water. Climate affects the overall hydrological cycle, influencing precipitation patterns and evaporation rates. Land use practices can introduce pollutants and alter natural drainage patterns. Seasonal fluctuations in temperature and precipitation impact the rate of weathering and erosion processes, influencing composition of materials entering streams.

The major water quality concern for streams in the planning area has been water temperature (Danforth et al. 2016), which correlate to the beneficial use of fish spawning and rearing habitat. Conditions that affect stream temperature, such as the amount of near-stream vegetation, channel shape, and hydrology, operate through complex interactions. Near-stream vegetation helps regulate water temperature by providing shade. The type and density of vegetation influence the extent of shade. Channel shape plays a role in sunlight exposure; wider channels may receive more direct sunlight, potentially leading to higher temperatures. Hydrology, which involves water flow rate and patterns, affects temperature dynamics. Some conditions vary daily or seasonally. In the planning area, conditions affecting stream temperature, such as the amount of near-stream vegetation, channel shape, and hydrology, are most associated with land use practices. Wild horses can also impact water source quality, aquatic ecosystems, and riparian communities (Griffin et al. 2019). Other land uses associated with degraded streams include roads, trails, water withdrawal, reservoir storage, and release, which can contribute to stream degradation through mechanisms such as increased sedimentation, altered drainage patterns, and potential pollution. Construction and use of roads and trails, along with large-scale water withdrawal and reservoir operations, may disrupt natural flow patterns, impacting streambed stability, water quality, and overall stream health. (Weltz et al 2017). Additionally, water quality issues are often exacerbated by wild horse and burro herds.

Other water quality stream impairment in the planning area is due to a variety of causes, including pathogens, biological integrity, oxygen depletion, flow and habitat alterations, nutrients, toxic inorganics, metals, mineralization, and pH conditions. Lake and reservoir impairment is attributed to a variety of factors, including oxygen depletion, high temperatures, phosphorus, polychlorinated biphenyls and mercury in fish tissue, total dissolved solids, and acidic conditions. These impairments can be linked to activities such as animal feedlots, crop production, livestock grazing, habitat alterations, construction activities, permitted discharges from industrial, municipal, and stormwater sources, and lesser so from channelization, sewage disposal, mine tailings, hardrock mining, industrial forestry, and recreation and tourism. Not all areas with such activities resulted in water quality impairments as they are generally site specific in nature (Weltz et al. 2017).

Water Quantity

Water availability can vary annually, depending on the volume of water recharged and the volume of water used in the planning area. Since most water in the planning area originates from precipitation, yearly climatic conditions play an important role in the volume of water available. This, in turn, determines available riparian habitat and conditions, particularly in systems that are more dependent on snowmelt and local precipitation events (Weltz et al. 2017). Activities associated with recreation, energy development, and grazing have resulted in significant impacts on water supply and quality within GRSG habitat. Invasive species, such as salt cedar (*Tamarix* spp.) and Russian olive (*Elaeagnus angustifolia*), further reduce available water by consuming significant quantities that would otherwise support beneficial uses (USGS 2022). Vegetation management, including the treatment of invasive species such as pinyon-juniper, tamarisks, and Russian olive, also affects water availability.

Peak flow times relate to spring runoff and snow melt, with a decrease to near base flow in later summer months, depending on winter accumulations of snow and other factors such as precipitation. Seasons, referring to periods such as summer or dry seasons, and years of low water yield are particularly crucial periods for most of the beneficial uses of water in the planning area.

States issue water rights for various beneficial uses for both groundwater and surface water. Consumptive water uses in the planning area are agricultural, municipal, mining and milling, industrial, stock watering, and wildlife. The BLM authorizes development of water-related infrastructure, such as ROWs, on BLM-administered lands, enabling applicants to apply water to beneficial use. When the United States reserves public land for Indian reservations, military reservations, national parks, forests, or monuments, it also implicitly reserves sufficient water to satisfy the purposes for which the reservation was created. The date of priority, or seniority, of a federal reserved right is determined by the date the reservation was established.

Trends

As early land management actions, such as vegetation reduction, wildlife extirpation, and wildfire suppression, impacted watersheds, overland flow of water increased, and stream channels deepened (Northern Woodlands 2023). Channel incisions eventually lead to bank failures and subsequent channel widening. This process alters the natural dimensions and morphology of the channel. As channel widening and bank failures continued, new low flow channels began to form in the debris from bank failure. Many of the stream channels in the planning area were in the process of this initial buildup in the 1980s. This process was influenced by factors such as changes in land use, natural sedimentation processes, or alterations in hydrological conditions. New channels are usually lower than pre-disturbance channels, and the old floodplain now functions primarily as a terrace (a flat or gently sloping elevated area next to a stream). This shift in elevation is a consequence of the sedimentation and changes in channel morphology during the build-up process. Some

terraces may be the result of climatic variations and associated changes in flow and sediment supply. Climatic variations influence river flow and supply of sediment. The resulting changes in sediment transport and deposition contribute to the formation of terraces along streambanks. Terraces, in this context, serve as indicators of past climatic and hydrological conditions. The stage of channel evolution results in a new bankfull channel (when a river is filled to its highest point without spilling onto nearby land) and active floodplain (the area next to a river that gets flooded regularly) at a new, lower elevation, which is observed in many stream channels in the planning area.

Existing climate change impact models in the planning area predict less water and water availability, a difference in timing of delivery, and increased stress on vegetation (Weltz et al. 2017). In particular, the models indicate longer and more severe droughts, changes in precipitation runoff and potential for changes in flooding patterns, increased wildfires, changes in the relationships among plants, water, nutrients, and soils on grazed lands, and increased susceptibility of ecosystems to invasion of nonnative species. Certain areas among the various states may experience trends that are not necessarily consistent with the rest of the range.

Activities associated with recreation, energy development, and grazing have resulted in significant impacts on water supply and quality within GRSG habitat. These include changes in stream morphology and vegetation, affecting the trends of water resources (Beck and Mitchell 2000). Within GRSG habitat, recreation activities, including both motorized uses like OHV activity and non-motorized uses such as hiking and equestrian activities, have resulted in surface disturbance, such as erosion, sediment production and gully creation that require mitigation to prevent water resource damage (Weltz et al. 2017). Non-motorized uses can also degrade water quality through soil loss along trails, improper disposal of human and pet waste, and the discharge of wastewater containing soaps, oils, or other chemicals into the environment. OHV activity has increased significantly in more easily accessible wildland urban interface boundaries as well as more remote areas, due in part to population growth. The expansion of the wildland urban interface is anticipated to have long-term impacts on surface water quality and flow, including increased runoff, changes in nutrient levels, and altered sedimentation patterns.

Demands on water resources have increased over the past few decades. Although most early water rights were established for irrigation and mining, today's demand includes municipal water supplies, commercial and industrial supplies, and maintenance of adequate streamflow for fish, recreation, and water quality. These changes, driven by shifts in demand for water right uses, may significantly impact the hydrology of streams, riparian areas, and wetlands on BLM-administered lands. Alterations in water usage patterns can lead to changes in flow regimes, affecting the ecological balance of these ecosystems. The limited availability of water in much of the planning area may pose challenges for additional developments that depend on water, potentially impacting GRSG habitat and associated ecosystems. Water scarcity can influence the feasibility and sustainability of projects affecting the natural environment. Changing and persistent drought conditions across most of the planning area have also significantly impacted water availability and conditions (Weltz et al. 2017). Future water development for wildlife, recreation, and livestock would require a state water right before project implementation could occur. This crucial step ensures compliance with regulations and addresses potential impacts on GRSG habitat.

3.16 CULTURAL RESOURCES

A cultural resource is a definite location of human activity, occupation, or use identifiable through field survey, historical documentation, or oral evidence (BLM Manual Section 8100). The term cultural resources is inclusive and has been adopted and widely used to refer to the diverse human record found in sites,

structures, objects and places created and/or used by people. These may comprise archaeological, historic, or architectural sites, structures, objects, or places, and may include locations of traditional cultural or religious importance to a particular social and/or cultural group, often referred to as Traditional Cultural Properties (See **Section 3.17**, Tribal Interests). The term includes "historic properties," as defined in the National Historic Preservation Act of 1966, as amended (NHPA), and the implementing regulations found at 36 CFR Part 800. Historic properties are cultural resources determined to be eligible for listing on the National Register of Historic Places (NRHP). The term also includes "archaeological resources" as defined in the Archaeological Resources Protection Act of 1979, and other sites, structures, objects, items, and places as addressed in other statutes/regulations (e.g., American Indian Religious Freedom Act of 1978, the Antiquities Act of 1906, NEPA, and the Native American Graves Protection and Repatriation Act of 1990). "Historic property" has a specific meaning under the NHPA, referring only to those properties determined to be eligible for or listed in the NRHP regardless of property type or period of use (e.g., traditional cultural property or archaeological site, and historic or prehistoric).

Cultural resources are represented by the full temporal range of human occupation of the continent, from the first known peoples' arrival and settlement in the planning area more than 12,000 years ago (Jenkins et al. 2012), possibly much longer (Davis et al. 2019), and subsequent expansion of Tribal groups throughout to more recent incursions of fur trappers, homesteaders, miners, and ranchers of the last 200 years. Cultural resources can include surface and buried artifacts and cultural features made and left by human cultures in archaeological sites; items built by past cultures (e.g., houses/house remains and activity areas); and places associated with traditional cultural uses (See **Section 3.17**, Tribal Interests).

3.16.1 Considering Effects on Cultural Resources Pursuant to Section 106 of the NHPA

Cultural resources are most frequently identified and recorded through federal compliance with Section 106 of the NHPA (now recodified as 54 U.S.C. 305108) and subsequent consultation with Native American Tribes and State Historic Preservation Offices (SHPOs). Section 106 requires federal agencies that fund, approve, authorize, license, or permit actions or undertakings to consider effects on "historic properties" that could occur due to proposed undertakings.

Federal regulations define specific criteria for NRHP eligibility and provide the measures for evaluating cultural resources for their eligibility (36 CFR Part 60.4). Once a cultural resource has been determined to be eligible for the NRHP, the agency must consider potential effects of the proposed action on the historic property and provide measures to either avoid, minimize, or mitigate any adverse effects. Compliance with Section 106 provides a primary mechanism for federal agencies to assess and take into account effects of proposed federal actions or undertakings on cultural resources during NEPA reviews.

The BLM follows alternative procedures, defined in state specific protocols, for meeting Section 106 obligations allowed for and pursuant to the implementing regulations of the NHPA (36 CFR Part 800.14). In collaboration with the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers, the BLM developed alternative procedures that define how the agency will comply with Section 106 of the NHPA. These procedures are defined in a national Programmatic Agreement, revised in 2012, between the three parties. The Programmatic Agreement procedures are implemented by state specific protocol agreements with each state's SHPO. The protocols further define how the BLM will coordinate with the SHPO in each state to fulfill Section 106 responsibilities.

Prior to initiating proposed actions for protection and enhancement of GRSG and GRSG habitat, the responsible manager shall determine the area of potential effect, review existing information on known and anticipated historic properties that could be affected, seek information (in coordination with environmental

review and land use planning processes) from Native American Tribes and other parties likely to have knowledge of or concern with historic properties (including places of traditional cultural and religious significance), determine need for field surveys or other actions to identify historic properties, make a good faith effort to identify and evaluate historic properties, assess and determine effects on historic properties, and identify measures to avoid, lessen or mitigate adverse effects on historic properties.

3.16.2 Conditions of the Planning Area

Given the vast planning area (see **Map 1.1**, Greater Sage-Grouse West-Wide Planning Area [**Appendix 1**]) types of cultural resources as well as the types and amount of data available about them vary greatly. Therefore, information about current conditions of cultural resources is high level and qualitative. The majority of the planning area has not been inventoried since resource inventories are driven by project-based cultural resource. New discoveries are documented regularly through regulatory compliance actions.

Some well-known historic properties and districts do occur across the planning area. These properties, along with other properties eligible for listing on the NRHP in the planning area, would need evaluation for the effects of proposed undertakings related to GRSG habitat improvement prior to implementation. Formal determinations of eligibility have not been completed for most known cultural sites in the planning area but known resources are treated as eligible until determined otherwise. Areas not previously inventoried would be subjected to full cultural resources analysis for ground-disturbing actions.

Cultural areas are often correlated to physiographic regions, with the current planning area falling within the Great Basin, Plateau, and Plains culture areas (d'Azevedo 1986). These cultural areas roughly correspond to distinctly different Indigenous groups with different languages and resource-based economic systems and social structures. While these areas are associated with cultural groups and distinct Tribes, cultural boundaries are fluid and overlapping. Tribes with interest in the planning area are listed and further discussed in **Section 3.17**, Tribal Interests. Additionally, the BLM recognizes the importance of Indigenous Knowledge (IK), which reflects the deep relationship between Indigenous peoples and the land over millennia. The BLM also acknowledges the history of those who settled the West in the mid-1800s, while being mindful of the complex impacts of that period on Indigenous communities.

3.16.3 Trends

Cultural resources are subject to deterioration over time due to both anthropogenic and natural processes. BLM-administered lands are currently and will continue to be managed for the protection and preservation of cultural resources, pursuant to pertinent regulation and policy. More concerted government-to-government consultation with Tribes is occurring to address Tribal interests and concerns, including those regarding cultural resources. For example, the 2021 Secretary's Order 3403: *Joint Secretarial Order on Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters* furthers these interests. Efforts have also increased in public education and outreach to create awareness about our nation's cultural heritage and Tribal contributions. These efforts continue to improve public understanding and awareness, resulting in increased preservation of cultural resources. Cultural resource inventories continue to regularly document previously unknown resources. Trends relevant to cultural resources and more specific to the planning area include increasing recreation use and demand (see **Section 3.19**, Recreation and Visitor Services), grazing (by livestock as well as wild horses and burros), and continued development like that related to mineral resources, renewable energy development, and utilities (**Section 3.9**, Lands and Realty [Including Renewable Energy], and **Section 3.10**, Mineral Resources).

3.17 TRIBAL INTERESTS

Tribal interests include economic rights such as Indian trust assets, resource uses, and access guaranteed by treaty rights. Traditional cultural resources or properties include areas of cultural importance to contemporary communities. These areas can encompass sacred sites, resource gathering areas, locations tied to historical reenactment, or places significant to various communities, such as those related to Japanese internment, among others. While this section addresses traditional cultural resources or properties in the context of Tribal interests, it is important to recognize that traditional cultural resources or properties extend beyond Tribes and can hold significance for diverse ethnic and cultural groups.

The federal government has a unique and distinctive relationship with federally recognized Native American Tribes as set forth in the Constitution of the United States, treaties, statutes, Executive Orders, judicial decisions, and agreements. This relationship is different from the federal government's relationship with state and local governments or other entities. The United States government has a trust responsibility to federally recognized Native American Tribes that covers lands, surveys, boundary risk assessments, resources, money, or other assets held by the federal government in trust, and the ability of those Tribes to exercise their rights. Tribal members use BLM-administered lands to gather plants or other native materials (e.g., stone for flint-knapping), hunt animals, and fish. The United States recognizes Native American Tribes as sovereign nations. The Tribes maintain active interests in the planning area.

Native American treaties are negotiated contracts made pursuant to the Constitution of the United States and are considered the "supreme law of the land." They take precedence over any conflicting state laws because of the supremacy clause of the Constitution (Article 6, Clause 2). Treaty rights are not gifts or grants from the United States, but are bargained for concessions. These rights are grants-of-rights from the Tribes rather than to the Tribes. The reciprocal obligations assumed by the federal government and Native American Tribes constitute the chief source of present-day federal Native American law.

The BLM and other federal agencies have the responsibility to identify and consider potential impacts of project alternatives identified for GRSG planning on Native American trust resources, including fish, game, and plant resources, and on off-reservation, treaty-reserved fishing, hunting, gathering, and similar rights of access and resource use on BLM-administered lands. This also includes rights of access and use for ceremonial and other traditional cultural practices. The BLM, as lead federal agency, also has the responsibility to ensure meaningful consultation and coordination concerning GRSG planning is conducted on a government-to-government basis with federally recognized Tribes to consider Tribal treaty rights and trust resources. BLM-administered lands retain social, economic, and traditional value for Tribal people, as well as contemporary and ongoing spiritual and cultural uses. Through consultation with the Tribes, the BLM is aware of their treaty and trust obligations and the Tribes' desire to capitalize on opportunities that maintain or enhance resources critical to the exercise of treaty rights, traditional customs, subsistence, and cultural uses of the land.

BLM consultation with Native American Tribes, as it pertains to Tribal interests, treaty rights and trust responsibilities, is conducted in accordance with the following direction:

- Executive Order No. 13175 – Consultation and Coordination with Indian Tribal Governments, November 6, 2000
- Secretarial Order 3317 – Department of Interior Policy on Consultation with Indian Tribes, December 1, 2011

- Bureau Manual Handbook H-1780-1 – Guidelines for Conducting Tribal Consultation (Transmitted 12/03/04)
- The National Historic Preservation Act of 1966 as amended (PL 89-665; 80 Stat. 915; 16 U.S.C. 470; recodified as 54 U.S.C. 305108).
- Archaeological Resources Protection Act of 1979 (PL 96-95; 93 Stat. 721; 16 U.S.C. 470aa et seq.) as amended (PL 100-555; PL 100-588)
- American Indian Religious Freedom Act of 1978 (PL 95-431; 92 Stat. 469; 42 U.S.C. 19960
- Native American Graves Protection and Repatriation Act of 1990 (PL 101-601; 104 Stat. 3048; 25 U.S.C. 3001)
- Executive Order No. 12898 – Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 11, 1994
- Executive Order No. 13007 – Indian Sacred Sites, May 24, 1996
- Executive Order No. 13084 – Consultation and Coordination with Indian Tribal Governments, May 14, 1998
- Government-to-Government Relations with Native American Tribal Governments (Memorandum signed by President Clinton; April 29, 1994)
- Tribal Consultation and Strengthening Nation-to-Nation Relationships (Memorandum signed by President Biden on January 26, 2021)
- Uniform Standards for Tribal Consultation (Memorandum signed by President Biden on November 30, 2022)
- Order No. 3175 – Departmental Responsibilities for Indian Trust Resources (Section 2 of Reorganization Plan No. 3 of 1950 – 64 Stat. 1262; November 8, 1993)
- USDA Department Regulations 1340-007 and 1350-002
- Joint Secretarial Order on Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters (SO 3403)
- Departmental Manual Part 303: Indian Trust Responsibilities, Chapter 7: Standards for Indian Trust Lands Boundary Evidence (303 DM 7)

In the planning area, there is extensive geographic, environmental, historic, economic, social, ethnic, and religious diversity reflected in Tribal interests and traditional cultural resources that may be valued by American Indian communities. There is no comprehensive way to define all of the resources on this broad scale, especially where confidentiality is often required.

Known topics of interest or concern to Tribal communities with interest in this planning effort include GRSG population and habitat condition, cultural practices related to the GRSG, ethnographic resources (locales and sites, structures, objects, and landscapes assigned cultural significance by traditional users), grazing, and energy or mineral development (BLM and Forest Service 2015). The effects of this planning effort on Tribal interests would largely be tied to implementation level actions. The BLM continues to inform and consult with interested federally recognized Native American Tribes as the BLM implements projects. Federally recognized Native American Tribes that are located within or have cultural ties to the planning area are listed in **Table 3-20** (**Appendix 9**).

Traditional cultural resources or properties are places associated with cultural practices or beliefs of a living community. They can be considered a subset of the broader category of cultural resources discussed in **Section 3.16**. Traditional cultural properties are rooted in the community's history and are important in maintaining cultural identity. Examples include natural landscape features, aboriginal title lands, ceremonial

and worship places, plant gathering locations, traditional hunting and fishing locations, ancestral archaeological sites, artisan material locations, rock art and communal resources such as community-maintained irrigation systems. The boundaries of these resources and impact areas are often difficult to assess. Resources tied to particular locations and that meet the criteria for eligibility can be listed on the National Register of Historic Places. Some traditional cultural resources have values that do not have a direct property referent and may not manifest themselves by distinguishable physical remains, but still are subject to consideration in planning. It is the continuity of their significance and importance to the maintenance of contemporary traditions that is important.

While many traditional cultural resources are well known, some locations or resources may be privileged information that is restricted to specific practitioners or clans. For Tribes, maintaining confidentiality and customs regarding traditional knowledge may take precedence over identifying and evaluating these resources, resulting in information being unavailable for inclusion in the NEPA analysis.

Resource-gathering areas are a broad category that can include trust assets; treaty and subsistence rights and resources; and culturally significant plants, animals, fish, and minerals. Plant resources can include foods that were established as part of a traditional seasonal round. Examples include traditions of gathering pine nuts, berries, and a variety of seed plants. Other examples include fibers used for basketry and weaving, and wood for building, carving, and fuels. Many plants are gathered for medicinal and religious use. Plant gathering is often a communal activity with cultural and religious significance. Loss of access to these plants or gathering locations, or losing the ability to maintain their habitats, can affect religious and ceremonial uses.

Most Native American Indian Tribes and individual Tribal members conceive of spirituality, or sacred sites and daily activities, as interconnected (Forest Service 1997). Many of the resource uses and use areas also have a spiritual or sacred dimension. Sacred sites can also include places that are an expression of belief systems in the land or nature. For some sacred areas, there may be no observable cultural function to an outsider or even to Tribal members who have not been entrusted with the information. Locations such as landscape features, mountain tops, trails, water courses, springs, caves, offering areas, shrines, and rock art sites often figure in these groups' oral traditions concerning their origins, mythology, and nature of the world. There are frequently active or ancestral ceremonial locations that are treasured. Archaeological sites, burials, and historic sites are often seen as important ties to ancestors and traditions that are not to be disturbed (Bengston 2003).

Tribal resources would experience trends similar to those experienced by cultural resources. Similar to cultural resources, Tribal resources are expected to move away from desired conditions over time unless management actions exist to protect these resources. The status of the local ecosystem, including but not limited to vegetation composition and any wildlife, is integral to many native cultures. Potential changes in local ecosystems associated with effects of climate change may alter the availability of plants, wildlife, or other natural resources for traditional uses.

3.18 LANDS WITH WILDERNESS CHARACTERISTICS

Section 201 of FLPMA requires the BLM to maintain on a continuing basis an inventory of all public lands and their resources and other values. This inventory requirement includes maintaining information regarding wilderness characteristics. Section 202 of FLPMA requires the BLM to rely on resource inventories in the development and revision of land use plans, including inventory information regarding wilderness characteristics. Lands with wilderness characteristics inventories will be updated for any site-specific project NEPA analyses conducted in the planning area to determine if a project will have impacts to lands with wilderness characteristics identified in accordance with BLM Manuals 6310 – Conducting Wilderness

Characteristics Inventory on BLM Lands (BLM 2021a) and 6320 – Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process (BLM 2021b). These revised policies do not address or affect policy related to Congressionally designated Wilderness or existing Wilderness Study Areas (WSA) pending before Congress. The Wilderness Act of 1964 requires the BLM to preserve the wilderness character of each designated wilderness area while FLPMA mandates that the BLM manage WSAs so as not to impair their suitability for wilderness preservation until Congress either designates them as wilderness or releases them for other uses. No such statutory authority exists with regard to non-wilderness, non-WSA lands possessing wilderness characteristics. Although lands with wilderness characteristics share the same criteria used to identify wilderness and WSAs, they are not subject to protective requirements prior to a planning or project-level management decision, though consideration for protection opportunities is part of the land use planning process. According to BLM Policy Manual Section 6320, when the BLM has inventoried an area and determined that it possesses wilderness characteristics, the BLM is not required to protect those characteristics as a priority over other resource values and multiple uses. Inventory and management are separate activities, carried out under different provisions of FLPMA (Sections 201 and 202, respectively).

3.18.1 Current Conditions

Within the planning area, there are approximately 14,246,000 acres outside of existing designated Wilderness Areas and WSAs the BLM has identified as having wilderness characteristics. Of these lands with wilderness characteristics units, approximately 2,673,600 acres are within PHMA and approximately 2,515,700 acres are within GHMA.

The portions of the planning area within the State of California contain approximately 2,400 acres of BLM-administered lands that have been inventoried for lands with wilderness characteristics that overlap with GRSG PHMA. The Eagle Lake Field Office and Surprise Field Office in California completed their RMPs in 2008. These field offices did not include an inventory of wilderness characteristics or make management decisions regarding wilderness characteristics in their land use planning. However, lands with wilderness characteristics (LWC) inventories will be updated for any site-specific NEPA analyses of the planning area to determine if a project will have impacts on wilderness characteristics identified through previous or updated inventorying.

The portions of the planning area that are within the State of Colorado contain approximately 673,000 acres of BLM-administered lands that have been inventoried for LWC that overlap with GRSG habitat, 261,000 in PHMA and 392,000 in GHMA and 20,000 in OHMA. Within the Colorado River Valley Field Office and Grand Junction Field Office, the BLM is currently completing LWC inventories but is deferring determinations of management actions for lands with wilderness characteristics until the release of the revised RMPs for those field offices.

The portions of the planning area that are within the State of Idaho contain approximately 417,000 acres of BLM-administered lands that have been inventoried for LWC that overlap with GRSG habitat - 283,000 in PHMA, 89,000 in GHMA, and 45,000 in OHMA. The BLM has completed LWC inventories in the Bruneau, Jarbidge, Salmon, and Pocatello Field Offices. The Upper Snake Field office has a draft inventory, and partial inventories have been completed in the Owyhee, Shoshone, and Burley Field Offices. The Pocatello Field Office has no LWC. The Bruneau, Salmon, Owyhee, Burley, Shoshone, and Jarbidge Field Offices found areas that do contain LWC. Currently no Field Offices have taken their LWC through a complete planning process to determine how they will be managed.

The portions of the planning area within the State of Montana contain approximately 18,900 acres of BLM-administered lands that have been inventoried for LWC that overlap with GRSG habitat, 9,200 in PHMA and 9,700 in GHMA. Currently no field offices have taken their LWC through a complete planning process to determine how they will be managed.

Portions of the planning area that are within the State of Nevada contain approximately 167,000 acres of BLM-administered lands that have been inventoried for LWC that overlap with GRSG habitat - 87,000 in PHMA, 57,000 in GHMA and 23,000 in OHMA. Seven units were found to possess wilderness characteristics within the Winnemucca District Office during the most recent RMP revision in 2015 and are currently managed to meet multiple use and sustained yield objectives. Within the Battle Mountain, Elko, Ely, and Winnemucca Districts, the BLM is currently completing updated LWC inventories. The Carson City District and Southern Nevada District have recently updated inventories for LWC. Other than the seven units within the Winnemucca District which have decisions from the 2015 RMP revision how to manage LWC, the BLM is deferring determinations of how all other inventoried areas will be managed until updated RMP revision processes are undertaken.

As part of the original FLPMA Section 603-mandated inventories, inventories were conducted for the North Dakota Field Office beginning in 1978. The initial phase of inventories resulted in all lands within North Dakota being dropped from further wilderness consideration (the only solid block of BLM-administered lands within the planning area acres is also a developed oil and gas field).

Portions of the planning area within the State of Oregon contain approximately 3,001,000 acres of BLM-administered lands that have been inventoried for LWC that overlap GRSG habitat, 1,360,000 in PHMA and 1,641,000 in GHMA. Eastern Oregon is currently completing LWC inventories but is deferring determinations of management actions in the Burns, Lakeview, Prineville, and Vale Field Offices for LWC until the release of revised RMPs.

Portions of the planning area within the State of South Dakota contain approximately 73,000 acres of BLM-administered lands within 4 units that have been inventoried for LWC. None of these areas were found to possess wilderness characteristics.

Portions of the planning area within the State of Utah contain approximately 986,000 acres of BLM-administered lands that have been inventoried for LWC that overlap GRSG habitat. Of these areas, 13 units totaling approximately 52,000 acres are natural areas managed for wilderness characteristics in the Uintah Population area where some land uses are restricted or prohibited under the Vernal RMP. The remaining LWC areas that overlap GRSG habitat do not currently have determinations made in an RMP for the specific management of these areas.

Portions of the planning area within the State of Wyoming contain approximately 12,000 acres of BLM-administered lands that have been inventoried for LWC that overlap GRSG habitat - all are in GHMA. The Newcastle Field Office has not identified any parcels potentially meeting the 5,000-acre roadless requirement nor have any citizen's groups nominated parcels that may contain wilderness characteristics. Thus, no inventory forms have been produced to date. One unit in the Buffalo Field Office has wilderness characteristics and is currently managed for their protection. Within the Casper Field Office the BLM is currently completing LWC inventories but is deferring determinations of protection for LWC until the next RMP revision for those field offices. The Cody and Worland Field Offices identified 45 units for LWC, but no specific management for retention of wilderness characteristics was carried forward. Lander Field Office identified 8 potential units for LWC, but management was only carried forward for one unit. Kemmerer

Field Office, Pinedale Field Office, Rawlins Field Office, and Rock Springs Field Office are not managing the inventoried lands with wilderness characteristic areas in their RMPs for Wilderness Characteristics. However, those inventories are considered and reviewed in all site-specific NEPA analyses.

3.18.2 Trends

As the BLM completes its inventories of wilderness characteristics, more units might be determined to contain wilderness characteristics. Until an inventory can be completed for all lands in the decision area, lands not yet inventoried for wilderness characteristics will be evaluated when any surface disturbing activity is proposed. Any lands with wilderness characteristics found in an inventory update will be considered in alternatives formulation and impacts of the proposal on their wilderness characteristics will be analyzed and disclosed in individual NEPA analyses. Absent specific management direction for protecting wilderness characteristics, the BLM anticipates that some characteristics may degrade over time depending upon BLM-administered activities, which will be subject to project-level NEPA analyses.

3.19 Recreation and Visitor Services

The BLM's Recreation and Visitor Services Program manages recreation resources and visitor services to offer the greatest benefits possible to individuals and communities and to better enable communities to achieve their own desired social, economic, and environmental outcomes (BLM 2019a). The planning area offers abundant settings for a wide range of recreational opportunities requiring no permits and no or minimal fees on BLM-administered lands. Most recreation users on BLM-administered lands participate in dispersed recreation activities, including hunting, fishing, camping, biking, hiking, horseback riding, skiing, off-highway vehicle (OHV) use, snowmobiling, rafting/floating, swimming, photography, rock climbing, boating on area lakes and rivers, pleasure driving, and wildlife viewing. Users often participate in these activities individually or in small groups. In parts of the planning area where recreation is a primary resource management consideration, the BLM designates and manages recreation management areas.

The BLM issues permits for a variety of organized activities, such as commercial river permits, big game hunting outfitter permits, and permits for organized groups, competitive events, or other types of commercial recreation outfitters such as bike tours. The BLM manages organized, commercial, and competitive recreation activities on BLM-administered lands and related waters with special recreation permits (SRPs). Issuance of an SRP is discretionary, with proposed activities subject to NEPA compliance and mitigation requirements specific to the proposed activity. The BLM may deny a permit request for several reasons, including if an assessment indicates unacceptable impacts, if an approved moratorium or restricted allocation system exists for the proposed activity, location, or timeframe, if there are serious health and safety concerns, or if past performance by an applicant has been deemed unacceptable and problematic.

3.19.1 Trends

Five key drivers are causing changes to recreation in the planning area:

1. Changing public expectations and demand for outdoor recreation opportunities, especially for dispersed recreation (BLM 2019b). In fiscal year 2022, the agency recorded more than 81 million visits, representing a 40% increase in use since 2012, with nearly a third of that growth occurring since 2020 (BLM 2023).
2. Continued growth in the recreation and tourism industries (BLM 2019c).
3. Increased energy development in portions of the planning area, which can lead to potential conflicts with recreation associated with placement and design of industrial infrastructure, concerns regarding visitor safety, as well as noise, smell, and air quality concerns (BLM 2022b).

4. Close proximity of BLM-administered lands to private property, and the growing use of BLM-administered lands as a community-based recreation asset (BLM 2019c).
5. Technological advances, such as all-terrain or utility vehicles and e-bikes, affordable global positioning system (GPS) units, as well as better outdoor equipment and clothing.

These drivers will impact the activity opportunities that can be offered and the recreation experience and opportunities that can be produced by land managers and partners.

3.20 TRAVEL AND TRANSPORTATION

Visitors to BLM-administered lands use roads and trails for a variety of activities involving various modes of travel. Most roads in the planning area are not managed by the BLM, with an estimated 10% to 15% under BLM management. The remaining roads are managed by other entities, including state, local, and private jurisdictions.[8] Motorized travel in the planning area ranges from standard passenger vehicles driving on maintained roads to OHVs and e-bikes operating on primitive roads and trails. Transportation routes are mainly concentrated around urban areas or where surface activities, such as mineral extraction, require access. Portions of the planning area are remote and rugged, limiting motorized travel on roads and trails in those areas.

An OHV is any vehicle capable of, or designed for, travel on or immediately over land, water, or other natural terrain. OHVs include dirt motorcycles, dune buggies, jeeps, four-wheel drive vehicles, and snowmobiles (43 CFR Part 8340.0-5(a)). Executive Order 11644 and CFR (43 CFR Part 8340) both require the BLM to designate all BLM lands nationally as open, closed, or limited for OHV use, defined as:

- **Open -** areas where there are no special restrictions, or where there are no compelling resource protection needs, user conflicts, or public safety issues to warrant limiting cross-country travel.
- **Limited -** areas where travel must be restricted in order to meet specific management objectives. For areas classified as Limited, the BLM must consider a full range of possibilities, including travel that will be limited to types or modes of travel (such as foot, equestrian, bicycle, motorized, etc.); existing roads and trails; time or season of use; certain types of vehicles (i.e., wheeled versus nonwheeled); licensed or permitted vehicles or users; or BLM administrative use only.
- **Closed -** areas where the BLM restricts all motorized travel and transportation for all or a portion of the year. The BLM designates areas as Closed where a prohibition on motorized travel is necessary to protect resources, promote visitor safety, or reduce use conflict.

3.20.1 Trends

Overall trends in travel management on BLM-administered lands within the planning areas include an increase in OHV use, hiking, and mountain biking as human populations increase within and adjacent to the project boundaries, and throughout GRSG habitats. Many areas currently designated as open to cross-country travel could be changed to limited or closed designations to minimize resource impacts in the future. However, changing areas from OHV open or limited to closed may not be possible due to RS 2477 rights associated with existing roads. The alternatives in this FEIS limit Travel and Transportation Management (TTM) to existing routes within PHMA and GHMA and do not propose the closure of any roads.

Construction of new routes for underground mining and renewable energy projects are also expected to increase as minerals, oil and gas, solar, and wind resource demands increase with energy demands in areas

[8] The estimate is based on typical road management proportions in BLM planning areas, where the majority of roads tend to fall under state, local, or private management.

surrounding the project areas. New energy and mining developments will require new roads for transportation of resources. Previously constructed roads may also require upgrading in width and ROW as drilling operations are transported to collection and production facilities. Recreationists will also use these routes even though they are not designed for improved recreational experiences.

Private properties adjacent to BLM-administered lands will likely continue to be subdivided. Subdivision of private property has increased the number of adjacent properties owners and the number of new access routes to public lands within planning zones. This may result in continued unauthorized social trails that are unmanaged and user-created routes that will impact GRSG resources as they cut through habitat. However, the remoteness of many areas within GRSG habitat may be beneficial for these areas as they have not experienced significant changes from travel disturbances.

Chapter 4. Environmental Consequences

4.1 INTRODUCTION

This chapter is organized by topic area and identifies and discloses environmental impacts resulting from the Proposed RMP Amendment outlined in **Chapter 2**. This chapter is complemented by **Appendix 10**, which details each topic area and includes the method of analysis, indicators of impacts, and assumptions specific to each topic area. **Appendix 10** also assesses the environmental consequences resulting from the management actions across Alternatives 1-6, as presented in **Chapter 2**. **Appendix 14** provides supplemental information for the environmental consequences analysis, including details on state and local conservation plans and efforts, the allocation acres for Habitat Management Areas (HMAs), locatable minerals, and fluid minerals for the eight mid-scale Habitat Assessment Framework (HAF) groups by alternative in **Section 14.4**. The HAF is a tool to measure the suitability of GRSG habitat at multiple scales. Mid-scale (second order) HAF areas are conceptually linked to GRSG dispersal capabilities in population and subpopulation areas as described by Connelly and others (2004). Please note, the allocation acres for the locatable minerals and fluid minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. For example, for locatable minerals, proposed mineral withdrawals for the purposes of GRSG conservation are only proposed and considered under Alternative 1 and Alternative 3 in this RMP Amendment.

This chapter first describes the nature and type of effects, then focuses on direct and indirect impacts that may benefit, enhance, or improve, or impair a resource because of management actions, and analyzes the cumulative impacts associated with the Proposed RMP Amendment. Some management actions may affect only certain resources. If an activity or action is not addressed in a given section, either no impacts are expected, or the impact is expected to be negligible.

The projected impacts on land use activities and the associated environmental impacts of land uses are characterized and evaluated for each of the alternatives (see **Appendix 10** for Alternatives 1-6) and the Proposed RMP Amendment. These are described in relation to the current condition or situation, as described in **Chapter 3**. Some impacts are described using ranges of potential impacts or in qualitative terms. **Table 4-1**, Summary of Environmental Consequences, summarizes the environmental consequences by topic for Alternatives 1-6 and the Proposed RMP Amendment. The column describing the Proposed RMP Amendment focuses on comparisons with the plan currently being implemented (Alternative 1) and the preferred alternative presented in the Draft EIS (Alternative 5).

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4.1.1 Summary of Environmental Consequences Table

Table 4-1. Summary of Environmental Consequences

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Greater Sage-Grouse						
Exemptions from restrictions on development, such as to waivers, exceptions, or modifications (WEMs), stipulations and avoidance/exclusion areas, would be applied within HMAs. As a result, fluid mineral leasing, locatable mineral development, ROWs, and other surface disturbing activities would be focused outside of PHMA. The BLM would incorporate adaptive management, mitigation, disturbance caps, buffers, habitat objectives, and monitoring would reduce the total net impact on GRSG.	Alternative 2 allows for more flexibility in the management of activities that can impact GRSG. The BLM would remove SFAs in some states. As a result, there would be more acres of GRSG habitat open to fluid mineral leasing. This would increase potential for impacts on GRSG and habitat, including disturbance and habitat alterations.	Under Alternative 3 all areas for GRSG would be managed as PHMA. Additionally, management actions for PHMA, such as lek buffers, closures to surface disturbing activities, and managing as unavailable for grazing would be more restrictive and designed to promote GRSG conservation to a greater extent. Applying a 3% disturbance cap at the project scale and within HAF fine-scale boundaries would include protection for both the larger population and individual leks and their surrounding habitat. As a result, this alternative would provide the most protection for GRSG and habitat. However, removal of grazing in PHMA could result in a build-up of fine fuels that may exacerbate a large-scale wildfire that would destroy large areas of GRSG habitat.	Impacts under Alternative 4 would be similar to those under Alternatives 1 and 2, with adjustments based on HMA review or other state-specific considerations. A larger acreage would be managed with an NSO stipulation on fluid mineral leasing, which would reduce impacts to habitats associated with this use. The requirement for compensatory mitigation to be completed before projects begin would eliminate any time lag between impacts on habitat and when they are restored.	Impacts from Alternative 5 would be similar to those under Alternative 4, though with less acres managed with NSO stipulations, which could allow for greater disturbance to GRSG or its habitat due to fluid mineral development. Further, compensatory mitigation could be completed after a project has started, which would introduce a time lag during with GRSG habitat would be fragmented and reduced in carrying capacity by project impacts.	Impacts would be the same as described for Alternative 5 but reduced due to additional protections associated with management of ACECs. These include reductions in disturbance and habitat loss from fluid mineral leasing and development due to NSO stipulations and closure to nonenergy mineral leasing and saleable minerals, as well ROWs due to ACEC management as ROW exclusion areas.	The Proposed RMP Amendment would offer heightened protection for GRSG compared with Alternative 1. It would manage a larger area of PHMAs and imposes stricter NSO stipulations without waivers, exceptions, or modifications in some areas of PHMA. This approach reduces potential disturbances from fluid mineral development compared with Alternative 1. Additionally, the Proposed RMP Amendment would set a 3% disturbance cap at the HAF fine scale and would mandate compensatory mitigation before project initiation. These measures would better limit habitat fragmentation and preserve habitat quality compared with Alternative 1.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Vegetation, Fish and Wildlife, and Special Status Species						
Alternative 1 includes restrictions on development, such as land use and surface-disturbing activities that would occur within HMAs and would limit damage to or removal of vegetation; disturbance to fish, wildlife, and special status species; and removal or disturbance to habitats. All states would manage to maintain and enhance sagebrush habitats, which would benefit vegetation as well as some wildlife and special status species which rely on these habitats.	Alternative 2 would result in more areas being open to fluid mineral leasing and some areas would remove management of SFAs. This would result in the potential for more impacts on vegetation, fish, wildlife, and special status species from surface-disturbing activities, such as removal, damage, disturbance and habitat fragmentation.	Management of the greatest acreage of PHMA with the most restrictions under Alternative 3 would result in the fewest open acres that could be subject to surface disturbing activities. Such management would decrease the potential for impacts to vegetation, fish, wildlife, and special status species associated with surface disturbing activities. Management of PHMA as unavailable for grazing could benefit biological resources since vegetation would not be trampled or eaten and competition for resources from livestock would be removed. However, the potential for build-up of fine fuels could exacerbate a large-scale wildfire that would destroy large areas of vegetation and habitats.	Impacts under Alternative 4 would be similar to those under Alternatives 1 and 2. With more acres managed as NSO, there would be fewer areas where vegetation could be removed or damaged and fish, wildlife, or special status species could be disturbed or habitats removed or degraded due to fluid mineral leasing and development. Updated management to reflect the latest science would improve management of GRSG habitat and thus vegetation and wildlife and special status species which rely on these habitats.	Impacts would be similar to those under Alternative 4. Under Alternative 5, fewer acres would be managed as NSO, which would allow for more areas where vegetation could be removed or damaged and fish, wildlife or special status species could be disturbed or habitats removed or degraded due to fluid mineral leasing and development.	Impacts would be similar to those under Alternative 5 but reduced due to additional protections associated with management of ACECs. These include reductions in vegetation removal and disturbance and fish, wildlife, and special status species disturbance or habitat removal or degradation from fluid mineral leasing and development due to NSO stipulations and closure to nonenergy mineral leasing and saleable minerals, as well ROWs due to ACEC management as ROW exclusion areas.	The Proposed RMP Amendment would include comprehensive measures to manage vegetation and GRSG habitat more effectively, compared with Alternative 1. Specifically, the Proposed RMP Amendment would expand NSO stipulation areas to offset disturbances. This approach would minimize damage to vegetation and reduce disturbances to fish, wildlife, and special status species. The Proposed RMP Amendment would improve habitat conditions and offer stronger protections compared with Alternative 1 by managing PHMA with limited exceptions and increasing protections from surface-disturbing activities.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Wildland Fire Ecology and Management						
Implementation of a comprehensive strategy for wildland fire management, including use of the Fire and Invasives Assessment Tool (FIAT), would improve wildland fire management and target those areas that need the most protection. As a result, the likelihood for wildland fire would be reduced.	Impacts would be the same as described for Alternative 1.	Management of PHMA as unavailable for livestock grazing could limit the BLM's ability to achieve resource objectives, such as the reduction of fine fuels. Such limitations could alter the risk of large-scale wildfires.	Impacts would be the same as described for Alternative 1.	Impacts would be the same as described for Alternative 1.	Impacts would be the same as described for Alternative 1.	Impacts would be the same as described for Alternative 1. No Alternatives include changes to wildfire management.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Wild Horses and Burros						
Restrictions on development under Alternative 1 would benefit wild horses and burros where herd management areas overlap these protections. Habitat conditions and forage would be improved in the absence of development. Temporary, or long-term changes to the management of wild horses and burros may be necessary to achieve and maintain the desired habitat condition and could include reducing AMLs, removing designations of herd management areas, and limiting movement patterns and forage access.	Removal of SFAs under Alternative 2 could lead to additional surface disturbance and removal of forage and disturbance of other resources, such as water sources. This would increase impacts on wild horses and burros when compared with Alternative 1.	Removal of wild horses and burros from herd management areas in PHMA under Alternative 3 would have a long-term impact on wild horses and burros. Wild horses and burros outside of herd management areas in PHMA but in adjacent lands could be impacted by changes in management due to the potential for removal of resources, such as water developments for wild horses and burros or livestock.	Impacts on wild horses and burros under Alternative 4 would be similar to those under Alternative 1, with additional management direction to remove reference to SFAs.	Impacts from wild horse and burro management under Alternative 5 would be similar to those described for Alternative 1. Management within established AMLs could reduce wild horse and burro populations in some areas.	Impacts would be similar to those described for Alternative 5. Additionally, management of ACECs would provide further protection to forage for wild horses and burros and disturbance to wild horses and burros from surface disturbing activities.	Impacts under the Proposed RMP Amendment would be similar to those described for Alternative 1, with enhanced GRSG conservation measures benefiting wild horses and burros. The 3 % disturbance cap and RDFs in habitats would improve forage and habitat conditions while reducing human impacts, compared with Alternative 1. This could lead to fewer and more complex authorization applications in PHMA, potentially resulting in reduced AMLs and adjustments in herd management to maintain habitat quality.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Livestock Grazing						
Alternative 1 includes restrictions on development, such as land use and surface-disturbing activities that would occur within HMAs and would limit disturbance to livestock and reduction in forage availability.	Under Alternative 2, the BLM would remove management of SFAs in some states and would allow more areas open to fluid mineral leasing, thus increasing the potential for surface disturbance and impacts on livestock grazing operations and forage quality and quantity.	Alternative 3 would make all acres of livestock allotments inside of PHMA unavailable for grazing. Removing the ability to graze livestock would directly impact permittees/operators through a reduction in income provided by grazing livestock on BLM lands across the rangewide planning area	Impacts would be similar to those described for Alternatives 1 and 2. With more acres managed as NSO, there would be fewer areas where livestock could be disturbed, or forage removed due to fluid mineral leasing and development.	Impacts would be similar to those under Alternative 4. Under Alternative 5, fewer acres would be managed as NSO, which would allow for more areas where livestock could be disturbed, or forage removed due to fluid mineral leasing and development.	Impacts would be similar to those under Alternative 5 but reduced due to additional protections associated with management of ACECs. These include reductions in disturbance to livestock or removal of forage from fluid mineral leasing and development due to NSO stipulations and closure to nonenergy mineral leasing and saleable minerals, as well ROWs due to ACEC management as ROW exclusion areas.	The 3% disturbance cap and compensatory mitigation requirements aim to reduce impacts on forage and grazing operations, compared with Alternative 1. Increased NSO stipulations and state-specific measures would further protect livestock and forage. In Oregon, additional restrictions could limit grazing in certain areas but may increase available grazing land in key RNAs, compared with Alternative 1.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Lands and Realty (Including Wind and Solar)						
Under Alternative 1, ROWs would be subject to variable restrictions, stipulations, and limitations depending on the state and type of ROW. Impacts in areas where ROWs are restricted would include increased project costs, planning periods, and potential abandonment of future projects.	Impacts would be largely similar to those described for Alternative 1 with some state-specific refinements in HMAs that would change restrictions on ROW developments.	Management of the largest area of PHMA under Alternative 3 compared with the other alternatives and managing PHMA as exclusion for ROWs and renewable energy would prevent ROWs from being developed in many areas and would increase costs or development pressure on neighboring lands.	Impacts associated with Alternative 4 would be less than Alternatives 1, 2, and 3 due to a consistent management approach across the planning area. The impacts would be greater than Alternative 5 due to PHMA and IHMA being managed as avoidance within 0.5 miles of mapped habitat.	Impacts on lands and realty under Alternative 5 would be the least of all of the alternatives due to a consistent approach across the Planning Area and lack of ROW exclusion areas, mitigation measures in corridors, and buffers in areas surrounding HMAs.	Impacts would be similar to those described for Alternative 5. Management of ACECs as ROW exclusion would prevent development in these areas and could increase costs or development pressure in other areas.	Under the Proposed RMP Amendment, PHMA would be designated as exclusion areas for utility-scale wind and solar energy development, including met towers. Managing PHMA as ROW exclusion areas, with limited exceptions, would impose stricter protections, reducing the likelihood of certain ROWs being developed, compared with Alternative 1. This approach could lead to reduced opportunities for new ROWs, similar to Alternative 1, but with the added benefit of standardized management practices across the planning area. Impacts in these exclusion areas would likely include increased project costs and planning periods, and potential abandonment of future projects, particularly for utility-scale solar and wind projects in PHMA.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Mineral Resources						
Under Alternative 1, mineral resources would be subject to variable restrictions, stipulations, and limitations depending on the state and type of mineral. Impacts in areas where mineral development is restricted would include increased project costs, planning periods, and potential abandonment of future projects. Making PHMA and IHMA NSO would make less land available to fluid mineral leasing. State-specific TLs and lek buffers in GHMA would slow or reduce leasing and development. Management of SFAs would impose restrictions or close areas to fluid mineral leasing and development, nonenergy leasable mineral leasing, coal leasing, mineral materials, and oil and tar sands.	Impacts would be largely similar to those described for Alternative 1 with some state-specific refinements in HMAs and minerals management that would change restrictions on mineral exploration and development. In general, Alternative 2 would reduce impacts by allowing for more fluid mineral leasing.	Alternative 3 would have the greatest impact on mineral resource exploration and development by managing the greatest acreage of PHMA of all alternatives and imposing the greatest restrictions and closures in PHMA. This could prevent minerals from being developed in some areas, could increase costs, and could increase development pressure on adjacent lands.	Impacts would be similar to those described for Alternatives 1 and 2, but impacts would likely be reduced due to a more consistent approach to management across the planning area, Impacts on fluid mineral leasing and development would be greater under Alternative 4 since a greater area would be managed with NSO stipulations, which would limit fluid mineral development or increase costs.	Impacts would be similar to those described for Alternative 4. Impacts on fluid minerals would be less under Alternative 5 since fewer acres would be managed with NSO stipulations.	Impacts would be similar to those described for Alternative 5. Management of ACECs would impose greater restrictions on mineral development in some areas, which may increase costs or push development to other lands.	Managing PHMA and IHMA with NSO stipulations would reduce available land for location and entry and mineral leasing. While more acreage might be available for leasing in some states, the prioritization process for leasing EOIs could result in fewer acres being offered. Similar to Alternative 1, these restrictions could lead to increased project costs, extended planning periods, and potential abandonment of future projects. A 3% disturbance cap in PHMA/IHMA may delay fluid mineral exploration or development depending on site-specific factors compared with Alternative 1.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
ACECs and RNAs						
Management of 15 key RNAs with important GRSG conservation values in Oregon would continue, including managing all or portions of 13 of the key RNAs as unavailable to livestock grazing. Alternative 1 does not propose designation of ACECS. Under this alternative the ACEC areas proposed for designation under Alternatives 3 and 6 would be managed predominately as PHMA and this would provide the areas with a relatively high level of protection but the exceptions allowed in PHMA under this alternative could allow for impacts to the relevant and important values.	Impacts would be the same as described for Alternative 1, however under Alternative 2, 13 key RNAs would be re-opened to grazing. Alternative 2 does not propose designation of ACECS. The effects to the ACEC areas proposed for designation under Alternatives 3 and 6 would similar to those identified be managed predominately as PHMA and the effects would be similar to those identified in Alternative 1.	The 32 ACECs proposed for designation under Alternative 3 and 6 would receive the greatest amount of protection under Alternative 3.	Impacts would be the same for key RNAs as described for Alternative 1. Alternative 4 does not propose designation of ACECS. Under this alternative the ACEC areas proposed for designation under Alternatives 3 and 6 would be managed predominately as PHMA and this would provide the areas with a relatively high level of protection but the exceptions allowed in PHMA under this alternative could allow for impacts to the relevant and important values.	Impacts would be the same for key RNAs as described for Alternative 1. Alternative 4 does not propose designation of ACECS. Under this alternative the ACEC areas proposed for designation under Alternatives 3 and 6 would be managed predominately as PHMA and has a slightly higher emphasis on resource uses than Alternative 4 and so while the effects would be similar to those anticipated under Alternative 4, impacts to the relevant and important values may be greater under this alternative.	Impacts would be the same for key RNAs as described for Alternative 1. The 32 ACECs proposed for designation under Alternative 3 and 6 would receive similar protections under Alternative 6 as under Alternative 3 but the less stringent management direction in Alternative 6 could result in some degradation of the relevant and important values of the ACECs.	Under the Proposed RMP Amendment, ACECs would not be designated but the relevant and important values of the ACECs proposed for designation would either be managed predominately as PHMA or PHMA with limited exceptions and the effects of this management would protect the relevant and important values of the ACECs identified under Alternatives 3 and 6 from irreparable damage to the potential ACECs relevant and important values due to the exclusion of solar and wind, the NSO for fluid mineral development, and avoidance of major rights of way in PHMA. The PHMA with limited exceptions direction provides even higher levels of protection to several of these areas by allowing no exceptions to the solar and wind exclusion, NSO stipulation, and excludes major rights way with a limited exception.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
(See above.)	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*	Under the Proposed RMP Amendment, there would only be 69 acres unavailable for grazing in the Mahogany Ridge key RNA, and there would be a 5-acre or less exclosure proposed to remove livestock use within the North Ridge Bully Creek key RNA, South Ridge Bully Creek key RNA, and Spring Mountain key RNA.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Social and Economic Conditions						
On annual average, oil and gas production revenue and well development expenditures in the analysis areas across 8 states combined is expected to result in a range of about 73,000 to 94,000 total jobs (from 28,000 to 34,000 direct jobs in the drilling oil and gas wells sector and the oil and gas extraction sector), $5.8 billion to $7.6 billion in total labor income (from $3.0 billion to $3.8 billion in direct labor income), and about $27.6 billion to $34.2 billion in economic output (from $19.0 billion to $22.8 billion in direct economic output). The projected oil and gas activity throughout the analysis areas, across 8 states, is expected to result in royalty revenue, severance tax revenue, ad valorem tax revenue, and other oil and gas production tax or fee revenues of about $2.9 billion to $3.4 billion, combined. The tax revenues would continue to support public services offered to the communities.	On annual average, oil and gas production revenue and well development expenditures in the analysis areas across 8 states combined is expected to result in about 325 more jobs (almost 100 additional direct jobs), about $27 million more in total labor income (about $11.5 million in additional direct labor income), and about $102 million in additional economic output (about $58 million in additional direct economic output) than under Alternative 1. Impacts tax revenues and public services would be the same as under Alternative 1, except in Colorado, where the increase in projected oil and gas activity would likely result in an increase in tax revenues. Across the Colorado analysis area, royalty revenue, severance tax revenue, oil and gas conservation fees, and ad valorem taxes combined are expected to be about $8.6 million to $8.7 million more than under Alternative 1.	On annual average, oil and gas production revenue and well development expenditures in the analysis areas across 8 states combined is expected to result in about 25,000 to 36,000 fewer total jobs (about 11,000 to 14,000 fewer direct jobs), about $2.0 million to $2.9 billion less in total labor income (about $1.2 million to $1.6 billion less in direct labor income), and about $9.2 billion to $12.8 billion less in economic output (about $6.5 billion to $8.5 billion less in direct economic output) than under Alternative 1.	On annual average, oil and gas production revenue and well development expenditures in the analysis areas across 8 states combined is expected to result in about 9,000 to 10,000 fewer total jobs (about 4,000 to 5,000 fewer direct jobs), about $702 million to $762 million less in total labor income (about $482 million to $506 million less in direct labor income), and about $3.5 million to $3.7 million less in economic output (about $2.6 to $2.8 million less in direct economic output) than under Alternative 1.	On annual average, oil and gas production revenue and well development expenditures in the analysis areas across 8 states combined is expected to result in about 560 fewer total jobs to 150 more total jobs (about 460 to 260 fewer direct jobs), about $34 million less in total labor income to $26 million more in total labor income (about $47 million to $23 million less in direct labor income), and about $54 million to $279 million less in economic output (about $141 million to $266 million less in direct economic output) than under Alternative 1.	On annual average, oil and gas production revenue and well development expenditures in the analysis areas across 8 states combined is expected to result in about 226 to 935 fewer total jobs (about 426 to 626 fewer direct jobs), about $3.1 million to $63.6 million less in total labor income (about $42.8 million to $65.5 million less in direct labor income), and about $193 million to $419 million less in economic output (about $241 million to $366 million less in direct economic output) than under Alternative 1.	The impacts under the Proposed RMP Amendment would largely mirror those described under Alternative 5, with some specific differences highlighted below. The impacts on jobs, income, and economic output associated with oil and gas production would be similar to those outlined under Alternative 5. However, due to potential shifts in leasing priorities and the application of NSO stipulations, there could be minor variances in economic contributions across different states. Revenue from royalties, severance taxes, and other oil and gas-related taxes would remain consistent with Alternative 5, although minor differences could occur depending on site-specific conditions and the prioritization process for leasing EOIs.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Across all states in the planning area, there would continue to be economic and social values associated with nonenergy leasable mineral extraction. There could be economic and social impacts due to current BLM management decisions regarding access to nonenergy leasable mineral extractions; however, it is not anticipated that these impacts would be large. Under Alternative 1, all states would recommend the withdrawal of all SFAs, from location and entry under the Mining Law of 1872. If the Secretary withdraws these lands through a separate process, there could be impacts on economic activity and social conditions, as discussed in Nature and Types of Effects; however, it is not anticipated that these impacts would be large.	Impacts on economic and social conditions from nonenergy leasable minerals is the same as under Alternative 1 for all states in the planning area, except Nevada. In Nevada, BLM management decisions would improve the availability of nonenergy leasable minerals in the planning areas compared to Alternative 1, which could improve economic and social conditions associated with nonenergy leasable minerals, such as lifestyle, culture, employment, and economic output. Alternative 2 does not include recommendations for the withdrawal of SFAs from location and entry under the Mining law of 1872, except in Montana which would continue the recommendation for withdrawal of SFAs as described under Alternative 1.	The projected oil and gas activity throughout the analysis areas, across 8 states, would result in a large decrease in royalty revenue, severance tax revenue, ad valorem tax revenue, and other oil and gas production tax or fee revenues of about $945 million to $1.3 billion less than under Alternative 1, combined. The reductions in tax revenues would put large strains on local governments' budgets and would impact public services that are offered to the communities. Under Alternative 3, all PHMA would be closed to new nonenergy mineral leasing, which would result in the economic and social impacts as discussed in the *Nature and Type of Effects* section.	Impacts tax revenues and public services would be the same as under Alternative 1, except in Colorado and Wyoming. Across the Colorado analysis area, the increase in projected oil and gas activity would likely result in an increase in royalty revenue, severance tax revenue, oil and gas conservation fees, and ad valorem taxes of about $39 million to $61 million more than under Alternative 1, combined. Across the analysis area, in Wyoming, royalty revenue, severance tax revenue, oil and gas conservation tax revenue, and ad valorem taxes combined are expected to be about $249 million less than under Alternative 1. The reductions in tax revenues in Wyoming could put strain on local governments' budgets and could impact public services that are offered to the communities.	Impacts tax revenues and public services would be the same as under Alternative 1, except in Colorado and Wyoming. In the Colorado analysis area, the increase in federal state and local tax revenue and public services from an increase in oil and gas activity would be the same as under Alternative 4. In the Wyoming analysis area, royalty revenue, severance tax revenue, oil and gas conservation tax revenue, and ad valorem taxes combined are expected to be about $42 million less than under Alternative 1. The reductions in tax revenues in Wyoming could put strain on local governments' budgets and could impact public services that are offered to the communities. Impacts on economic, nonmarket, and social conditions from changes in nonenergy leasable minerals would be the same as under Alternative 1.	Impacts tax revenues and public services would be the same as under Alternative 5, except in Wyoming where the decrease in projected oil and gas activity would likely result in a decrease in tax revenues. Across the analysis area, in Wyoming, royalty revenue, severance tax revenue, oil and gas conservation tax revenue, and ad valorem taxes combined are expected to be about $50 million less than under Alternative 1. The reductions in tax revenues could put strain on local governments' budgets and could impact public services that are offered to the communities. Impacts on communities of interest are similar to Alternative 1, with some state analysis area level differences.	The economic impacts from geothermal development would be the same as those described under Alternative 1, with no significant changes in the number of jobs, labor income, or economic output expected across all states. For wind and solar energy, PHMA would be designated as exclusion areas, similar to Alternative 4. This could lead to the relocation of potential projects, which might not be feasible due to the high costs of developing new transmission lines or the impacts of ROW exclusion areas. As a result, the economic contributions from wind and solar activities could be similar to or slightly reduced compared with Alternative 1.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Under Alternative 1, PHMA and IHMA would be closed to new mineral material sales, but open for new free use permits, and expansion of existing pits for both free use permits and material sales. However, extraction could take place in other locations outside of GRSG habitat. Given the other opportunities to extract mineral materials in other locations, the impacts on economic activities and social conditions associated with mineral materials is likely to be minimal, under Alternative 1. On annual average, geothermal development across 7 states in the planning area is expected to result in about 634 total jobs (about 330 direct jobs), $41.2 million in total labor income (about $20.0 million in direct labor income), and about $120 million in economic output (about $28.4 million in direct economic output).	Under Alternative 2, impacts on public access to mineral materials and social and nonmarket values of mineral material extraction would likely be similar to under Alternative 1, for all states except for Idaho and Nevada. BLM management decisions in Idaho would allow reduce impacts on road conditions and high road maintenance costs on local governments which would no longer have to transport mineral materials required for road maintenance from outside these areas. Impacts would otherwise be the same as described under Alternative 1. Under Alternative 2, BLM management decisions in Nevada would increase the time to get approval for new mineral material developments but would also provide certainty about the conditions under which exemptions would be granted and would reduce social and economic impacts.	Under Alternative 3, PHMA would be recommended for withdrawal from location and entry under the Mining Law of 1872. If the Secretary were to withdraw these lands through a separate process, this would likely result in a reduction of the economic activities of locatable minerals, compared with under Alternative 1, as described in the Nature and Type of Effects. Under Alternative 3, all areas managed for GRSG would be PHMA and saleable minerals would be closed to disposal in all PHMA. This would likely result in a reduction of the economic activities of mineral materials, compared with under Alternative 1, as described in the Nature and Type of Effects.	Impacts on economic, nonmarket, and social conditions from changes in nonenergy leasable minerals would be the same as under Alternative 1. Under Alternative 4, there would be no areas recommend for withdrawal from locatable mineral entry. This would likely result in less impacts to jobs, income, economic output and social conditions, as discussed in Nature and Types of Effects, than under Alternative 1. Under Alternative 4, impacts on public access to mineral materials and social and nonmarket values of mineral material extraction would likely be similar to under Alternative 1, for all states, except for Idaho. In Idaho, under Alternative 4, economic and social impacts from proposed management and impacts on mineral material development would be the same as described under the Alternative 2 Idaho section.	Impacts on economic, nonmarket, and social conditions from changes in mineral materials would be the same as under Alternative 1. Economic contributions from geothermal activities would be the same as Alternative 1. Economic contributions from wind and solar activities would be the same as Alternative 1. Impacts on economic, nonmarket, and social conditions from changes in livestock grazing would be the same as under Alternative 1. Impacts on nonmarket and social conditions from changes in GRSG conservation vary by state analysis area depending on state specific restrictions on development. Impacts on communities of interest are similar to Alternative 1, with some state analysis area level differences.	Impacts on economic, nonmarket, and social conditions from changes in nonenergy leasable minerals would be the same as under Alternative 5, except that any existing nonenergy leasable operations within ACECs would not be able to expand on federal mineral estate and no new operations would be permitted in ACECs. This limitation on expansion and new operations would result in the economic and social impacts as discussed in the Nature and Type of Effects section. However, the impacts would be limited to areas within ACECs.	The impacts on economic, nonmarket, and social conditions due to changes in nonenergy leasable minerals, and mineral materials would be consistent with those described under Alternative 5, which are largely aligned with the impacts outlined under Alternative 1. The economic impacts from livestock grazing in PHMA would remain consistent with Alternative 1, resulting in a similar number of jobs, labor income, and economic output across all states in the planning area. Management restrictions to protect GRSG habitat could potentially increase operational costs and time for ranchers, as described under Alternative 5.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Under Alternative 1 the entire plan area except for Wyoming would limit lands used for ROWs in PHMA (or IHMA in Idaho) and GHMA for greater sage-grouse (see **Appendix 12**, Reasonably Foreseeable Development Scenario, for more detail). These BLM management decisions could result in operators relocating development of wind and solar facilities to other locations that are not restricted. However, relocating wind and solar operations could result in increased costs if access to transmission lines is limited.	Economic contributions from geothermal activities would be the same as Alternative 1. Economic contributions from wind and solar activities would be the same as Alternative 1. Impacts on economic, nonmarket, and social conditions from changes in livestock grazing would be the same as under Alternative 1. Impacts on nonmarket and social conditions from changes in GRSG conservation would generally be the same as Alternative 1, with some additional differences across states. Impacts on communities of interest are similar to Alternative 1, with some state analysis area level differences.	On annual average, geothermal development in the states in the planning area is expected to result in about 76 fewer total jobs (about 43 fewer direct jobs), $4.3 million less in total labor income (about $2.4 million less in direct labor income), and about $11.5 million less in economic output (about $3.3 million less in direct economic output), compared with Alternative 1. Economic contributions from wind and solar activities would be similar to Alternative 1, but impacts may be higher than Alternative 1 due to the highest level of restrictions on solar and wind site development.	Economic contributions from geothermal activities would be the same as Alternative 1. Economic contributions from wind and solar activities would be the same as Alternative 1. Impacts on economic, nonmarket, and social conditions from changes in livestock grazing would be the same as under Alternative 1. Impacts on nonmarket and social conditions from changes in GRSG conservation vary by state analysis area depending on state specific restrictions on development. Impacts on communities of interest are similar to Alternative 1, with some state analysis area level differences. Under Alternative 4, impacts from BLM management decisions on environmental justice populations through cultural resource disturbance would be similar to Alternative 1.	Under Alternative 5, impacts from BLM management decisions on environmental justice populations through cultural resource disturbance would be similar to Alternative 1. Impacts on environmental justice populations from changes in subsistence resource availability would be similar to Alternative 1. Impacts on environmental justice populations from air quality impacts would be reduced, compared with Alternative 1, due to BLM management decisions that promote project designs that avoid, minimize, reduce, rectify, and compensate for indirect impacts. Impacts on environmental justice populations from changes in water quality would be the same as Alternative 4. Impacts on environmental justice populations from changes in climate change would be the same as Alternative 4.	Requiring a plan of operations in ACECs would increase administrative process and cost for operators conducting exploration. This could result in a reduction in exploration in ACECs, compared with Alternative 1, which could lead to a reduction in development and production in these areas as well. If this results in a reduction development, there could be impacts on economic and social conditions in the surrounding communities. Restrictions on mineral material development in ACECs could result in impacts on economic and social conditions, compared with Alternative 1; however, due to mineral materials being available in other locations, the impacts are not anticipated to be large. Economic contributions from geothermal activities would be the same as Alternative 5.	The impacts on environmental justice populations under the Proposed RMP Amendment would closely align with those described under Alternative 5. This includes potential effects from cultural resource disturbances, access to subsistence resources, and changes in air and water quality. Efforts to avoid, minimize, and compensate for indirect impacts would be prioritized, particularly in reducing air quality impacts, which could positively affect environmental justice populations. The non-market value of GRSG conservation would be maintained at current conditions, with variability depending on the state-specific restrictions on development.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
On annual average, livestock grazing on allotments where PHMA accounted for at least 15% of the acreage in the analysis areas for all states combined is expected to in about 2,000 total jobs (about 841 direct jobs in the animal production and ranching sectors), $120 million in total labor income (about $67.6 million in direct labor income), and about $380 million in economic output (about $204 million in direct economic output) throughout all states in the planning area combined. Management restrictions for grazing may be applied to protect GRSG habitat, with potential to increase time and costs for management.	Impacts on environmental justice populations from BLM management decisions on cultural resources, access to subsistence resources, air quality, water quality, and climate change would be similar to under Alternative 1, except for areas with fewer restrictions on fluid mineral leasing.	On annual average, livestock grazing on allotments where PHMA accounted for at least 15% of the acreage in the analysis areas for all states combined is expected to in about 2,000 fewer total jobs (about 841 fewer direct jobs), $120 million less in total labor income (about $67.6 million less in direct labor income), and about $380 million less in economic output (about $204 million less in direct economic output) throughout all states in the planning area combined, compared with Alternative 1. Lowest level of support for livestock grazing and wild horse and burro non-market values as a result of no permitted use for grazing in PHMA. Highest level of support for GRSG conservation related non-market values due to limitations on development and resources uses.	Impacts on environmental justice populations through subsistence resource availability could be reduced due to BLM management decisions on minerals. Under Alternative 4 impacts on air quality from fluid mineral development may increase compared with Alternative 1 due to the wavers, exceptions, and modifications that would be allowed, which would likely result in adverse and disproportionate impacts on environmental justice populations. Under Alternative 4 impacts on climate change from fluid mineral development may increase compared with Alternative 1 due to the wavers, exceptions, and modifications that would be allowed, which would likely result in adverse and disproportionate impacts on environmental justice populations.	*(See above.)*	Economic contributions from wind and solar activities would be the same as Alternative 5. Impacts on economic, nonmarket, and social conditions from changes in livestock grazing would be the same as under Alternative 5. Impacts on nonmarket and social conditions from changes in GRSG would be the same as under Alternative 5. Impacts from BLM management decisions on environmental justice populations would be the same as under Alternative 5.	*(See above.)*

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Non-market value of GRSG conservation would remain supported at current conditions and would vary by analysis areas depending on the disturbance cap and adaptive management approach. Some continued support for conservation-based groups on GRSG habitat specific measure. Support for business development due to continued mineral and energy development and livestock grazing. Under Alternative 1, there could be impacts on environmental justice populations from BLM management decisions through impacts on cultural resources, access to subsistence resources, air quality, water quality, and climate change. These impacts would likely result in disproportionate and adverse impacts on environmental justice populations.	*(See above.)*	Highest potential for impacts to groups associated with development, greatest level of support for those associated with conservation values. Under Alternative 3, impacts on environmental justice populations from impacts on cultural resources, access to subsistence resources, air quality, water quality, and climate change would be the lowest compared with all other alternatives. Under Alternative 3, BLM management decisions regarding restrictions on mineral development and livestock grazing could have adverse impacts on prices and availability of food and household products. These impacts would disproportionately affect low-income environmental justice populations due to food and household products purchases making up a larger percentage of the disposable income and fewer alternative resources available.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Air Resources and Climate Change						
Alternative 1 would continue current impacts on air quality and climate change. This is because the alternative does not change BLM management that can impact air quality or climate change (through GHG emissions and carbon sequestration). Such management includes livestock grazing, surface-disturbing activities (including mineral development, renewable energy development, and ROW development), and changes in the potential for wildfire.	Alternative 2 would result in increased air quality impacts from fugitive dust generation and exhaust emissions compared with Alternative 1. Alternative 2 would also result in increased climate change impacts due to changes in GHG emissions and carbon sequestration and storage potential of the land, when compared with Alternative 1. This is because this alternative would have fewer restrictions on fluid mineral leasing as well as renewable energy development and major ROW projects. This would result in an increase in surface disturbance that creates dust and reduces carbon sequestration and storage of the landscape. In addition, there would be more direct emissions of criteria and hazardous air pollutants and GHGs into the atmosphere.	Alternative 3 has the most restrictions on emission-producing and surface disturbing activities from livestock grazing, mineral exploration and development activities, renewable energy development, roads, and other major ROWs, and changes in potential for wildfire. This would result in the least amount of surface disturbance and dust generations, as well as the smallest emission of criteria and hazardous air pollutants and GHG emissions. Managing PHMA as unavailable for grazing could lead to a build-up of fine fuels that could exacerbate a large-scale wildfire that would result in a reduction in carbon storage potential and an increase in carbon dioxide into the atmosphere.	Alternative 4 would implement an adaptive management approach that is based on the best available data and science and through mitigation and design features that minimize impacts to habitats. This could reduce impacts on air quality and climate change in some areas. In addition, a greater acreage would be managed with NSO stipulations under Alternative 4, which would prevent some surface disturbance associated with fluid mineral leasing and development that could cause dust generation and emission of criteria and hazardous air pollutants and GHGs.	Impacts would be similar to Alternative 4. However, Alternative 5 would be less restrictive than Alterative 4 in terms of allowing for fluid mineral and renewable energy development. Therefore, there is the potential for greater dust generation and emission of criteria and hazardous air pollutants and GHGs under Alternative 5.	Impacts would be similar to those under Alternative 5. Management of ACECs under Alternative 6 would restrict some surface-disturbing activities, which could reduce potential sources of pollutants and GHGs.	Under the Proposed RMP Amendment, impacts on air quality would be similar to those described under Alternative 4. PHMA would be designated as exclusion areas for utility-scale wind and solar projects, with limited exceptions, to prioritize habitat conservation and minimize air quality impacts, similar to the approach under Alternative1. The Proposed RMP Amendment would apply stringent lease stipulations for fluid mineral development, reducing emissions and preserving carbon sequestration, similar to Alternative 4. Additionally, the plan would strengthen protections within ROW avoidance areas, promoting the use of designated corridors to reduce air quality impacts compared with Alternative 1. Overall, the Proposed RMP Amendment would minimize GHG emissions and retain carbon sequestration, offering stronger protections compared with Alternative 1.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Soil and Water Resources						
Alternative 1 would continue current impacts on soil productivity and erosion and water resource conditions. This is because the alternative does not change BLM management that can impact soil, such as livestock grazing, surface-disturbing activities (including mineral development, renewable energy development, and ROW development), and the potential for wildfire.	Alternative 2 would result in fewer restrictions on activities that could cause soil compaction and erosion compared with Alternative 1. This is because the alternative allows for more flexibility in the management of activities that can impact soil and water, particularly changes in surface-disturbing activities (including fluid mineral leasing, renewable energy development, and ROW development.	Alternative 3 would result in the greatest restrictions on soil- and water-disturbing activities, particularly surface-disturbing activities (including fluid and locatable mineral development, renewable energy development, and ROW development). This would result in the greatest protections of any alternative for soil and water conditions in the planning area. Managing PHMA as unavailable for grazing could lead to a build-up of fine fuels that could exacerbate a large-scale wildfire that would degrade soil and water conditions in many areas.	Impacts would be similar to those described for Alternatives 1 and 2. However, a greater acreage would be managed with NSO stipulations under Alternative 4, which would prevent some surface disturbance associated with fluid mineral leasing and development that could degrade soil and water conditions.	Impacts would be similar to Alternative 4. However, Alternative 5 would be less restrictive than Alternative 4 in terms of allowing for fluid mineral and renewable energy development. Therefore, there is the potential for greater degradation of soil and water conditions under Alternative 5.	Impacts would be similar to those under Alternative 5. Management of ACECs under Alternative 6 would restrict some surface-disturbing activities, which could reduce potential activities that would degrade soil and water conditions.	The Proposed RMP Amendment would implement enhanced management measures that could result in more targeted protections for soil productivity, erosion, and water resource conditions compared with Alternative 1. These measures include stricter lease stipulations, NSO designations, and enhanced mitigation measures for surface-disturbing activities, particularly within PHMA and IHMA. The Proposed RMP Amendment aims to balance resource development with conservation goals, reducing potential degradation of soil and water conditions. While similar to Alternatives 4 and 5, the Proposed RMP Amendment offers more stringent protections in certain areas, potentially leading to improved soil and water conditions over time compared with Alternative 1.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Cultural Resources and Tribal Interest						
Alternative 1 would result in a continuation of current impacts on cultural resources and areas of Tribal interest from GRSG management decisions regarding activities such as mineral development, renewable energy development, livestock grazing, and ROW location. Management could shift ground-disturbing activities in the planning area out of GRSG habitat and into other landscapes such as pinyon-juniper vegetation where known concentrations of resources important to tribes are known to exist.	Under Alternative 2, potential for impacts on cultural resources and areas of Tribal interest is similar in magnitude, but likely greater than under Alternative 1 due to increased potential for fluid mineral and renewable energy development, as well as increased potential for ROW location in PHMA. This alternative could increase the range and magnitude of impacts on cultural resources and areas of Tribal interest as compared to Alternative 1.	Due to the most robust restrictions and highest acreage of PHMA, Alternative 3 would offer the greatest restrictions on surface disturbing activities such as mineral development, renewable energy development, and ROW location. This alternative would result in the lowest potential for impacts on cultural resources and areas of Tribal interest in the planning area.	Impacts would be similar to those described for Alternatives 1 and 2. However, a greater acreage would be managed with NSO stipulations under Alternative 4, which would prevent some surface disturbance associated with fluid mineral leasing and development that could degrade cultural resources or areas of Tribal interest.	Impacts would be similar to Alternative 1,2, and 4. However, Alternative 5 would be less restrictive than Alterative 4 in terms of allowing for fluid mineral and renewable energy development. Therefore, there is the potential for greater degradation of cultural resources or areas of Tribal interest under Alternative 5.	Impacts would be similar to those under Alternative 5. Management of ACECs under Alternative 6 would restrict some surface-disturbing activities, which could reduce potential activities that would degrade cultural resources or areas of Tribal interest.	Impacts under the Proposed RMP Amendment would be similar to Alternatives 4 and 5, falling between the two in terms of impacts on cultural resources and Tribal interests. GRSG management and disturbance caps would apply similar protections as under Alternatives 4 and 5, with the potential for reduced impacts in areas designated with limited exceptions. Fluid mineral management would seek to minimize fragmentation, similar to Alternative 4, but with more waivers potentially increasing impacts compared with Alternative 1. Renewable energy restrictions would be comparable to Alternative 1, potentially displacing impacts to areas outside of HMAs. ROW avoidance designations would lead to shorter ROWs and reduced impacts compared with Alternative 1.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Lands with Wilderness Characteristics						
Impacts on lands with wilderness characteristics under Alternative 1 would continue from mineral and ROW development and infrastructure, and livestock grazing.	Alternative 2 would allow more areas to be open to fluid mineral leasing and ROW authorizations, causing greater impacts on lands with wilderness characteristics when compared with existing management under Alternative 1.	Alternative 3 would have the overall greatest potential to maintain wilderness characteristics on lands with wilderness characteristics when compared to all other alternatives due to the closure of fluid, saleable, and nonenergy mineral leasing, ROWs being managed as exclusion, and PHMAs being unavailable for livestock grazing.	Impacts would be similar to those described for Alternatives 1 and 2. However, a greater acreage would be managed with NSO stipulations under Alternative 4, which would prevent some surface disturbance associated with fluid mineral leasing and development that could degrade wilderness characteristics.	Impacts would be similar to Alternative 4. However, Alternative 5 would be less restrictive than Alterative 4 in terms of allowing for fluid mineral and renewable energy development. Therefore, there is the potential for greater degradation of wilderness characteristics under Alternative 5.	Impacts would be similar to those under Alternative 5. Management of ACECs under Alternative 6 would restrict some surface-disturbing activities, which could reduce potential activities that would degrade wilderness characteristics.	Impacts on lands with wilderness characteristics from GRSG management and mineral resource allocations would align with Alternative 4, but with stricter protections in PHMA and IHMA. Renewable energy development would be restricted in PHMA with limited exceptions, consistent with Alternative 1, while GHMA would remain open with minimization measures. ROW avoidance designations would reduce impacts compared with Alternative 4, and livestock grazing impacts would be similar to Alternative 4, with additional protections and improvements aimed at minimizing new impacts.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Recreation and Visitor Services						
Under Alternative 1, existing restrictions on other resource uses would indirectly affect recreation by reducing resource conflicts and preserving recreational experiences. Management of ROW avoidance areas would continue to improve recreation experiences in the long-term in PHMA and IHMA as these diminish the naturalness of the physical setting and opportunities for recreation.	Under Alternative 2, additional exceptions to restrictions on other resource uses would indirectly increase recreation conflicts with other resources, which would diminish recreational experiences in those areas. Management of fewer acres of PHMA and IHMA compared to Alternative 1 would restrict fewer acres for the construction of new recreation facilities.	Alternative 3 would impose the greatest restrictions on other resources, which would have the great potential for enhancing and preserving the recreation experience by reducing resource conflicts. More acres of ROW exclusions would prohibit developments over a greater area, maintaining the naturalness and remoteness for recreation experiences. Alternative 3 would also have the greatest acreage of PHMA, thus, prohibiting the greatest area for the construction of new recreation facilities compared to other alternatives.	Like Alternative 1, Alternative 4 would have an indirect effect on recreation by reducing resource conflicts in PHMA, IHMA, and GHMA with existing restrictions on other resource uses, which would preserve the recreational experiences in those areas. ROWs would have additional criteria for avoidance of GRSG, which would enhance naturalness and remoteness for recreation experiences in the area. There would be more acres of PHMA and IHMA compared to Alternative 1 which would restrict more fewer acres for the construction of new recreation facilities.	Impacts on recreation from Alternative 5 would be similar to Alternative 4; however, on ROWs, there would be less restrictive criteria for avoidance of GRSG when compared to Alternative 1. These fewer restrictions would indirectly affect recreation by decreasing the naturalness and remoteness for recreation experiences in the area.	Impacts would be similar to those under Alternative 5. Management of ACECs. Alternative 6 would have greater restrictions on mineral exploration, including fluid minerals, nonenergy minerals, and mineral materials as well as major ROWs, wind and solar, which would indirectly decrease the resource conflicts that also affect recreation resources when compared to Alternative 1.	Existing restrictions on resource uses like fluid mineral leasing would reduce conflicts in PHMA, IHMA, and GHMA, indirectly benefiting recreation. The Proposed RMP Amendment's avoidance of utility-scale wind and solar energy development, which is less restrictive than under Alternative 1, could further enhance recreational experiences by reducing energy development conflicts. PHMA would cover a larger area compared with Alternative 1, potentially restricting more land for new recreation facilities due to disturbance caps. Limited exceptions for PHMA would offer additional protections, reducing conflicts with recreational uses and preserving naturalness and remoteness for improved recreational experiences.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Transportation and Travel Management						
The existing GRSG travel and transportation allocations or management direction would continue. In PHMA and GHMA, OHV travel is limited to existing routes and no cross-country travel is allowed.	Same as Alternative 1 for Colorado, Idaho, Montana, Oregon, Utah, and Wyoming. NV/CA: Increase in OHV open areas by 4.82% compared with Alternative 1.	Same as Alternative 1 for Colorado, Idaho, Montana, and Wyoming. NV/CA: Decrease in OHV open areas by 6.92% compared with Alternative 1. OR: Decrease in OHV open areas by 3.70% compared with Alternative 1. UT: Decrease in OHV open areas by 1.68% compared with Alternative 1.	Same as Alternative 1 for Colorado, Idaho, Montana, and Wyoming. NV/CA: Increase in OHV open areas by 5.13% compared with Alternative 1. OR: Same as Alternative 2. Decrease in OHV open areas by 3.70% compared with Alternative 1. UT: Decrease in OHV open areas by 1.36% compared with Alternative 1.	Same as Alternative 1 for Colorado, Idaho, Montana, and Wyoming. NV/CA: Increase in OHV open areas by 4.78% compared with Alternative 1. OR: Decrease in OHV open areas by 4.80% compared with Alternative 1. UT: Decrease in OHV open areas by 0.33% compared with Alternative 1.	Same as Alternative 1 for Colorado, Idaho, Montana, and Wyoming. NV/CA: Increase in OHV open areas by 4.78% compared with Alternative 1. OR: Same as Alternative 5. Decrease in OHV open areas by 4.80% compared with Alternative 1. UT: Same as Alternative 5. Decrease in OHV open areas by 0.33% compared with Alternative 1.	Same as Alternative 1 for Colorado, Idaho, Montana, and Wyoming. NV/CA: Increase in OHV open areas by 4.44% compared with Alternative 1. OR: Same as Alternatives 5 and 6. Decrease in OHV open areas by 4.80% compared with Alternative 1. UT: Decrease in OHV open areas by 1.08% compared with Alternative 1.

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4.2 GREATER SAGE-GROUSE

4.2.1 Nature and Types of Effects

Habitat Designation and Management

Management actions addressed during the land use planning process include adjustments to designated HMAs, habitat objectives, disturbance caps, and mitigation strategies, all of which may vary by alternative. Changes to these issues are reflected in actions related to management of other resources, such as minerals. Adjusting HMA boundaries could lead to fewer or greater acres managed as PHMA, and subsequently, smaller or greater areas subject to restrictions on mineral resource management. Permitted activities within HMA boundaries may also vary by alternative. Therefore, impacts from GRSG management are incorporated into the impacts discussion for management of other resources.

Habitat management and designations impact GRSG and habitat by influencing the kind and level of activities and associated disturbances that can occur in GRSG habitat on BLM-administered lands. Impacts to GRSG and habitat resulting from GRSG habitat disturbances vary depending on proximity to important GRSG seasonal habitats, type and quality of the habitat disturbed, type of disturbance, associated indirect impacts (one-time human presence and noise disturbance or on-going maintenance and human presence), how the disturbance is distributed on the landscape, other existing threats, and disturbance density. Any habitat impacts that decrease nesting success and chick and adult female survival can impact population growth and viability (Taylor et al. 2012). Analyses of disturbance thresholds found that GRSG began negatively responding to disturbances at approximately 4.5% disturbance and did not use habitats when surface disturbance exceeded 8% (Kirol et al. 2012). Other research reported almost all occupied leks (99%) in the western portion of the range had less than 3% disturbance from urbanization within 3.1 miles of the lek (Knick et al. 2013). Rangewide lek trend analyses suggest that aggregated human influences on the landscape are associated with negative GRSG lek count trends (Johnson et al. 2011) and population persistence (Kirol et al. 2020). Varied methodology precludes direct comparisons of these studies. The BLM would use different criteria for calculating disturbance caps for some alternatives, as described in the Alternatives subsections below.

Habitat fragmentation can result in lower tolerance to disturbance (Doherty et al. 2016), increased movement distances, reductions in lek persistence, lek attendance, population recruitment, yearling and adult annual survival, female nest site selection, nest initiation, and complete loss of leks and winter habitat (Doherty et al. 2008). Large-scale disturbances, such as agricultural conversions, within surrounding landscapes affect GRSG habitat selection and population persistence (Wisdom et al. 2011). Habitat loss and fragmentation also decrease the connectivity between seasonal habitats, potentially resulting in population isolation or loss (Knick and Hanser 2011) and decreased genetic connectivity (Oyler-McCance et al. 2022).

GRSG habitat use varies by season (see **Chapter 3**), so the impacts of habitat disturbance may vary due to different life stages being affected and may result in changes to vital rates. Research has found negative responses of GRSG to ex-urban development on brood-rearing habitats (Westover et al. 2016), well pads and roads on nesting habitat (Zabihi et al. 2017), and human disturbance on all habitats once sagebrush landscape cover is reduced to a level where GRSG occupancy is negatively affected (Doherty et al. 2016). These effects are intensified in highly fragmented habitats with low sagebrush landscape cover. Considering the spatial area of disturbances in relation to seasonal habitats and different GRSG life history stages is important (Reinhardt et al. 2017).

Disturbances due to land use activities vary by geographical areas. Open plains, prairies, and plateaus may be suitable for wind and solar energy development, whereas mountainous regions may be more suitable for

recreation. Rangewide lek persistence is related to environmental factors, including topography and landscape configuration (Wann et al. 2023), so impacts from disturbance likely vary by geographical area. Activities in higher quality habitat may have a greater impact on GRSG. Activities contributing to habitat fragmentation may interfere with gene flow and population persistence, particularly since GRSG may already avoid dispersal areas of rough terrain or steepness (Row et al. 2018).

Some alternatives include a disturbance and energy facility density cap to limit aggregated disturbance and impacts within GRSG management areas. Caps influence allowable level of disturbance within a GRSG HMA, which vary by alternative. A lower level of allowable disturbance would have fewer impacts to GRSG habitat and individuals. Adaptive management is included in some alternatives to address the possibility that habitat or populations continue to decline to the point that thresholds are met. The goal of adaptive management is to detect effects on GRSG habitats and populations and act in an appropriate time frame to effectively offset impacts.

Baseline data shows a total of 330,285 acres of disturbance on PHMA/IHMA in fine scale HAF units rangewide (excluding WY, for which fine scale HAFs have not yet been mapped), and the amount of disturbance in PHMA/IHMA within fine scale HAF units does not currently exceed 3% (BLM GIS 2023). The targeted annual warning system (TAWS), which identifies local populations exhibiting asynchronous decline relative to regional population patterns (Coates et al. 2021a), estimated 2.9% average annual declines in GRSG populations across their geographical range over a 29-year time period (Coates et al. 2023). A rangewide analysis conducted by the BLM showed that sagebrush availability declined by approximately 3% between 2012 and 2018, and 16 habitat triggers were tripped between 2015 and 2020 (Herren et al. 2021). Forty-two GRSG population triggers were tripped in the same time period (Herren et al. 2021). Most of the habitat triggers were the result of wildfires and the associated loss of sagebrush habitats. For population triggers, management changes were identified as needed to address the causal factor in almost half of the areas evaluated. These data indicate that similar trends may continue even with a 3% disturbance cap. These trends were calculated rangewide, but disturbance caps would be calculated at smaller scales. Not all the alternatives incorporate wildfire into the disturbance calculations, and since wildfire is a primary driver of sagebrush habitat loss, there may be differences in the total amount of disturbance needed to stay within the cap by alternative.

Minerals Management

Mineral extraction of all types in GRSG habitat may result in habitat loss from construction of infrastructure, surface or underground mines, and other associated facilities. GRSG population reestablishment in reclaimed areas may take upwards of 30 years (Braun 1998). The use of reclaimed areas is likely influenced by whether the sagebrush systems are mesic or arid, with GRSG more likely to use reclaimed mesic sagebrush systems which recover more quickly (Walker 2022). Where compromised by invasive grasses, reclamation may be minimally effective without additional intervention.

Necessary infrastructure, including location, construction, and use of ancillary facilities, staging areas, roads, railroad tracks, buildings and power lines cause additional direct and indirect impacts on GRSG (Green et al. 2017). These may also result in noise and light pollution, fugitive dust, human disturbance, increases in predator perch sites, and weed proliferation, any of which leads to habitat degradation (Hanser et al. 2018).

Fluid Mineral Resource Management

Industrial activity associated with oil and gas development disrupts the habitat and life cycle of GRSG, resulting in negative impacts to populations and habitats (Green et al. 2017). While advancements in drilling

technologies over the past 15 years have reduced surface disturbance, significant challenges remain in minimizing the broader ecological impacts on GRSG populations, particularly with habitat fragmentation and disruption of critical breeding areas. GRSG populations typically decline following oil and gas development (Doherty et al. 2008), and impacts have been observed when leks occur within 2.5 miles of a producing well, when greater than eight active wells are within 3.1 miles of leks, or when more than 200 active wells are within 11 miles of leks (Johnson et al. 2011). Other studies reported increasing density of oil and gas wells correlated with decreasing lek attendance with effects observed at 3.98 miles from leks (Hanser et al. 2018). Abundance was also negatively affected for a distance of between 3 and 4 miles (Holloran 2005). In some instances, impacts were directly attributed to features associated with energy development (Doherty et al. 2008). A one-mile buffer from energy development in Wyoming and Montana resulted in a lek persistence of approximately 30%, whereas lek persistence in areas without oil and gas development averaged 85% (Walker et al. 2007a). Three miles was recommended as a minimum buffer to protect GRSG from energy development impacts in the Bi-State Distinct Population Segment area (Coates et al. 2013). Other impacts have been documented within varying distances from energy infrastructure and at different well densities (Manier et al. 2014).

A one to four-year time lag between oil and gas development and lek decline can occur, possibly because this activity negatively affects recruitment rather than causing avoidance or decreased survival (Green et al. 2017). Lags are potentially explained by avoidance and reduced survival and fecundity in GRSG generations produced following the onset of development (Holloran et al. 2010).

Direct and indirect impacts from energy development accrue both locally and at the landscape scale. GRSG populations typically decline following oil and gas development (Doherty et al. 2008). Indirect effects are habitat degradation or utilization displacement and are estimated to occur out to 11.8 miles from leks (Naugle et al. 2011). Noise from industrial activity may disrupt GRSG communication by interfering with acoustical signals that attract females to leks (Blickley et al. 2012b). Noise from oil and gas development may have been a factor in habitat selection and a decrease in lek attendance by GRSG in western Wyoming (Holloran 2005). Recent studies in oil and gas areas suggest that GRSG avoid leks exposed to human noise (Blickley et al. 2012a; Blickley and Patricelli 2012) and may cause declines in GRSG (Ambrose et al. 2021). Chronic noise pollution can also cause GRSG to avoid otherwise suitable habitat (Patricelli et al. 2013) and can cause elevated stress levels in the birds that remain in noisy areas (Blickley et al. 2012a).

Interaction and intensity of effects of habitat loss from energy development could cumulatively or individually lead to habitat fragmentation in the long term (Holloran 2005). This could negatively impact lek persistence and attendance, winter habitat use, recruitment, yearling annual survival rate, and female nest site choice.

To address population impacts identified, stipulations would be associated with new fluid mineral leasing in GRSG HMAs including NSO, CSU/disturbance caps, and TL stipulations on new leases. These stipulations are intended to reduce or avoid direct disturbance, protect HMAs from surface-disturbing activities, and conserve habitat and population connectivity contributing to genetic diversity. NSO stipulations on new leases would limit impacts to HMAs from surface-disturbance, ensure habitat connectivity between leks, and minimize habitat fragmentation. NSO stipulations can push infrastructure to surrounding private and state lands which may still result in GRSG habitat loss and fragmentation. Waivers, exceptions, and modifications (WEMs) could be applied to stipulations and could void or modify the stipulation depending on the alternative.

Other Mineral Resource Management (Saleable, Nonenergy Leasable, Locatable, and Coal)

Impacts from management of other mineral resources would be similar to those described for fluid mineral resources, and include disturbance, habitat loss/degradation. Infrastructure for locatable or coal mine developments is like that required for fluid minerals but is more localized in extent, but mines may have a large footprint. Direct habitat loss can occur from removing vegetation and soil to access mineral resources and storage of overburden (soil removed from mining activities or the formation of mine shafts) in undisturbed habitat. Construction of ancillary facilities, staging areas, roads, railroad tracks, and structures such as buildings and power lines can result in direct habitat loss. Indirect impacts, such as noise, light, human activity, dewatering of springs and surface water, loss or reduction of groundwater that may be connected or important to surface waters, and subsidence, can impact GRSG and habitat. The interaction and intensity of effects from habitat loss could lead to broader-scale habitat fragmentation in the long term. Surface mining has a greater direct habitat impact than underground mining but disturbance from related above ground infrastructure located in GRSG habitat can also result in direct loss of that habitat.

Several scientific studies examine the effects of coal mining on GRSG. In North Park, Colorado, overall GRSG population numbers were not reduced, but there was a reduction in the number of males attending leks within 0.8 mile of three coal mines, and existing leks failed to recruit yearling males (Braun 1986). New leks formed farther from mining disturbance (Remington and Braun 1991). Some leks that were abandoned adjacent to mine areas reestablished when mining activities ceased, suggesting disturbance rather than habitat loss was the limiting factor (Remington and Braun 1991). Hen survival did not decline in a population of GRSG near large surface coal mines in northeast Wyoming, and nest success appeared not to be affected by adjacent mining activity (Brown and Clayton 2004). Blasting, a practice used to remove overburden or the target mineral, produces noise and ground shock. The full effect of ground shock on wildlife is unknown, but noise from mining operations during lekking activity could result in lek or nest abandonment (Moore and Mills 1977). However, such abandonment may be short term, as leks have been shown to reestablish after mining activities cease (Remington and Braun 1991).

As to locatable minerals, the BLM could request that the Secretary of the Interior to withdraw sage-grouse habitat from location and entry under the Mining Law of 1872 pursuant to Section 204(a) of FLPMA. The Secretary could consider such a request filed according to the process outlined in Section 204 of FLPMA and any Secretarial decision to withdraw the lands must comply with NEPA and other applicable laws. Withdrawing land from location and entry under the Mining Law of 1872 is not a land use planning decision and a recommendation does not in itself change land status, restrict activities, or have any impacts. The alternatives analysis includes a description of the likely environmental effects should the Secretary propose and make a withdrawal in the future.

Lands and Realty Management

GRSG respond negatively to increased human infrastructure in sagebrush habitats, including roads, power lines, and communication towers (Manier et al. 2013). Transmission and power line construction does not generally result in substantial direct habitat loss, but it would permanently disturb individual GRSG and habitat along the ROW due to the associated human activity, equipment, noise, and habitat fragmentation. Transmission lines can also provide perches and nest sites for ravens and raptors, resulting in indirect negative impacts on GRSG survival and reproduction. Avian predator control methods and deterrents may reduce avian predation impacts on GRSG, but efficacy is variable.

In areas managed as ROW exclusion, the BLM would prohibit development of all or certain types/subsets of ROWs such as utility scale wind and solar testing and development. In areas managed as ROW avoidance

the BLM would consider allowing ROW on a case-by-case basis. This flexibility may be advantageous where federal, state, tribal, and private landownership areas are mixed and exclusion areas may result in more widespread development, potentially in higher quality habitat, off of BLM administered lands.

Collisions with power lines, vehicles, and property fencing, and increased predation by raptors using these features may increase GRSG deaths at leks (Connelly et al. 2000a). Since GRSG deaths associated with power lines and roads occur year-round (Aldridge and Boyce 2007) roads and power lines may also indirectly affect lek persistence by altering productivity of local populations or survival at other times of the year. Artificial ponds created by development (Zou et al. 2006) can support breeding mosquitoes known to carry West Nile virus (Walker et al. 2007b) and elevate the risk of GRSG deaths in late summer (Walker and Naugle 2011). GRSG may also avoid otherwise suitable habitat as development increases (Lyon and Anderson 2003).

Avoidance of developed areas should be considered a reduction in the distribution of GRSG (Walker et al. 2007a) as avoidance can result in population declines when density dependence, competition, or displacement of birds into poorer-quality adjacent habitat lowers survival or reproduction (Aldridge and Boyce 2007). The specific response is tied to the type of ROW, its location, and associated human activity and infrastructure. GRSG exhibit extremely high site fidelity, which strongly suggests that unfamiliarity with new habitats may also reduce survival (Holloran and Anderson 2005), as evidenced in other grouse species (Yoder et al. 2004).

Renewable Energy Management

Potential impacts of renewable energy projects on GRSG and their habitats have not been as widely studied as other energy development. Studies of oil and gas development and associated infrastructure on the species (Becker et al. 2009) suggest that impacts to GRSG and their habitats can be anticipated from renewable energy projects, as well. GRSG have evolved in habitats with little vertical structure or other human-made features, therefore, tall vertical structures such as wind turbines may displace GRSG from their usual habitat (Johnson and Stephens 2011). Wind energy studies have found that nest and brood survival are negatively affected with proximity to wind turbines, likely a result of increased predation (LeBeau et al. 2014, 2017a, 2017b). Additional concerns with wind energy development include noise produced by rotating blades, GRSG avoidance of structures, mortality by flying into rotors, and the presence of new roads and power lines (Connelly et al. 2004; Manier et al. 2013). Disturbance from the footprint of infrastructure is negatively associated with GRSG viability (Kirol et al. 2020; Coates et al. 2021a). Development of solar facilities would have similar infrastructure effects (vertical structures, roads, fencing, other associated infrastructure, and related changes in vegetation), but would occur at a discrete location with intense development (i.e., a solar field). Negative impacts to GRSG and their habitats from solar facilities are anticipated to extend to ancillary infrastructure, such as transmission lines and substations as seen with other types of energy development. While there is less potential for mortality or injury due to collisions at solar versus wind facilities, there may be an increased risk of GRSG mortality due to collisions with fencing associated with solar facilities. Research on geothermal development in Nevada reported adverse effects on GRSG populations by decreasing nest survival, adult survival, and increased density of common ravens (Coates et al. 2021a).

Longer-term residual impacts may be cumulative and their contribution to GRSG population declines depend on the magnitude, frequency, and duration of human disturbance. GRSG may abandon leks if repeatedly disturbed by raptors perching on power lines or other tall vertical structures near leks (Ellis 1984), by vehicular traffic on roads (Lyon and Anderson 2003), or by noise and human activity associated with energy development (Kaiser 2006).

Travel and Transportation Management

The effect of development of roads can result in direct changes in habitat and GRSG populations and indirectly result in through avoidance behavior by these populations (USFWS 2010a). Roads alter and fragment habitat by impeding use of seasonal habitats, facilitating habitat degradation by creating a corridor along which invasive plants can spread, allowing for increased human noise disturbance, resulting in GRSG avoidance, direct mortality, and increasing mammalian and avian predator abundance (Formann and Alexander 1998).

GRSG persistence is inversely correlated with road density. Compared with currently occupied GRSG range, areas where GRSG no longer occur are 60% closer to highways and had 25% higher road densities (Manier et al. 2013). Within GRSG range, 95% of the mapped sagebrush habitats are within 1.6 miles of a mapped road and density of secondary roads exceeds 3.1 miles per 247 acres in some areas (Knick et al. 2011). Incremental effects of accumulating lengths of state and federal highways and interstates near leks included decreasing lek counts when there were more than 3.1 miles of federal or state highway within 3.1 miles of leks and when more than 12.4 miles of highway occurs within 11.2-miles of leks (Johnson et al. 2011).

Livestock Grazing Management

Livestock grazing in GRSG habitat may either improve or decrease habitat quality, depending on the type of habitat, spatial and temporal scale, and how the grazing is administered (Boyd et al. 2014). Numerous variables influence GRSG habitat on the landscape (e.g., vegetation present, soil, elevation, aspect, and precipitation). These, combined with historic and current levels and methods of livestock grazing, result in variable impacts on GRSG habitat from livestock grazing in both space and time (Manier et al. 2013). The nature and level of impacts discussed in this analysis are described in broad terms due to this variability. Habitat impacts from livestock consumption of vegetation are diffused over broad spatial or temporal scales and are different than discrete disturbances (Knick et al. 2011; BLM IM 2012-044, BLM National Greater Sage-Grouse Land Use Planning Strategy). Livestock can influence yearly vegetation conditions, and/or result in altered vegetation dominance over time. Prolonged selective grazing pressure on vegetation communities can affect the condition of individual plants, abundance of species, interspecific competition, and ultimately, community composition (Manier and Hobbs 2006). While specific effects and conditions from grazing are localized in most cases, the continuous and collective presence of these effects across the West may affect the regional condition of GRSG habitats (Manier et al. 2013).

Timing of grazing relative to plant growth stages (growth initiation, rapid growth, seed development, seed ripe, and dormancy) can influence the effects on vegetation (Veblen et al. 2011). Repeated grazing during periods of fastest growth of the dominant grasses and forbs in intermountain sagebrush steppe over multiple consecutive years tends to favor sagebrush growth (Pyke 2011) through reduced competitive ability of grasses (Manier et al. 2013). Spring grazing in winter habitat may improve GRSG winter habitat because grass reductions can increase sagebrush densities (Beck and Mitchell 2000), suggesting an opportunity to graze GRSG winter habitats in spring when non-overlapping brood-rearing habitats would be avoided, and vice versa (Manier et al. 2013). GRSG initiate nesting prior to new herbaceous growth, so grazing levels from the previous year and the residual grass can provide initial cover for nesting GRSG (Hausleitner et al. 2005; Holloran et al. 2005). Nesting GRSG consistently select areas with more sagebrush canopy cover and taller grasses compared with available habitats (Hagen et al. 2007), increasing the probability of a successful hatch (Manier et al. 2013). If nesting and early brood-rearing habitats are grazed in a manner that consistently results in a lack of sufficient residual grass cover the following spring, predation of GRSG nests could increase and the rate of nest success could decrease (USFWS 2010a).

The availability of forbs is an essential component of a pre-laying hen's diet (Barnett and Crawford 1994; Connelly et al. 2000b; Gregg et al. 2008). In Nevada, greater forb diversity and higher plant species richness were small-scale habitat factors associated with brood success (Casazza et al. 2011). A reduction in forbs due to livestock grazing would reduce the value of nesting and early and later brood-rearing habitat for GRSG and may cause them to use less optimal habitat, potentially affecting nesting GRSG (Barnett and Crawford 1994) and chick survival (Huwer et al. 2008). Forb diversity and concentration dramatically increase invertebrate densities, which are crucial for chick survival and growth (Johnson and Boyce 1990). Insect diversity and density are positively correlated with herbaceous density and diversity (Jamison et al. 2002). Recent research has found that grazing intensity was not ultimately detrimental to insect abundance and permitted some insect taxa to thrive (Richardson et al. 2023).

The effects from grazing also vary by kind of livestock, numbers of livestock, duration, and area (intensity), and grazing management systems. Grazing intensity has consistently been identified as having impacts on ecosystem and rangeland health (Veblen et al. 2011), including the vegetative structure required by GRSG. Livestock, especially cattle, prefer to concentrate near water sources and the location of water affects livestock distribution patterns. This pattern can result in disproportional use of riparian habitats and wet meadows, which can result in loss of riparian vegetation and cover, as well as compaction of soils and lowering of water tables, which alters water quality, invertebrate populations, and plant species composition. This can result in degradation of crucial habitats for GRSG.

Artificial water sources provided in support of livestock grazing may attract GRSG and expose them to insects that may serve as vectors for diseases such as West Nile virus (Naugle et al. 2004). The presence of livestock is also associated with increased raven occurrence (Coates et al. 2016), which can lead to increased GRSG predation. Livestock management practices provide ravens with resource subsidies, such as water sources, which are naturally scarce in the arid west. Structural range improvements, such as fences, represent potential movement barriers or predator perches and are a potential cause of direct mortality to GRSG due to collision (Manier et al. 2013).

Livestock grazing can be a management tool to aid in the management or maintenance of vegetation communities within GRSG habitat. Well managed livestock grazing may change plant community composition, increase productivity of selected species, increase forage quality, and alter structure to increase habitat diversity (Vavra 2005), and can positively effect GRSG habitat suitability (Manier et al. 2013). Many studies demonstrate weeds can be controlled through grazing at a specific time, intensity, and duration to reduce abundance of these species. Under controlled situations, where livestock is used as a targeted vegetation treatment tool, livestock can reduce fine fuel loads (e.g., cheatgrass) (Diamond et al. 2009). Cheatgrass completes its reproductive cycle, using limited soil moisture and nutrients, well before most native perennial grasses and is usually dry by mid-summer, which coincides with increased wildfire danger (Pellant 1996). Intense "flash" grazing during the winter or early-late spring, while it is still green, may control cheatgrass. Recent research also suggests bunchgrass community structure and the presence of biological soil crusts increases resistance to cheatgrass invasions. Grazing management that decreases those components decreases the vegetation communities' resistance to invasion (Reisner et al. 2013). Sheep and goats can be used to control noxious weeds such as leafy spurge, spotted knapweed, and yellow star thistle. Effectiveness of livestock as a management tool for the control of undesirable vegetation is highly dependent on the scale, livestock behavior, and ability to avoid grazing native vegetation. However, livestock grazing could be used to meet habitat objectives.

Although the potential for population level effects is uncertain, GRSG and their habitats may be directly impacted by livestock trampling of GRSG eggs or causing nest desertion from repeated disturbance (Beck and Mitchell 2000). Trampling by livestock under short-duration or season-long grazing may also kill sagebrush, particularly seedlings growing in the spaces between shrubs (Beck and Mitchell 2000), though effects are typically localized.

Under all alternatives, described in **Appendix 21**, livestock grazing would be managed to meet or make progress towards land health standards and improper grazing would be limited and addressed through implementation-level corrective actions. In this Proposed RMP Amendment/Final EIS, varying acres of GRSG HMAs would be available for livestock grazing. The actual number of AUMs authorized on a permit may be adjusted through permit renewals, permit modification, allotment management plan development, or other appropriate implementation activity. In areas unavailable for grazing, there would be no GRSG habitat alterations as a result of grazing. Removal of grazing would result in reduced landscape scale removal of fine fuels, which could indirectly impact GRSG habitat by increasing the potential for wildfire. The BLM could still implement targeted grazing treatments, but at a smaller scale than if more areas are available for grazing. In areas of mixed land ownership, making public lands unavailable for grazing that are adjacent to private, state or Tribal grazing lands could result in more fencing. This could impact GRSG due to increased perches for avian predators (O'Neil et al 2018) and increased risk of collision. Sale of private lands could also lead to an increased potential for urbanization which may impact GRSG due to habitat loss, fragmentation and disturbance.

Wild Horse and Burro Management

Wild horses may alter habitat conditions for GRSG by reducing vegetation abundance and cover, increasing shrub canopy fragmentation, lowered species richness, increased compaction in surface soil horizons, and increased dominance of unpalatable forbs (Coates et al. 2021b). Horse and burro populations can degrade riparian areas, decrease water quantity and quality, and increase soil erosion. Additionally, wild horses may disrupt the lekking activity, reducing lek attendance, and mating opportunities, and contributing to population declines (Munoz et al. 2021). Cumulatively this can reduce habitat quality for wildlife, including GRSG. Effects of wild horses on habitats may also be more pronounced during periods of drought or vegetation stress (NTT 2011). Wild horse and burro gather methods may also disturb GRSG and their habitats.

Fences used to manage horse distribution are a potential source of direct mortality to GRSG (Manier et al. 2013). Year-round water availability in horse herd management areas and wild horse territories is required by the Wild and Free-Roaming Horses and Burros Act of 1971. This can result in year-long use of riparian areas by wild horses and other modifications (fences, troughs). Negative effects are possible depending on how each facility is constructed. Range improvements would increase potential perch sites for avian predators (fences) and potential drowning hazards (troughs).

Predator Management

GRSG are prey for various predators including but not limited to, coyotes, badgers, bobcats, red fox, golden eagles, hawks, and corvids (Hagen 2011). Predation can be a threat to GRSG, with effects on population size and high distribution in many areas of the West, especially in areas of low population density where there is limited habitat or poor habitat quality (USFWS 2010a). Under some circumstances, predation rates can increase, such as when human subsidies attract increased numbers of predators. Raven populations have dramatically increased, with 293% more ravens within GRSG range compared to outside their range between 1966 and 2018 (Harju et al. 2021). This has led to concerns about increased predation rates which can be exacerbated by supplemental food resources, increased infrastructure supporting nesting and perching

opportunities, increased paved roads and highways which are sources of roadkill, and livestock carcasses and afterbirths. Elevated raven abundance associated with human resource subsidies have been documented to cause elevated predation rates on GRSG (Coates et al. 2020). While managing these subsidies is important, it may not be sufficient to solve the raven problem on its own. Predator control in areas of compromised habitats with high populations of synanthropic predators (predators that live near, and benefit from, an association with humans) may be help ensure GRSG persistence until habitat conditions improve (O'Neil et al 2018). Predators, especially coyotes, are often controlled to prevent livestock loss, which may reduce predation on GRSG. Wildlife management, including predator control, remains the responsibility of state and/or federal wildlife agencies.

ACEC Designation

Special management areas such as ACECs can be used as a management tool to provide protection to GRSG and habitats through restrictions on uses and surface-disturbing activities. Management to protect the relevant and important values in these ACECs and others that overlap GRSG habitat may provide incidental protection to GRSG and their habitats by restricting land disturbances (including ROWs).

4.2.2 Proposed RMP Amendment

Habitat Designation and Management

Rangewide Environmental Consequences

Impacts from designating GRSG habitat as HMAs would be similar to, but more protective, than those described for Alternative 1 (the plan currently being implemented), though the BLM would manage approximately 2,056,000 acres (6%) more PHMA and 4,848,000 (18%) fewer acres of GHMA (**Table 2-15**). The HMA designations are more protective than under Alternative 1 because the delineations of the HMA areas under the Proposed RMP Amendment are based on updated science and data. This information included GRSG habitat persistence (Wann et al., 2022), habitat and genetic connectivity (Cross et al., 2018, Row et al., 2018, Cross et al., 2022, Oyler-McCance et al., 2022), GRSG distribution (Doherty et al., 2016, Coates et al., 2021) and likelihood of sagebrush habitat persistence under changing climatic conditions (Palmquist et al., 2021, Rigge et al., 2021) and, therefore, would be more effective in providing GRSG habitat protections where they are needed and where they will be most effective. Compared to the draft preferred alternative (Alternative 5) the BLM would manage approximately 592,000 (2%) more PHMA and 75,000 (less than 1%) fewer acres of GHMA. Additionally, there would be 4,213,000 acres of PHMA with limited exceptions which would provide additional protections for GRSG from impacts of wind and solar development, and the associated ROWs and surface impacts from fluid mineral development. Increasing amounts of PHMA would result in less habitat fragmentation and loss and disturbance to GRSG. However, where PHMA would be reduced, the decision was based on new information on GRSG habitat use, or loss of habitats due to non-anthropogenic impacts such as wildfire on BLM lands.

State-Specific Environmental Consequences

In WY PHMA would increase by 269,000 acres (3%), under the proposed RMP Amendment compared to plan currently being implemented (Alternative 1), resulting in an increase in protections from PHMA. PHMA would decrease by 12,000 acres (less than 1%) compared with Alternative 5, resulting in a slight decrease in protections. GHMA in WY would decrease by 191,000 acres (2%) compared with Alternative 1, resulting in a slight decrease in associated protections. GHMA would increase by 13,000 acres (less than 1%) compared with Alternative 5, resulting in a slight increase in associated protections. Approximately 273,000 acres in WY are identified as PHMA with limited exceptions. This subset of PHMA would have additional protections for GRSG habitats from renewable and non-renewable energy development and associated rights-of-ways.

Management in Wyoming SHMA (15,000 acres) would align with GHMA restrictions, increasing protections to GRSG.

In MT/DK PHMA would decrease by 42,000 acres (1%) and 68,000 acres (2%), under the proposed RMP Amendment compared to plan currently being implemented (Alternative 1) and the draft preferred alternative (Alternative 5), respectively. These changes would result in a decrease in protections associated with PHMA. GHMA in MT/DK would decrease by 452,000 acres (19%) compared with Alternative 1, resulting in a decrease in associated protections. GHMA would increase by 73,000 acres (4%) compared with Alternative 5, resulting in an increase in associated protections. Approximately 639,000 acres in MT are identified as PHMA with limited exceptions (there are no areas of PHMA with limited exceptions in North and South Dakota). This subset of PHMA would have additional protections for GRSG habitats from renewable and non-renewable energy development and associated rights-of-ways. the associated development restrictions

Under the Proposed RMP Amendment, MT/DK would designate Unique HMAs (Little Missouri HMA, South Carter HMA, and Connectivity HMA) to maintain, improve and restore sagebrush communities and increase habitat availability and quality for greater sage-grouse. These Unique HMAs cover 388,000 acres and are managed to provide greater protections from impacts described in Alternative 5.

In CO PHMA would increase by 4,000 acres (1%) and 1,000 acres (less than 1%), under the proposed RMP Amendment compared to the plan currently being implemented (Alternative 1) and the draft preferred alternative (Alternative 5), respectively. These changes would result in an increase of protections in PHMA. GHMA in CO would decrease by 2,000 acres (less than 1%) compared with Alternative 1, with impacts being the decrease in associated protections. GHMA under the Proposed RMP Amendment would not change when compared with Alternative 5. Approximately 5,000 acres in CO would be identified as PHMA with limited exceptions, protecting vital winter habitat. This area within PHMA would have additional protections for GRSG habitats from renewable and non-renewable energy development and associated rights-of-ways. the associated development restrictions. Linkage Management Areas would not change when compared with either Alternative 1 or Alternative 5.

In ID PHMA would increase by 395,000 acres (9%), under the proposed RMP Amendment compared to plan currently being implemented (Alternative 1), resulting in an increase in protections associated with PHMA. PHMA under the Proposed RMP Amendment would not change when compared with Alternative 5. IHMA in ID would decrease by 210,000 acres (8%), and GHMA would decrease by 259,000 acres (13%) compared with Alternative 1, resulting in a decrease in associated protections. Compared with Alternative 5, IHMA would increase by 23,000 acres (less than 1%), with an increase in protections under the Proposed RMP Amendment, while GHMA would decrease by 22,000 acres (1%), resulting in an associated decrease in protections. Approximately 251,000 acres in ID would be identified as PHMA with limited exceptions. This area within PHMA would have additional protections for GRSG habitats from renewable and non-renewable energy development and associated rights-of-ways and would contribute to the conservation of GRSG that cross the border with NV.

In NV/CA PHMA would increase by 394,000 acres (4%) and 164,000 acres (2%), under the proposed RMP Amendment compared to the plan currently being implemented (Alternative 1) and the draft preferred alternative (Alternative 5), respectively. These changes result in an increase in protections associated with PHMA. GHMA in NV/CA would decrease by 3,340,000 acres (58%) and 137,000 (5%) compared with Alternatives 1 and 5, respectively. These changes would result in a decrease in associated protections. OHMA would similarly decrease compared with Alternative 1 (764,000 fewer acres, 16% decrease) and with

Alternative 5 (29,000 fewer acres, less than 1% decrease). Approximately 3,001,000 acres in NV/CA would be identified as PHMA with limited exceptions. This area within PHMA would have additional protections for GRSG habitats from renewable and non-renewable energy development and associated rights-of-ways.

In OR PHMA would increase by 983,000 acres (21%), under the proposed RMP Amendment compared to the plan currently being implemented (Alternative 1). These changes would result in an increase in protections associated with PHMA. GHMA in OR would decrease by 810,000 acres (14%) compared with Alternative 1, resulting in a decrease in associated protections. PHMA and GHMA under the Proposed RMP Amendment would not change when compared with Alternative 5. Approximately 39,000 acres in OR would be identified as PHMA with limited exceptions. This area within PHMA, which is currently designated as an ACEC, would have additional protections for GRSG habitats from renewable and non-renewable energy development and associated ROWs.

In UT PHMA would increase by 54,000 acres (3%) and 507,000 acres (31%), under the proposed RMP Amendment compared to the plan currently being implemented (Alternative 1) and the draft preferred alternative (Alternative 5), respectively. These changes would result in an increase in protections associated with PHMA. GHMA in UT would increase by 207,000 acres (47%) compared with Alternative 1, with impacts being the increase in associated protections. Compared with Alternative 5, the Proposed RMP Amendment would manage 1,000 fewer acres (less than 1%) of GHMA, resulting in a slight decrease in associated protections. There would be no PHMA with limited exceptions identified in UT as the primary threats addressed with that designation do not occur within PHMA in UT.

Renewable Energy Management

Rangewide Environmental Consequences

Managing PHMA as exclusion for utility scale renewable energy (wind, solar) development and testing in the Proposed Amendment would provide protections for GRSG from these uses, similar to those as described for Alternative 1, and more restrictive than the avoidance criteria described in Alternative 5. In areas of PHMA with limited exceptions there would be no exceptions to these exclusions, providing additional protections to GRSG habitats. GHMA would be open, but the requirement for minimization measures and mitigation in the Proposed Alternative would provide more protections for GRSG and their habitats. Associated ROWs would be managed as exclusion for wind and solar energy development, offering greater protections for GRSG than identified under either Alternatives 1 and 5.

State-Specific Environmental Consequences

In OR PHMA is buffered by 0.5 miles to avoid potential indirect impacts from disturbance in adjacent non-habitats. GHMA is avoidance for both utility scale wind and solar, with specific criteria or co-location requirements to minimize direct and indirect disturbances associated with development. These requirements will increase protections for GRSG.

In GHMA would be avoidance in CO, OR, and NV/CA, increasing protection for GRSG. MT would also be avoidance in GHMA, and exclusion within 2 miles of active leks, crucial GRSG winter habitats and UMRBNM, protecting more habitat. UT would be avoidance within connectivity areas, conserving those corridors. ID and WY would be open, and ID would apply RDFs, lek buffers and mitigation. WY would apply state specific minimization measures from Alternatives 1 and 2, resulting in similar protections.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Rangewide Environmental Consequences

Under the Proposed RMP Amendment, impacts to PHMA GRSG habitats would be similar to those described for Alternative 5 for saleables, locatables, and fluid mineral objectives and allocations. In addition, management of PHMA with limited exceptions would be as NSO with no waivers, exceptions and modifications; closed to saleable minerals with fewer exceptions for new free use permits and expansion of existing pits; and closed to nonenergy leasables without expansions, would provide further protections for GRSG in these areas. Fluid mineral management direction under the Proposed RMP Amendment will be working with project proponents to promote measurable conservation objectives that reduce habitat loss and fragmentation. These approaches would reduce the risk of habitat degradation and fragmentation in PHMA, offering stronger protections compared to Alternative 1 (current plan). GHMA would be open rangewide, but with the state variations as noted below. Locatable mineral leasing would be open unless currently withdrawn in accordance with the Mining Law of 1872.

State-Specific Environmental Consequences

Fluid Minerals Allocation and Management Directions:

Exceptions in PHMA vary in CO, WY, MT/DK, OR, and NV/CA. For areas already leased, WY allows for exceptions to NSO within 0.6 miles if the development will not impact GRSG habitats and GRSG behavior. MT would not allow exceptions within 0.6 miles of an active lek, and CO would extend the NSO to 1.0 mile protecting these breeding habitats. In ID, OR, and NV/CA the exceptions would apply to areas beyond 3.1 miles of active leks. These state variations would accommodate ecological and topographical differences and would have similar impacts to those analyzed under Alternative 5.

The oil and gas lease stipulations summarized in **Appendix 2** would be applied in MT/DK; these stipulations would reduce the potential for impacts associated with fluid mineral leasing as described in in Nature and Types of Effects. Applying a 5% disturbance cap at the project scale in MT/DK and WY, and a 3% disturbance cap at the HAF fine scale area would limit disturbance to local populations, although it could allow for more potential fluid mineral development rangewide, increasing disturbance and habitat alterations, including fragmentation. Impacts from the disturbance cap would be similar to those described under Alternative 5 but may be less than the current plan (Alternative 1) since the larger scale at which disturbance was monitored did not consider actual location of GRSG habitat use. Compensatory mitigation must be in place when an exception is granted, as described under Alternative 4. To grant an activity based on compensatory mitigation in Colorado, the compensation project must be planned, funded, and approved in coordination with the State of Colorado. Impacts from the NSO in WY would be the same as described for Alternative 5, meaning similar protections would apply.

Impacts from consistency in stipulations in MT/DK HMAs and from closing the Upper Missouri River Breaks National Monument to fluid mineral leasing and development would be the same as those described for Alternative 3. This means that closing PHMA to fluid mineral leasing, saleable minerals, and nonenergy minerals would reduce potential impacts to GRSG and habitat more than under Alternative 1, protecting habitat from surface-disturbing activities and associated fragmentation, though valid, existing leases may still be developed.

In GHMA OR would retain a NSO designation, and UT would be NSO near leks and apply seasonal limitations. MT/DK would apply a NSO within 0.6 miles of active leks and crucial winter GRSG ranges, and UMRBNM would be closed. WY would apply NSO within 0.25 miles of active leks (this would also apply in

SHMA). CO and NV/CA would apply CSUs and seasonal limitations around leks. These state specific variations accommodate ecological and topographical differences and would provide additional protections when compared to Alternative 1 and are similar to those analyzed in Alternative 5.

Salaeable Minerals:
In PHMA OR, MT/DK and WY would be open for new free use permits if the BLM can verify the area proposed for development is not habitat and would not adversely impact any adjoining GRSG habitat. IHMA in ID would be open as would SHMA in WY. The impacts would be similar to Alternative 5.

In ID PHMA, the exception for new saleable mineral free use permits or expansion of existing permits would be less restrictive than Alternative 5, which may allow for greater impacts on GRSG and habitat. Lek buffers would be reduced in IHMA and further reduced in GHMA, resulting in similar effects to those described for Minerals Management under Alternative 1.

Nonenergy Leasable Minerals:
In WY expansion of existing operations would be permitted but subject to CSUs and TL to minimize disturbance to GRSG. In PHMA with limited exceptions WY would be closed except in cases of human health and safety. NV/CA allows project level considerations that demonstrate no impact to GRSG in PHMA. In CO, PHMA would have TL for construction, drilling or completions within 4 miles from occupied leks from March 1 to July 15 to conserve breeding birds and habitats. GHMA (and SHMA in WY) is open but state-specific minimization measures would be applied to conserve GRSG and their habitats. The addition of the state-specific minimization measures would reduce potential impacts to GRSG in GHMA, but would not remove them potentially resulting in loss and fragmentation of GRSG habitats.

Lands and Realty Management

Rangewide Environmental Consequences

Under the Proposed RMP Amendment, PHMA would be managed as avoidance with some exceptions for major and minor ROWs. This is similar to the protections described under Alternative 1. PHMA with limited exceptions is exclusion for major ROWs but can be considered within RMP designated corridors when the ROW is not "viable" in areas designated as open with restrictions and compensatory mitigation, similar to Alternative 3. Such management would decrease potential impacts from ROW development by excluding new ROW authorizations in PHMA. However, ROW routes, if made longer to bypass the PHMA exclusions, might increase surface disturbance, albeit outside PHMA.

GHMA would be open for major and minor ROWs but with applicable state minimization measures from 2015 and 2019, and compensatory mitigation to maintain habitats consistent with state agency designations (e.g., restoration, connectivity) and to preclude negative impacts to any adjacent PHMA. Impacts would be similar to those in the current plan (Alternative 1) and Alternative 2, but additional state-specific requirements outlined below would provide additional protections to GRSG.

State-Specific Environmental Consequences

In Colorado, GHMA would be avoidance for both major and minor rights-of-way to preclude negative impacts to PHMA, but open in designated corridors. Impacts would be the same as those described under Alternative 4. Compared with the current plan (Alternative 1), this would include increased restrictions on ROW development in GHMA areas, enhancing GRSG protection during critical life stages, but with the potential for higher costs or delays for ROW projects due to additional timing limitations and review processes.

In Idaho, PHMA management (avoidance) would be more restrictive than impacts analyzed under Alternative 5 due to the management direction that restricts anthropogenic development, and would be consistent with the 2021 Idaho Sage-grouse Plan (State of Idaho 2021). IHMA would be also avoidance for major rights-of-way with RDFs, lek buffers and mitigation for both major and minor rights-of-way with similar impacts. GHMA would be open with RFDs, buffers and mitigation for both major and minor rights-of-ways. Although impacts would be higher in GHMA, the state restrictions will reduce habitat losses.

MT would be exclusion for rights-of-ways in PHMA within 0.6 mi of active leks and crucial winter range, providing additional protection for those GRSG habitats and with similar impacts as described in Alternative 5. Projects would be considered if resulting impacts were neutral or beneficial for GRSG (also true for GHMA, LMHMA, SCHMA, and CHMA). In PHMA with limited exceptions no exceptions would be considered within 0.6 mi of active leks and crucial winter range, providing increased protection to these habitats. GHMA would be avoidance for minor rights-of-ways within 1.2 mi of leks and within crucial winter range, open with mitigation elsewhere.

In OR no new major rights-of-ways would be allowed in PHMA within breeding and nesting habitats and other limiting/high value seasonal habitats, which is more protective than described in Alternative 5. No major rights-of-ways would be permitted in GHMA within 0.5 mi of PHMA and would be avoidance within breeding, nesting, and limiting habitats, open with minimization and mitigation elsewhere. Although impacts would be higher in GHMA, the state restrictions will reduce habitat losses.

GHMA and SHMA would be open for major rights-of-ways in WY with state minimization measure and compensatory mitigation to maintain GRSG habitats and protect PHMA. No mitigation would be required for minor rights-of-ways in GHMA and SHMA. The potential impacts would be the same as considered in the current plan (Alternative 1). In UT, GHMA would be avoidance in connectivity areas but could be considered if a proposed project can document no negative impacts to PHMA or important seasonal habitats in GHMA.

Travel and Transportation Management

The Proposed RMP Amendment would change acres that that are closed to OHV use. While there would be changes in open and limited acres resulting from changes in PHMA (see **Section 4.20**), these changes would not result in substantial changes in effects on GRSG.

Livestock Grazing Management

Rangewide Environmental Consequences

Impacts from livestock and grazing management under the Proposed RMP Amendment would be the same as those described under Alternative 4 and would focus on managing livestock to meet Land Health Standards for Special Status Species (including GRSG). Direct impacts to GRSG from livestock range improvements would also be avoided. Managing to Land Health Standards would focus on maintaining robust and impact sagebrush habitats which would benefit GRSG. Additionally, existing range improvement projects for managing livestock would be reviewed during renewal processes to identify and possibly modify those that negatively impact GRSG and GRSG habitats. Current grazing allotments and permit levels would be maintained, but adjustments to active AUMs, and timing, intensity, duration, and frequency of grazing would be considered as needed to ensure meeting Land Health Standards. Mitigation measures such as adjusting grazing practices to avoid key GRSG habitats during critical periods would be implemented, remaining consistent with the provisions outlined under Alternative 5. In GHMA (and SHMA in WY) existing livestock

management range improvements would not be evaluated during the grazing authorization process as they would be in PHMA, potentially retaining improvements that negatively impact GRSG or associated habitats.

State-Specific Environmental Consequences

In Oregon some key Research Natural Areas may be open to grazing which would increase the amount of grazing in some GRSG habitats. Those areas would still be managed to meet Land Health Standards. In some key Research Natural Areas closed to grazing authorizations water-related range improvements may be considered to ensure water availability. In ID, IHMA would have the same management as described above in PHMA.

Wild Horse and Burro Management

Impacts to habitat from wild horse and burro management under the Proposed RMP Amendment would be similar as those described under Alternatives 2 and 5, except AML levels would be focused on achieving or maintaining Land Health Standards (vs. specific GRSG habitat objectives). Managing to Land Health Standards would focus on maintaining robust and imtact sagebrush habitats which would benefit GRSG as well as other sagebrush-associated species. The impact of these management differences for GRSG would likely be negligible. The same population control measures, such as increased removals and fertility control programs, would be implemented to manage wild horse and burro populations. Consequently, the effects on habitat use and competition with GRSG would be consistent with those outlined under Alternative 5.

State-Specific Environmental Consequences

In WY, wild horse gathers would not be prioritized in PHMA, which would potentially maintain any negative impacts to GRSG if range conditions are not meeting or making progress towards meeting Land Health Standards as the result of wild horses in those areas.

Predation Management

Impacts from reducing opportunities for predators would be similar to those described for Alternative 3. The requirement for some project proponents to develop a proactive predator management plan for proposed projects in PHMA under the Proposed RMP Amendment would potentially reduce habitat loss and fragmentation and artificial predator food subsidies – primary contributors to increasing predators in GRSG habitats. These requirements would conserve GRSG habitats and reduce the influx of predator numbers, providing increased protection for GRSG than the current plan (Alternative 1). The BLM would also focus on conserving intact GRSG habitats to maintain predation at natural levels would be applied, and will work with predator control agencies (federal, state and local) as needed to address predation concerns.

State-Specific Environmental Consequences

NV will continue implementing their state GRSG conservation plan which addresses management to reduce predation on GRSG. ID will require a predator management plan in IHMA and NV/CA and OR will require a predator management plan in GHMA, extending those benefits across the range of the species in those states.

ACEC Designation

The Proposed RMP Amendment would not result in any impacts from ACEC designation since it does not propose designation of any new ACECs or include management for ACECs.

Travel and Transportation

None of the action alternatives, including the Proposed RMP Amendment, propose changes to the existing 2015 GRSG travel and transportation allocations or management direction. Therefore, under all alternatives,

in PHMA and GHMA, OHV travel is limited to existing routes and no cross-country travel is allowed. The changing HMA allocations occurring across the alternatives could, however, result in changes to areas moving from open to cross country travel to limited to existing routes due to areas moving from non-habitat to either PHMA or GHMA and, conversely, areas could move from limited to open if previously identified habitat (GHMA or PHMA) is no longer identified as habitat and the areas are not otherwise limited or closed under an existing RMP decision. Under all alternatives and the Proposed RMP Amendment, there are no changes in acres of OHV allocations due to changes in HMA allocations in Colorado, Idaho, Montana/Dakotas, or Wyoming (refer to **Table 4-4** in **Appendix 9**).

In Nevada/California there is an increase in open areas when compared with the existing condition under Alternative 1 in all alternatives except Alternative 3, where there is a decrease in open areas (refer to **Table 4-5** in **Appendix 9**). The increase in open areas is greatest under Alternative 4. Alternatives 5, 6, and the Proposed RMP Amendment all increase open areas by approximately two million acres (refer to **Table 4-5** in **Appendix 9**). Although this increase in open areas could cause negative impacts to vegetation and soils and other wildlife; because these areas are now open. The fact that they would move to open means they are not identified as habitat and so there are no anticipated direct effects to GRSG or GRSG habitat by this increase in open areas and corresponding decrease in areas that are limited to existing routes. There could, however, be indirect effects to nearby habitat from potential increases in areas open to cross-country use.

In Oregon, there is decrease in open areas and corresponding increase in limited areas from the existing acres in Alternative 1 in all of the alternatives except Alternative 2 (refer to **Table 4-6** in **Appendix 9**). The largest decrease in open areas occurs under Alternatives 5, 6, and the Proposed RMP Amendment with approximately 600,000 fewer acres identified as open. Under 4 and 5, there are approximately 500,000 fewer acres allocated as open. These decreases in open areas in what is identified as habitat under alternatives 3, 4, 5, 6, and the Proposed RMP Amendment would reduce impacts from cross country OHV use to GRSG and GRSG habitat from the potential noise and disturbance effects from cross-country travel.

In Utah, like Oregon, there is a decrease in the amount of OHV areas that are open and a corresponding increase in areas that are limited as a result of changes in HMA allocations. The decrease in open areas is greatest under Alternative 3 followed by Alternative 4, and the Proposed RMP Amendment (refer to **Table 4-7** in **Appendix 9**). These reductions in areas open to cross country OHV use would reduce negative impacts from noise and disturbance to GRSG and GRSG habitat.

Management Directions (Habitat Management Objectives, Mitigation, Disturbance Caps, and Adaptive Management).

Habitat Management Objectives

Similar to Alternative 5, the Proposed RMP Amendment would manage GRSG habitats at multiple scales to ensure connected mosaics of sagebrush and associated communities to provide for all seasonal habitat needs, dispersal and migration. The HAF would be used, along with other available data such as ESDs, to assess habitat suitability, and identify areas for habitat improvement. Habitat management objectives was analyzed under Maintaining and improving suitable seasonal habitats at multiple scales will benefit GRSG conservation.

Mitigation

As was analyzed under Alternative 5 the BLM would emphasize avoidance and minimization of habitat loss given the challenges with restoring sagebrush habitats that support GRSG populations. Where impacts remain following application of avoidance and minimization measures compensatory mitigation to achieve no net habitat loss, as well as addressing indirect impacts would be applied. A no net habitat loss will require

full restoration of functional GRSG habitats or enhancement of habitats such that the habitat can support the number of GRSG present prior to the disturbance. Where a State has a higher requirement for compensatory mitigation the BLM would comply with that requirement. Compensatory mitigation would be prioritized in the location to be affected to reduce potential for population loss and range contraction. Compensatory mitigation should be completed prior to initiating the activity, with monitoring for durability and efficacy. Mitigation will conserve GRSG habitats by preventing or minimizing losses and replacing impacted habitats to a level that conserves GRSG population numbers.

State-Specific Mitigation Requirements

In CO compensatory mitigation would first be conducted in PHMA and within the same CO Management Zone where the impact was realized. If those criteria cannot be met, compensatory mitigation would be considered within other GRSG populations in consultation with the State of Colorado.

For LMHMA in North Dakota, a MOU or restoration plan would be developed with partners and adjacent states (MT and SD) to establish a cooperative approach for mitigation. In OR, BLM would authorize mitigation in conformance with the State of Oregon mitigation policy, requiring mitigation when development exceeds 5 acres.

Disturbance Caps

For all states except WY and MT, a 3% disturbance cap for proposed and existing infrastructure would be applied in PHMA (and IHMA in ID) at both the project and HAF fine-scale. Loss of habitat from wildfire and agriculture would be addressed through the sagebrush availability objective included by all states, as well as the habitat objectives. The impacts would be similar to those analyzed for Alternative 5, with the addition of requiring compensatory mitigation to be in place before any exception to the disturbance cap is granted, as analyzed for Alternative 4. Minimizing disturbance from anthropogenic infrastructure projects reduces GRSG habitat loss and displacement in PHMA. Disturbance caps would not apply in GHMA.

State-Specific Environmental Consequences

In CO, disturbance caps would be calculated at state Management Zone population scales. Exceptions to the disturbance cap may be granted in NV if the project is in compliance with the NV GRSG Conservation Plan and the states regulatory Conservation Credit System.

In addition to the rangewide management direction OR would implement an additional limit of no more than a 1% increase per decade within Oregon priority areas of conservation.

In WY and MT a 5% disturbance cap would be applied at the project scale. WY would use their Disturbance Density Calculation Tool to calculate disturbance, and unlike other states would consider habitat losses due to wildfire and agriculture in their calculations. This is similar to the current plan (Alternative 1). The disturbance cap would not apply in LMHMA and SCHMA in MT, but project proponents would need to submit the information for BLM consideration for future recommendations.

Adaptive Management

Adaptive management is designed to address unanticipated negative impacts to GRSG and their habitats from changes in habitat conditions before consequences become severe or irreversible. The BLM would implement the adaptive management strategy for both habitat and population anomalies identified at the HAF fine-scale level, as well as by State wildlife agencies, as analyzed under Alternatives 3 – 6 for PHMA, GHMA, SHMA (WY) and IHMA (ID). Addressing habitat concerns, as indicated by any threshold identified

through proposed adaptive management processes would provide additional conservation for GRSG habitats if the identified causal factor can be addressed before it becomes irreversible.

4.2.3 Cumulative Effects

The following two factors would apply for all resources and resource uses discussed below. First, GRSG state plans affect most resources and resource uses and must be considered in the cumulative effects analysis for the BLM Proposed RMP Amendment and alternatives. While 10 of the 11 States in the GRSG range have updated their State plans to conserve the species by incorporating new information, not all of these plans have been implemented or are regulatory in scope. Specifically, the regulatory conservation actions mandated by the State plans in WY, MT, OR, and NV provide the greatest degree of regulatory certainty in addressing potential threats to GRSG. Required mitigation in NV is through the Conservation Credit System (CCS) managed by the State of Nevada Sagebrush Ecosystem Program. The goal of the CCS is to generate a net benefit of greater sage-grouse habitat on public lands, but it may be adapted to support the ongoing preservation, enhancement, and restoration of NV sagebrush ecosystems. The regulatory plans may reduce or increase restrictions on resource uses in planning areas that would protect or limit impacts on natural and cultural resources and Tribal interests. For instance, regulatory plans could add to the potential complications and costs of large projects that span multiple states, such as transmission lines, pipelines, and fiber optics or in areas where the federal plan is inconsistent with the state plan.

The remaining State plans are voluntary in nature and do not meet a level of certainty for implementation and effectiveness; they may result in implementation of more compensatory mitigation than if no State plan existed, which could still provide long-term benefits to natural and cultural resources and Tribal interests. However, these voluntary state plans do have measurable goals and objectives for habitat and population management across the state.

Secondly, as described further in **Section 4.21.8** and **Appendix 12**, decisions made based on the BLM's ongoing Solar PEIS revision may change the availability of lands for solar energy development outside of GRSG habitat. Within the cumulative impacts study area but outside of GRSG habitat, natural and cultural resources, Tribal interests, and resource uses could be impacted by solar development, though the extent of such impacts could be limited by other exclusion criteria or design features imposed by the Solar PEIS. This analysis of cumulative effects discloses the short and long-term effects on GRSG and its habitat from implementing each RMPA/EIS alternative, in conjunction with other past, present, and reasonably foreseeable actions, such as implementation of the state plans referenced above. The cumulative effects analysis area for GRSG is the same as the planning area, which encompasses the entirety of the GRSG current range. The temporal scale of the analysis is the anticipated lifetime of the Proposed RMPA/Final EIS, i.e., 20 years.

The past, present, and reasonably foreseeable actions that, individually and together, affect GRSG are summarized in **Appendix 14, Table 14-1**. These include the ongoing and reasonably foreseeable actions across the entire range for GRSG, which are separated by state. However, the cumulative impacts analysis for the BLM Proposed RMP Amendment and alternatives considers multiple geographic scales, including the appropriate HAF groupings, which have biological significance to GRSG. Fine scale HAFs represent an individual's home range and are determined in part by the quality and juxtaposition of resources within and between seasonal habitats (Stiver et al. 2015).

The impacts of the BLM-authorized activities set forth in the EIS alternatives would add, cumulatively, to the impacts of these actions where they within GRSG habitat. The actions in **Appendix 14, Table 14-1** can broadly be characterized as regional and state land use and conservation plans; resource uses and projects

such as energy development and grazing; wildfire, fuels, and vegetation/habitat management. The types of cumulative impacts that can occur from these activities are discussed in the sections below.

Regional and State Land Use and Conservation Plans

Regional efforts to manage threats to GRSG include land use/resource management plans and amendments conducted by the BLM, Forest Service, and by other federal and/or in cooperation with non-federal agencies, organizations, landowners, or other groups. The National Resources Conservation Service partners with private agricultural lands for the Working Lands for Wildlife to conserve habitat while keeping working lands. The Sage-Grouse Initiative is a part of the and targets conservation efforts where the returns are highest by targeting threats to the bird. At the state level, each state considered in the GRSG range has developed a GRSG conservation plan with a suite of management actions that aim to conserve GRSG habitat and populations across all land ownerships. In their 2015 determination not to list the GRSG as threatened under the ESA, the USFWS cited regulatory mechanisms provided by federal and the three existing state plans at that time, as having substantially reduced threats to the species in approximately 90% of the breeding habitat through avoidance and minimization measures (USFWS).

Plans developed by States for GRSG vary widely in the nature of the protective measures, but generally establish goals and objectives to maintain and increase GRSG populations statewide, and maintain, protect and increase GRSG seasonal habitats. They also generally include stipulations and guidelines, for leases, permits, and easements on state lands and conservation measures for activities such as oil and gas and locatable mineral development and wildfire prevention or suppression.

Mineral Development

Mineral leasing, exploration, and development occur throughout the planning area. These include activities associated with fluid minerals (oil, gas, and geothermal), locatable minerals, leasable minerals, and mineral materials. The types of impacts on GRSG and their habitats that could occur from these mineral developments are described in **Section 4.2**, and generally relate to surface and subsurface disturbance from exploration and development actions and infrastructure. These activities may contribute to fragmentation, removal or alteration of habitat, changes in GRSG use patterns, changes in GRSG demographics (e.g., nest survival, recruitment, and population growth), and an increase in invasive plant introduction and spread. Past, present, and reasonably foreseeable development related to fluid minerals in the planning area are included in the Reasonably Foreseeable Developments (RFDs) for those resources (see **Appendix 12** and **Appendix 14**). In addition, consideration of the proposed withdrawal of SFAs is underway in a process separate from this land use planning initiative; if the Secretary withdraws the land as proposed, the effects would be similar to those described under Alternative 1 for locatable minerals. The acres of HMAs subject to energy and mineral decisions within each HAF group are presented in **Appendix 14**.

Lands and Realty, including Renewable Energy Development

Effects on GRSG and its habitat from roads and ROWs have occurred throughout the planning area and are expected to continue to occur (**Table 14-1**). The likelihood for development would increase following the development of large-scale utility corridors. The types of impacts on GRSG and their habitats that could occur from lands and realty and solar and other renewable energy development are described in **Chapter 4**. Increasing development and population growth have increased demand and construction of transmission lines and roads within the planning area which fragments habitat and increases the risk of collision, predation, and mortality of GRSG. Road use is also a source of spread for invasive annual grasses which degrade GRSG habitats and increase wildfire frequency. This trend is expected to continue. In addition to the direct impacts on GRSG habitat, lands and realty decisions can influence adjacent and nonfederal lands by extending habitat

fragmentation beyond the immediate project area. This can exacerbate cumulative impacts on GRSG populations by increasing human activity, reducing contiguous habitat, and heightening the spread of invasive species. These cumulative effects, when combined with other development pressures, further contribute to the degradation of habitat and ecosystem resilience.

Livestock Grazing

The BLM and other land management agencies authorize livestock grazing in accordance with their regulations (43 CFR Part 4100 for the BLM) and agency policies and guidance. Where lands are available for livestock grazing, BLM field offices will continue to administer grazing authorizations in conformance with the Taylor Grazing Act (TGA), FLPMA and other applicable laws. Land management agencies will authorize structural and nonstructural range improvements, and agencies like the NRCS and state agricultural departments will continue to work with private landowners to conduct projects on private rangelands. Several GRSG Candidate Conservation Agreements with Assurances (CCAA) have been initiated. These are voluntary agreements between the USFWS and landowners whereby landowners agree to manage their lands to remove or reduce threats to GRSG will help contribute to the long-term persistence of GRSG by helping to maintain intact habitats and implement conservation measures to reduce threats. Impacts to GRSG habitats from grazing on public and private lands would continue to occur as described in **Chapter 4**.

Wild Horses and Burros

Wild horse and burro grazing on BLM lands can impact GRSG habitat. Horse-occupied areas exhibited lower cover of grasses, shrubs, and total vegetative cover, as well as lower species richness at sites, a less contiguous shrub canopy (and lower sagebrush cover), and, at higher elevations only, greater forb cover (Beever 1999; Beever 2003). These effects impact GRSG by causing habitat alteration, such as loss of cover and forage (Coates et al. 2021b). There are approximately 168 wild horse and burro herd management areas across the planning area (15 million acres), and populations are continuing to grow, often exceeding AMLs. As such, impacts to GRSG habitats, such as degradation, will likely increase. Removal, adoption, and fertility control of animals from the range each year will help control herd sizes and lessen impacts to GRSG habitats.

Wildfire, Fuels, and Vegetation/Habitat Management

Wildfires result in the greatest direct loss of GRSG habitat and have been widely distributed in terms of frequency and severity. The spread and prevalence of invasive plant species contribute to increasing wildfire frequency and size. Increasing recurrence and severity of drought conditions have been predicted for much of the planning area as a result of climate change. These trends can contribute to increasing the occurrence, size, and severity of wildfires throughout the planning area. In addition, grazing during drought contributes to the feedback loops that tend to worsen the habitat impacts of drought, both in intensity and duration.

Fuels management and fuel reduction projects have been and continue to be implemented throughout the planning area by the BLM, other federal agencies such as the Forest Service, states, local or regional partnerships, and other groups to assist in wildfire management. These cooperative treatments seek to support and, where possible, improve natural resilience and resistance of sagebrush habitats to invasive plant species and wildfire. Treatments also seek to improve the ability of cooperative firefighting agencies to better suppress wildfires, minimizing the potential size of wildfires and the related acres of habitat burned. Where fuels projects reduce the potential for catastrophic wildfire, they would also reduce potential for GRSG habitat loss and fragmentation. They would also contribute to short-term impacts such a disturbance from use of equipment and habitat alterations.

Likewise, vegetation and habitat management projects for GRSG have occurred throughout the planning area and projects such as hazardous fuels reduction, pinyon-juniper removal, emergency stabilization and rehabilitation, and invasive species control have impacted vegetative cover and structure, which in turn influence wildfire risk and GRSG habitat conditions and availability. These projects have been and continue to be implemented by the BLM and other federal and state land management agencies and private landowners. Vegetation projects will continue throughout the planning area and new projects will be proposed, regardless of decisions made in this Proposed RMP Amendment/Final EIS. Where vegetation and habitat management projects focused on GRSG habitat occur, they would improve habitat for GRSG by improving native plant composition and structure and decrease the risk of habitat avoidance resulting from conifer invasion because trees displace species that are important to GRSG habitat (Manier et al. 2013). They would also reduce the potential for/mitigate the risks of catastrophic wildfire that creates stand replacing impacts or major changes to vegetation seral stages affecting habitat availability and suitability on a long-term basis. Vegetation treatments would contribute to short-term habitat impacts such a disturbance from use of equipment and temporary habitat alterations until desired conditions are achieved.

Travel Management and Recreation

Travel management planning on BLM-administered lands continues throughout the planning area. Travel management planning has been completed or is underway on certain BLM-administered lands to develop travel networks and manage access for all types of resources and resource uses. As demand for each resource use continues to grow, the use of existing routes, demand for new routes, and upgrading of existing routes would be considered in future travel management planning. Use of existing roads and development of new roads in GRSG habitat contributes to GRSG habitat loss, alteration, and fragmentation. Travel management plans typically include seasonal and permanent closures of roads and other mitigation measures reduce impacts to other resources, such as vegetation and wildlife, including GRSG.

Dispersed, organized, and concentrated recreation would continue throughout the planning area with specific management for certain activities per the recreation management allocations and management actions in individual BLM resource management plans. Overall visitation to the BLM-administered lands in the planning area is expected to continue to increase; however, the number of visitors would vary by season, year, location, and type of activity. Where roads, trails, and recreation occur in GRSG habitat it would contribute to disturbance, habitat alterations and fragmentation, and potential for injury or mortality from vehicle collisions.

Comparison of Alternatives

Consistent with multiple use management, each alternative would allow for some land use activities, including energy and mineral resource development, lands and realty, renewable energy development, grazing, recreation activities, and travel and trails. These land uses will have varying cumulative impacts of habitat loss and degradation and behavioral disturbance of individuals. The cumulative contribution of each alternative would vary due to differences in habitat designations, stipulations, management actions, and protections that would influence the type, extent, and magnitude of allowable activities within GRSG habitats.

Under Alternative 1, GRSG habitat would be separated into SFAs, PHMAs, IHMAs, and GHMAs (**Table 2-3**). Restrictions to land use and surface-disturbing activities would occur within each HMA and SFA, depending on the classification. Restrictions on development, such as stipulations and avoidance/exclusion areas would be applied within HMAs and would limit impacts to GRSG habitats. Under Alternative 1, the BLM would manage lands to conserve, enhance and restore GRSG habitat and the sagebrush ecosystem upon which GRSG populations depend. The BLM would incorporate adaptive

management, mitigation, disturbance caps, buffers, habitat objectives, and monitoring. Including 3% disturbance caps at both project and biologically significant unit (BSU) scales for most states would reduce disturbance on both the local and landscape scales, therefore, provide protection for both the larger population and individual leks and their surrounding habitat. In MT/DAK and WY, a 5% disturbance cap would apply to land use activities; this would increase potential for habitat loss and alterations as well as direct disturbance to GRSG above those of 3%. Because the 5% cap would include wildfire and agricultural conversion in the calculation, there would be potential for added protection from impacts to habitats other than anthropogenic development (in contrast to considering only anthropogenic disturbance in the calculation).

Under Alternative 2, the contribution to cumulative impacts from designating HMAs and incorporating adaptive management, mitigation, disturbance caps, buffers, habitat objectives, and monitoring would be similar to Alternative 1 (**Table 2-3**). Alternative 2 would remove SFAs in some states, which would reduce protections to GRSG and habitat. It would also include more areas open to fluid mineral leasing. Fewer restrictions may result in greater impacts to GRSG habitats.

Under Alternative 3, the BLM would manage all HMAs as PHMA (**Table 2-3**). Management actions for PHMA, such as lek buffers and required design features would be more restrictive and designed to promote GRSG conservation to a greater extent than in previously designated GHMA. Therefore, managing previously designated GHMA as PHMA would minimize potential impacts to GRSG habitats to a greater extent than if they remained managed as GHMA. Expanding PHMA in some states to include areas of adjacent non-habitat, unoccupied historic habitat, or areas with potential to become habitat as PHMA would also decrease potential for disturbance to birds and habitat alterations because management restrictions associated with PHMA would occur over a larger area. Applying a 3% disturbance cap at the project scale and within HAF fine scale habitat selection area would include protection for both the larger population and individual leks and their surrounding habitat. Including no disturbance cap exceptions and wildfire and agriculture as part of the overall disturbance cap would also result in a lower level of disturbance overall, particularly since wildfire was the cause of the majority of habitat loss between 2012 and 2018 (Herren et al. 2021). Closing PHMA in all states to fluid mineral leasing, saleable minerals, and nonenergy minerals would protect GRSG habitat from surface-disturbing activities as well as subsurface activities (e.g., directional drilling), maintain connectivity between leks, and not contribute to fragmentation. These restrictions would decrease the acres available for development and the potential for impacts to GRSG and their habitats associated with surface disturbing activities in PHMA to a greater extent than under Alternatives 1 and 2. Additionally, this alternative would require all states that have PHMA to restrict livestock grazing and place developments outside of the PHMA boundaries. The additional fencing that could be needed to separate public from private lands would increase the potential for increased GRSG collision rates and habitat alterations. Fencing is a potential cause of direct mortality to GRSG by acting as potential movement barriers, predator perches, or travel corridors (Manier et al. 2013). GRSG collision rates with fencing generally increases with low visibility fencing and decreases in areas of greater topographic relief (Manier et al. 2013). Exclusion of grazing on BLM-administered lands may intensify grazing use on private lands, which could degrade GRSG habitat in those areas. Managing PHMA as unavailable for grazing could promote rural subdivisions and thus habitat loss in areas where livestock operators are not able to continue their operations solely on private lands.

Under Alternative 4, leasing would be permitted in HMAs, which would increase the HMA acres affected and potential for cumulative impacts to GRSG, including disturbance and habitat loss and alterations. Applying a 3% disturbance cap at the project scale and within HAF fine scale habitat selection area would limit potential

for overall disturbance and habitat alterations, including fragmentation, and would provide protection for both the larger population and individual leks and their surrounding habitat. Including exceptions to the cap and excluding wildfire and agriculture from the calculation would result in an overall greater contribution to cumulative impacts to GRSG habitat compared with Alternative 3. The potential for developments in PHMA and GHMA is underdetermined at the time of this analysis and would likely vary by state. Therefore, cumulative impacts on GRSG habitats from mineral resource development, renewable energy development, ROW development, and travel development is unknown in this analysis, but the 3% disturbance cap would limit the overall disturbance level as described above. Both Alternatives 4 and 5 would include compensatory mitigation that would meet the requirements set by the state wildlife agency or appropriate authority. This would reduce impacts on GRSG habitats but to a lesser degree than Alternative 3. Impacts associated with certain uses, such as livestock grazing or wild horses and burros, would not be subject to compensatory mitigation requirements but would be addressed through compliance with laws, regulations, and policies, such as 43 CFR 4180 for livestock grazing. Further, adaptive management under Alternatives 4 and 5 may result in more favorable outcomes for GRSG because the approach would be coordinated at ecological rather than geopolitical boundaries.

Under Alternative 5, cumulative impacts from permitting leasing in HMAs and applying a 3% disturbance cap (including exceptions to the cap and excluding wildfire and agriculture from the calculation) at the project scale and within HAF fine scale habitat selection area in most states would be similar as to those described for Alternative 4 but would occur over a smaller area given the lower acreage of PHMA under Alternative 5. Cumulative impacts from applying a 5% disturbance cap at the project scale in WY and MT/DAK would be similar to those described for Alternative 1. Habitat impacts from development in PHMA and GHMA as well as from compensatory mitigation would be the same as described for Alternative 4.

Impacts under Alternative 6 would be similar to impacts under Alternatives 4 and 5 except for the designation of ACECs, which may offer additional protection within them.

Under the Proposed RMP Amendment, cumulative impacts from designating GRSG habitat as HMAs would be more restrictive than those described for Alternative 5 and more similar to components of Alternative 3 and Alternative 1. However, unlike under Alternative 1, the HMA areas in the Proposed RMP Amendment are based on updated science and data and more accurately reflect the location of GRSG habitat and, therefore, the HMA areas under the Proposed RMP Amendment would provide more protection to GRSG and GRSG habitat. Cumulative impacts from managing SHMA in WY would be the same as those described under Alternative 5. The designation of Unique HMAs (Little Missouri HMA, South Carter HMA, and Connectivity HMA) in MT would provide greater protections for greater sage-grouse due to the emphasis on improving sagebrush communities and increasing habitat availability for the species—resulting in fewer cumulative impacts than those described under Alternative 5. Cumulative impacts from development in PHMA would be less than those described under Alternative 5 as a result of the higher levels of protection provided by making PHMA exclusion to solar and wind development, reducing the number of exclusions allowed for major rights of way, and making fluid mineral development NSO in PHMA with waivers, exceptions, and modifications. Under the Proposed RMP Amendment, the identification of areas within PHMA (PHMA with limited exceptions) increases protection of GRSG habitat by making the areas exclusion to solar and wind development and NSO with no exceptions. These areas would also be exclusion to major rights of way with limited exceptions to that exclusion. Additionally, the BLM would work with the State of Nevada to incorporate recommended fire and vegetation management from the state. Implementation of management directions (habitat objectives, disturbance caps, adaptive management and mitigation) would reduce impacts from any disturbance to GRSG and their habitats.

4.3 VEGETATION

4.3.1 Nature and Type of Effects

Greater Sage-Grouse Management

GRSG management plans incorporate objectives for maintaining, improving, or restoring vegetation communities, particularly sagebrush and riparian and wetland habitats. In the 2015 GRSG plans there is consistently applied management across all LUPs to preserve and improve vegetation communities. However, anthropogenic disturbances, such as road construction, mineral resource development, and ROW development, would continue. This could influence impacts on vegetation, including removal, fragmentation of vegetation communities, loss of pollinator habitat, and conversion of areas to an earlier seral stage, which could change vegetation community succession and reduce the extent of native plant communities. Remaining vegetation could have reduced vigor or productivity due to mechanical damage, soil compaction, and dust. Soil compaction would inhibit natural revegetation in areas without active reclamation efforts and would reduce plant vigor, making plants more susceptible to disease, drought, or insect attack. Expansion of conifer woodlands, especially pinyon (*Pinus* spp.) and juniper (*Juniperus* spp.), is also associated with increased bare ground and increased erosion potential (Manier et al. 2013). Pinyon-juniper expansion presents a threat to GRSG as it doesn't provide suitable habitat, and mature trees displace shrubs, grasses, and forbs through direct competition for resources. Additionally, fire suppression has significantly contributed to the expansion of pinyon and juniper. The absence of natural fire regimes allows these species to encroach and establish more extensively, as fires historically played a crucial role in maintaining open habitats and controlling tree density.

Disturbance caps would influence the allowable level of disturbance within a GRSG HMA, and these would vary by alternative. In general, a lower level of allowable disturbance would have fewer impacts to vegetation including reduced sagebrush or riparian vegetation fragmentation and reduced vectors for noxious weed or invasive species introduction or spread.

An adaptive management approach is included in the event that habitat or populations continue to decline. In the event a threshold is met, more restrictive measures could be applied. This would help to ensure that actions are taken to limit impacts to habitat (and by proxy, vegetation) in an appropriate time frame to offset impacts.

Minerals Management

Mineral resource development requires construction of roads, well pads, wells, and other infrastructure, and associated noise, traffic, and lights that alter, degrade, and/or entirely displace native ecosystems (Manier et al. 2013). Surface disturbance associated with mineral resource development often removes vegetation, reduces the condition of native vegetation communities and the connectivity of habitat, and encourages the spread of invasive species (NTT 2011). Vegetation removal results in conversion of areas to an earlier seral stage, which could change vegetation community succession and reduce desired plant communities. The remaining vegetation could have reduced vigor or productivity due to mechanical damage, soil compaction, and dust. Habitat impacts would not occur in areas closed to mineral resource leasing or development.

Lands and Realty Management

Permitted activities, such as construction of utility ROWs, involve vegetation removal, which reduces the condition of native vegetation communities and individual native plant species, alters age class distribution, reduces connectivity, and encourages the spread of invasive species. Construction activities could compact soils, which would inhibit natural revegetation in areas without active reclamation efforts and would reduce

plant vigor, which would make plants more susceptible to disease, drought, or insect attack. In most cases, reclaimed areas would be ripped and seeded during interim or final reclamation (NTT 2011).

Aboveground and underground ROWs, such as transmission lines or pipelines, would temporarily remove vegetation during construction. Vegetation would be permanently removed for construction of surface ROWs, such as roads and reservoirs. Because aboveground and surface ROWs may extend for many miles, vegetation communities could be fragmented and the potential for weeds to be introduced or to spread may increase. Aboveground site-type ROWs, solar energy projects, and wind energy projects would remove vegetation during the life of the project, often lasting several decades, but areas would be reclaimed after the ROW is decommissioned. ROW corridors would concentrate disturbances in one area, which would cause greater impacts to GRSG and their habitats in this one area but may reduce the likelihood of disturbance in other areas.

ROW exclusion areas would protect vegetation from disturbance and removal. In ROW avoidance areas, the permits would be considered on a case-by-case basis. This flexibility may be advantageous where federal, state, Tribal and private land ownership is mixed, as exclusion areas may result in more widespread development outside of BLM administered lands.

Livestock Grazing Management

Livestock grazing can affect soils, vegetation health, species composition, water, and nutrient availability by consuming vegetation, redistributing nutrients and seeds, trampling soils and vegetation, and disrupting microbial systems (Connelly et al. 2004; NTT 2011; Jones 2000). Grazing effects are not distributed evenly because historic practices, management plans and agreements, and animal behavior all lead to differential use of the range (Manier et al. 2013). In addition, some grass species that evolved with grazing pressure from large herbivorous mammals (such as warm season grasses like blue grama (*Bouteloua gracilis*)) may be less affected by livestock grazing compared to species without herbivore-adapted traits (such as cold season grasses like bluebunch wheatgrass (*Agropyron spicatum),* western wheatgrass *(Pascopyrum smithii),* and Idaho fescue (*Festuca idahoensis*)) (Mack and Thompson 1982). Cold season grass species, which evolved with intense herbivory from large ungulates such as bison, elk, and deer, are prominent in the grass understories of sagebrush habitats. Historically, bison roamed in large herds across expansive areas, and these herds likely covered considerable distances, influencing the structure and composition of grass communities. Despite the large size of these herds, even at low densities per acre, bison populations were substantial, influencing the structure and composition of these grass communities. These cold season grasses, which are adapted to this historic grazing pressure, form key vegetation communities in sagebrush habitats across the biome. Livestock often use riparian and wetland areas for water and shade, which could reduce riparian community condition and hydrologic functionality. Properly managed grazing could also assist with desired vegetation objectives, modify vegetation composition, and structure, and reduce litter and fine fuel loading, which could reduce wildfire size and severity (see **Section 4.4**, Wildland Fire Ecology and Management).

While limited, improper grazing can lead to loss of vegetative cover, reduced water infiltration rates, decreased plant litter, increased bare ground, reduced nutrient cycling, decreased water quality, and increased soil erosion (Manier et al. 2013; Jones 2000). Grazing may also confer competitive advantage on pinyons and junipers through the removal of native grasses and forbs, facilitation of tree regeneration by increased shrub cover, and enhanced seed dispersal (Baker 2011). As described in **Appendix 21**, livestock grazing is managed to meet or make progress toward land health standards, thus reducing the likelihood of these effects.

Wild Horse and Burro Management

Wild horses and burros can directly impact forage, vegetation, soil, and water resources within the planning area. Wild horses and burros consume forage in competition with livestock and wildlife and can trample vegetation. Habitat impacts from wild horses and burros are more pronounced when herd populations exceed established AML levels. Across 3.03 million ha of the western Great Basin, horse-occupied sites exhibited lower grass, shrub, and overall plant cover; higher cover of unpalatable forbs and abundance of cheatgrass; 2.2–10.0 times lower densities of ant mounds; and 2.9–17.4 times greater penetration resistance in soil surfaces, compared to sites from which horses had been removed for 10–14 years (Beever and Aldridge 2011). Wild horse and burro use of BLM land is not authorized through the permitting process and is not managed in the same way as domestic livestock grazing. All herd management areas are managed for appropriate management levels (AML). Priorities for gathering excess wild horses and burros to maintain AML are based on population inventories, resource monitoring objectives, gather schedules, and budgets. Implementing management to protect GRSG generally involves reducing or otherwise restricting land uses and activities, such as wild horse and burro populations, that could reduce vegetation and water availability. By managing wild horse and burro populations to meet AML, the potential for those populations to adversely affect vegetation would be reduced. Limiting development to protect GRSG would also support vegetation habitat for wild horses and burros and limit human and surface disturbance. Reducing wild horse and burro populations in GRSG habitat management areas could assist in reducing impacts to vegetation communities in these areas. However, establishing priority for gather operations in PHMA could put herd management areas that do not contain PHMA at risk for overpopulation, with associated negative affect on vegetation communities.

4.3.2 Proposed RMP Amendment

Greater Sage-Grouse Management

Impacts from designating GRSG habitat as HMAs would be similar to those described for Alternative 1 though the BLM would manage approximately 2,056,000 acres (6%) more PHMA and 4,848,000 (18%) fewer acres of GHMA (**Table 2-15**). Compared to the draft preferred alternative (Alternative 5) the BLM would manage approximately 592,000 (2%) more PHMA and 75,000 (less than 1%) fewer acres of GHMA. The increase in PHMA acreage would result in an increase in associated protections to vegetation by limiting certain resource uses, described further below.

The Proposed RMP Amendment could improve more acres of vegetation for GRSG habitat than under Alternative 1 because the delineations of the HMA areas under the Proposed RMP Amendment are based on updated science and data. This information included GRSG habitat persistence (Wann et al., 2022), habitat and genetic connectivity (Cross et al., 2018, Row et al., 2018, Cross et al., 2022, Oyler-McCance et al., 2022), GRSG distribution (Doherty et al., 2016, Coates et al., 2021) and likelihood of sagebrush habitat persistence under changing climatic conditions (Palmquist et al., 2021, Rigge et al., 2021) and, therefore, would be more effective in providing GRSG habitat protections where they are needed and where they will be most effective. The management of 4,213,000 acres of PHMA with limited exceptions would provide additional protections for vegetation from several resource uses as described further below. Impacts from adaptive management would be as described for Alternative 3.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Under the Proposed RMP Amendment, impacts to vegetation would be similar to those described for Alternative 5 for saleables, locatables, and fluid mineral objectives and allocations. Fluid mineral development could be more flexible compared with Alternative 1 due to WEMs, though adherence to the WEM criteria

would ensure no impacts to GRSG or their habitats within 0.6 miles of leks. Additionally, the Proposed RMP Amendment would provide for off-setting effects through compensatory mitigation in PHMA beyond 0.6 miles (except in WY, where the NSO only applies within 0.6 miles). Protective effects of PHMA would increase under the Proposed RMP Amendment compared with Alternative 1, as PHMA would be expanded. The management of PHMA with limited exceptions as NSO with no waivers, exceptions, and modifications would provide further protections for vegetation in these areas.

Lands and Realty Management

Managing PHMA as avoidance with some exceptions for major and minor ROWs would have impacts as described for Alternative 1. Management of PHMA with limited exceptions as exclusion for major ROWs with some exceptions would result in impacts similar to Alternative 3. Such management would decrease potential impacts from ROW development by excluding new ROW authorizations in PHMA. However, ROW routes, if made longer to bypass the PHMA exclusions, might increase surface disturbance, albeit outside PHMA. Impacts in GHMA would be similar to those under Alternatives 1 and 2, but additional state-specific requirements as described for GRSG in **Section 4.2.1** above would provide additional protections to vegetation.

Managing PHMA as exclusion for renewable energy would have impacts similar to those described for Alternative 1. Managing associated ROWs as exclusion would offer greater protections than Alternative 1. Managing PHMA with limited exceptions would further reduce impacts by not allowing exceptions to these exclusions. GHMA would be open, but the requirement for minimization measures and mitigation in the Proposed RMP Amendment would provide more protections for vegetation.

Livestock Grazing Management

Impacts to vegetation from livestock grazing management under the Proposed RMP Amendment would be the same as those described for Alternative 4 and Alternative 1 (refer to **Appendix 10**). Under the Proposed RMP Amendment, no livestock prioritization in SFAs would occur as under Alternative 1. As a result, these areas would not receive additional priority for grazing management. The BLM would address areas that are not meeting GRSG special use criteria identified in the Sage-grouse Habitat Assessment Framework and other methodology to determine if an area is meeting or making significant progress toward meeting land health standards for BLM special status species and adjust livestock grazing practices where livestock grazing is a significant causal factor in not meeting land health standards for special status species. In processing grazing permits BLM will include an alternative that includes specific thresholds and responses when the special status species standard is not being met due to livestock grazing and reduce the impacts of livestock grazing on vegetation such as those described under Nature and Type of Effects.

Wild Horse and Burro Management

Impacts to vegetation from wild horse and burro management under the Proposed RMP Amendment would be the same as those described for Alternative 5. That is, the BLM would manage wild horses and burros within AML and would reduce the potential for impacts from wild horses and burros on vegetation such as those described under *Nature and Type of Effects*, compared with Alternative 1.

4.3.3 Cumulative Effects

The cumulative effects analysis for vegetation includes consideration of land managed by the BLM, Forest Service, and other federal agencies with adjacent state, Tribal, county, and privately owned lands within the planning area are considered to be the cumulative effects analysis area for vegetation. Ongoing and planned actions in and near GRSG habitat that are considered PHMA or GHMA (including IHMA in ID) would

influence vegetation conditions and management effectiveness across the different state plans over a 20-year period.

Vegetation management, including fire and fuels management, is becoming more broadly consistent across federal landownerships, due largely to updated adherence with current federal law, regulation, and policy and increased collaboration between agencies. Past actions have directly or indirectly contributed to increased shift of native plant community size, distribution, and risk of invasion or expansion of invasive species. The BLM completed a programmatic environmental impact statement (PEIS) that evaluates creating and maintaining a system of fuel breaks, fuels reduction and rangeland restoration in the Great Basin region. This landscape scale PEIS analyzes potential effects of reducing fuel loading and restoring rangeland productivity within the Great Basin Region (Idaho, Oregon, Nevada, northern California, Utah, and eastern Washington) to protect and conserve the sagebrush-steppe ecosystem from loss or fragmentation caused by wildfires. However, certain vegetation types, such as pinyon-juniper woodlands, provide important habitat for other species of concern. Large-scale treatments aimed at benefiting GRSG may unintentionally impact these species, potentially leading to adverse impacts.

Reasonably foreseeable actions in the planning area have the potential to impact vegetation. Generally, these are projects that would substantially alter vegetation conditions, including projects which disturb the land's surface, increase the potential for invasive weed spread, or increase the risk of human-caused wildfire. Anticipated projects that could impact vegetation include energy (with the exclusion of Solar in PHMA) and mineral resource exploration and development, lands and realty decisions, livestock grazing, wild horses and burros, timber removal, and travel and transportation decisions that create new routes or roads.

Past and present vegetation management and other actions in the planning area have had differing effects, as described under Nature and Types of Effects, based on type of disturbances. These types of actions include management of wild horses and burros, wild ungulate herds, mineral resource development, wind and solar development, and ROW development in addition to historic and ongoing livestock grazing and wildfire suppression. These habitat impacts vary in degree of disturbance based on state and local regulations throughout the multi-state HMA boundaries, wild horses management, and ranching which have contributed to the introduction of invasive annual grasses that have made changes to the wildfire regime to current conditions. These disturbances have resulted in a landscape with increased pinyon-juniper densities and invasive annual grasses and a greater potential for uncharacteristically large, severe wildfires compared with historical conditions. Climate change trends, including more frequent extreme fire weather, combine with and exacerbate these conditions.

State, Federal, and private land owners in the planning area all recognize the importance of vegetation management including fuels treatments, wildland fire management and management of wildlife habitat. Vegetation and habitat management projects focused on GRSG habitat have occurred throughout the planning area and projects such as hazardous fuels reduction, pinyon-juniper removal, emergency stabilization and rehabilitation (ESR), and invasive species control have impacted vegetative cover and structure, which in turn reduce wildfire risk. Additionally, the BLM would work with the State of Nevada to incorporate the recommended fire and vegetation management from the state. These projects have been and continue to be implemented not only by the BLM but also by other federal and state land management agencies and private landowners. Coordination of these activities during implementation across ownership/jurisdictions boundaries improves their effectiveness for providing habitat benefits. Vegetation management will continue throughout the planning area and new projects will be proposed, regardless of decisions made in this

Proposed RMP Amendment/Final EIS. Implementation of these projects will include completion of the appropriate level of NEPA and compliance with other applicable authorities.

Comparison of Alternatives

Under all alternatives, the BLM would implement or require best management practices and would provide guidance on which treatments and chemicals can be used. Avoiding or limiting surface disturbance on steeper slopes or highly erodible soils would maintain native vegetation stability and resiliency to invasive species spread or invasion. There would be no impacts common to all alternatives from mineral resource management, renewable energy development, infrastructure development, livestock grazing management, or ACEC management.

Alternative 1 management actions refer to the 2015 plan amendments. These include restrictions on development, such as land use and surface-disturbing activities, that could occur within HMAs and would limit impacts to vegetation. All states would include language to maintain and enhance sagebrush habitats with the intent of conserving GRSG populations. In summary, there would not be any significant changes to management that would cause an impact on vegetation beyond current conditions and management practices.

By contrast, under Alternative 2, more areas would be open to oil and gas development and exploration. The consequence of fewer restrictions would likely be greater impacts to vegetation and habitats. Alternative 2 would remove the GHMAs in Utah for wild horse and burro management and this would increase the potential for vegetation loss.

Alternative 3 would include the fewest acres open and the most stringent restrictions for fluid mineral leasing. More restrictions on PHMA would result in fewer open acres that could be used for development. These restrictions would decrease the potential for impacts to vegetation associated with surface disturbing activities (including mineral resource development, renewable energy development, ROW development, and travel development) in PHMA to a greater extent than under Alternative 1. Additionally, this alternative would require that all states have PHMA unavailable to livestock grazing and to place developments outside of the HMA boundaries; this would result in less disturbance within the planning area. Mitigation approaches for direct and indirect impacts would utilize avoidance, minimization, and compensation, with emphasis on avoidance, precluding new developments when possible. In summary, Alternative 3 would have the most direct protections for vegetation and habitat within GRSG management areas but would have the greatest contribution to cumulative effects through a potential increase in fine fuels that could influence large-scale wildfires.

Alternative 4 would be similar to Alternative 1 but would emphasize more avoidance. Fluid mineral leasing would be allowed in HMAs, which would increase potential impacts to vegetation in these areas as described in the *Nature and Types of Effects*. Impacts on vegetation communities from fluid mineral leasing, renewable energy development, and ROW development will vary depending on the location. Like Alternative 3, Alternatives 4 would include consideration of compensatory mitigation where appropriate to meet the requirements set by the state wildlife agency or appropriate authority. Mitigation requirements would reduce impacts on vegetation but to a lesser degree than Alternative 3.

Alternative 5 would be similar to Alternative 4 but would allow more development to occur which would potentially impact vegetation communities. As a result, more compensatory mitigation would be needed to when development is allowed in HMA boundaries. However, no net habitat loss and disturbance limits would not apply to the removal of invasive or encroaching vegetation, where such removal creates habitat.

Therefore, this alternative could cumulatively allow for the improvement of more acres of vegetation for GRSG habitat than Alternative 1.

Impacts under Alternative 6 would be similar to impacts under Alternatives 4 and 5 except for the designation of ACECs, which may offer additional protection to vegetation communities within them.

The Proposed RMP Amendment would reduce contributions to cumulative impacts compared to Alternatives 4 and 5 due to the management of PHMA with limited exceptions coupled with managing for ROW exclusion for wind and solar development in all of PHMA to reduce the incidence of development. State wildlife agencies or appropriate authorities would implement state requirements to restore and maintain GRSG habitat.

4.4 WILDLAND FIRE ECOLOGY AND MANAGEMENT

4.4.1 Nature and Type of Effects

Impacts on wildfire management result from changes in wildfire frequency and intensity and the ability to employ wildfire suppression methods, both of which would affect management of wildfire and related costs within the planning area. Surface disturbance caused by development would generally contribute to the modification of the composition and structure of vegetation communities (including increases in noxious weed proliferation) around developed areas. This would then be more likely to fuel high-intensity wildfires, which could increase program costs because of the increased potential for wildfire.

Livestock grazing is the most widespread land use across the sagebrush landscape (Connelly et al. 2004) and it can be used to achieve resource objectives. Livestock grazing can alter an ecosystem's fuel characteristics, particularly fine fuel loads; however, this effect depends on weather conditions and plant community characteristics (Strand et al. 2014). In shrub-steppe, grazing with cattle may not be effective when shrub cover is high enough to serve as the primary carrier of the wildfire (Schachtschneider 2016) nor is it likely to be effective under extreme burning conditions (Strand et al. 2014). Several small-scale studies (Davies et al. 2010, Davies et al. 2016, and Davies et al. 2017) indicate cattle grazing can reduce grass fuels, alter potential wildfire behavior, and protect restoration investments, particularly when used on annual grasses prior to the wildfire season (Strand et al. 2014). Sagebrush grassland grazed at 30 to 50% utilization has been found to have lower % cover of perennial grasses and total herbaceous species, as well as larger gaps in fuels (Davies et al. 2010). At higher wind speeds, targeted grazing at a utilization of 50% reduced flame lengths below 4 feet, allowing direct attack by firefighters (Decker 2018). Burned areas that were grazed at 40% utilization had less cheatgrass and more perennial grasses compared with ungrazed burned areas (Davies et al. 2009). For invasive, annual, grass-dominated landscapes, high-intensity grazing is typically needed to suppress invasive annuals and thereby change wildfire behavior (Mosley and Roselle 2006). By coupling knowledge of fuel characteristics with foraging habits of different livestock, prescriptions of the appropriate intensity can be developed to target specific components of the fuel load, and grazing can be applied effectively to reduce the risk associated with fine fuels. Such management would be consistent with Executive Order 13855, Promoting Active Management of America's Forests, Rangelands, and other Federal Lands to Improve Conditions and Reduce Wildfire Risk.

Wild horse and burro populations present within the planning the area can have similar effects on wildland fire as domestic livestock. Wild horse and burros select to graze similar forage species that domestic livestock do. Grazing is predicted to reduce the occurrence of both small and large-scale wildfires by reducing fuel load and altering the vertical structure of the vegetation. This occurs even at low ungulate densities and is most pronounced at high ignition frequencies (Kramer et al. 2003). Wild horse and burro

populations in combination with permitted domestic livestock can reduce fire fuel loads within the planning area.

4.4.2 Proposed RMP Amendment

Impacts on wildland fire management under the Proposed RMP Amendment would be the same as described for Alternative 1. That is, the Proposed RMP Amendment would implement a comprehensive strategy for wildland fire management, including the Fire and Invasives Assessment Tool (FIAT). The FIAT would identify PHMA areas and management strategies to reduce the threats to GRSG from invasive annual grasses, wildfires, and conifer expansion. It would incorporate recent scientific research on resistance and resilience of Great Basin ecosystems as well as interdisciplinary team knowledge. Potential management strategies include proactive measures, such as fuels management and habitat restoration and recovery, and reactive measures, such as fire operations and post-fire rehabilitation. Together, these actions would improve wildland fire management, given the limited resources available, and would target those areas that need the most protection. The likelihood for wildfire would be reduced, and subsequent impacts on vegetation, particularly vegetation that meets GRSG habitat requirements as described under **Section 3.2**, would also be reduced. Providing adequate rest from livestock grazing would improve the likelihood that ESR seedings would stabilize the site, compete effectively against invasive annuals, and successfully establish native vegetation over the long term.

4.4.3 Cumulative Effects

The analysis area for cumulative effects for wildland fire ecology and management includes lands managed by the BLM, Forest Service, and other federal agencies with adjacent state, Tribal, county, and privately owned lands in the planning area. The time frame for the cumulative effects analysis is 20 years.

Vegetation treatments, livestock grazing, increases in population and recreation, and development in the wildland-urban interface have and will continue to affect fuels and wildfires. Alternatives 1, 2, 4, 5, 6, and the Proposed RMP Amendment would each contribute to cumulative effects on wildland fires in similar ways since they would carry forward the vegetation and wildland fire ecology and management decisions from the 2015 GRSG plans. By making all PHMA unavailable for grazing, Alternative 3 would have the greatest contribution to cumulative effects through a potential increase in fine fuels that could influence a large-scale wildfire.

4.5 FISH AND WILDLIFE

4.5.1 Nature and Type of Effects

Minerals Management

Mineral exploration and development could result in impacts on the fish and wildlife species and habitat identified in **Chapter 3**. During minerals management, increased human disturbance activities could result in temporary habitat avoidance or direct impacts on fish and wildlife species, causing mortality or injury. Other direct impacts include the removal or degradation of habitat from vegetation removal and increased potential for the spread of noxious weeds. Continuous (24-hours per day) operations often associated with fluid or locatable minerals exploration and development can result in long-term impacts on wildlife and their habitat from displacement or other noise-related disturbance. Displacement of species could increase competition for resources in adjacent habitats. These activities could remove and fragment habitats due to road development and use, facility construction and placement, and creation of well pads and pipelines. Wildlife may avoid developed areas over the long term, or may adapt and recolonize sites, including after reclamation of temporarily disturbed areas.

Both short term, loud noise (such as from vehicles or construction) and long-term, low-level noise (such as from industrial activities such as oil and gas development) have been documented to cause physiological effects on wildlife species. These include increased heart rate, altered metabolism, and changes in hormones, foraging, anti-predator behavior, reduced reproductive success, density, and community structure (Radle 2007; Barber et al. 2009). In addition, noise can impact wildlife through the disruption of communication and environmental cues (US Department of Transportation, Federal Highway Administration 2004). Determining the effect of noise is complicated because different species and individuals have varying responses, and certain species rely more heavily on acoustic cues than others (Radle 2007; Barber et al. 2009). Impacts would be both short- and long-term, depending on the type and source of noise, and the depending on the species.

Impacts on wild ungulate populations would result from disturbance and/or loss of seasonally important habitat (for example, critical winter, breeding, or rearing habitats). Wild ungulate species could also be impacted by interference with seasonal migration or movement patterns (Kauffman et al. 2022) that decreases the ability of a species to breed or overwinter successfully. If effects are severe enough, this could lead to population declines. Additionally, habitat fragmentation caused by mineral development activities could further disrupt wild ungulate populations, impacting their ability to migrate and access essential resources.

Water pollution from minerals management could also have detrimental effects on fish and amphibian populations, particularly through the degradation of water quality in critical habitats. This can lead to long-term harm to these species, potentially affecting their reproductive success and overall population health.

Restricting surface-disturbing activities during minerals management actions would reduce impacts on wildlife and their habitat. Such management actions include stipulations to protect GRSG habitat, closure of areas to mineral leasing and development, and restrictions within ACECs. Areas closed to fluid mineral leasing and development or managed under NSO stipulations would reduce surface disturbance and associated habitat impacts from fluid mineral development in certain areas. Wildlife on BLM-administered lands may be affected by disturbances from mineral development on adjacent lands.

Lands and Realty Management

Although transmission and power line construction does not generally result in substantial direct habitat loss, it would disturb wildlife species in habitat along the ROW due to the associated human activity, equipment, and noise, and would contribute to habitat fragmentation. In addition, transmission lines provide perches and nest sites for predators such as ravens and raptors, resulting in indirect negative impacts on prey species. Over the long term, ROWs may cause mortality of birds and bats due to collisions with power lines or guy lines. Collocation of transmission lines could reduce impacts by siting new developments in areas that are previously disturbed. Roads associated with energy transmission facilities can also reduce the extent and quality of habitat or serve as inroads for invasive plants to establish, further reducing habitat quality.

In areas managed as ROW exclusion, the BLM would prohibit all development of ROWs, with some exceptions provided; in areas managed as ROW avoidance, the BLM would consider allowing ROWs on a case-by-case basis. This flexibility may be advantageous where federal, state, Tribal, and private landownership areas are mixed and exclusion areas may result in more widespread development off of BLM-administered lands.

Renewable Energy Management

The type of effects on fish and wildlife species from renewable energy development and associated infrastructure (including construction and operation of distribution and transmission lines, substations, and

access roads) would largely be similar to the type of effects resulting from ROW management, including habitat removal, alteration, or fragmentation, and direct injury or mortality, disturbance, and displacement. The development of wind energy could cause habitat loss and fragmentation, and both short- and long-term impacts to wildlife habitat. Disturbances during installation of towers, roads, and infrastructure could force wildlife away from preferred habitat. Some smaller prey species will avoid and abandon areas where overhead structures such as power lines and towers are present due to the increased risk of avian predators. Construction of wind turbines throughout the planning area create collision hazards for bats, raptors, and multiple other avian species. Studies have documented deaths of avian and bat species from wind turbines, although the levels of collision and death vary in the scientific research (Cohn 2008; Madders and Whitfield 2006; Frick et al. 2017). Specific wildlife impacts from wind energy development have been shown for some wild ungulate species. Mule deer are displaced from suitable habitat by human activity related to the development and operation of gas wells in western Wyoming (Sawyer et al. 2006). Recent study regarding interactions of a transplanted elk population with an operating wind facility in Oklahoma found no evidence that turbines had a significant impact on elk use of the surrounding area (Walter et al. 2006). Similarly, Johnson et al. (2000) found no effect on pronghorn use of the Phase I and II Foote Creek Rim project in Wyoming.

Solar-specific impacts would be similar to wind disturbances during development that would lead to habitat removal, alteration, fragmentation, and collision risks. Wildlife, such as small mammals, big game, reptiles, and amphibians, would be more vulnerable to habitat fragmentation due to the large geographic range of solar developments (DOE 2021). Additionally, the risk for collision would increase for avian species that migrate over, nest near, or forage in or around solar projects if they are attracted to the solar panels as they resemble large bodies of water.

Livestock Grazing Management

The direct and indirect impacts of livestock grazing on plants, as described in **Section 4.3**, Vegetation, can have indirect impacts on insect pollinators, particularly bees. Trampling can also have negative impacts on pollinator nesting sites, destroying active nests and causing soil compaction which can prevent new nest construction. Livestock may also trample nests of ground-nesting birds (Sabatier et al. 2016).

While limited, improper grazing management can lead to loss of vegetation cover, reduced nesting habitat quality (for ground-nesting species), reduced forage availability, reduced water infiltration rates due to soil compaction, change in vegetation composition, decreased plant litter, increased bare ground, reduced nutrient cycling, decreased water quality, increased soil erosion, and reduced overall habitat quality for wildlife (Manier et al. 2013). Grazing may contribute to the spread of nonnative, invasive plants and noxious weeds in sagebrush ecosystems by reducing cover of native bunchgrass (Reisner et al. 2013). It may increase desertification or worsen the impacts of climate change on rangeland (Beschta et al. 2014). Properly managed grazing may be compatible with wildlife habitat, does not preclude healthy rangelands, and may reduce wildfire in sagebrush ecosystems by reducing fuel loads in certain circumstances (Strand et al. 2014; Svejcar et al. 2014; NTT 2011). As described in **Appendix 21**, livestock grazing is managed to meet or make progress toward land health standards, thus reducing the likelihood of adverse effects.

Structural range improvements, such as fences represent potential predator perches and wildlife movement barriers (especially woven-wire fences), restricting movement and increasing predation pressure (Coates et al. 2016). Additional range improvements for water availability would include troughs that can create drowning risks for wildlife if not properly constructed with adequate escape ramps that are maintained. Generalist predators can be abundant in anthropogenic-influenced areas, including areas developed for

minerals, livestock grazing, and other uses, where they can reduce prey populations. Common ravens (*Corvus corax*) prey on eggs and young of numerous other wildlife species, including GRSG. Ravens have been documented to prey on other special status species in the western US, including desert tortoises (*Gopherus agassizii*; Boarman 1992), least terns (*Sterna antililarum*; Avery et al. 1995), and western snowy plovers (*Charadrius alexandrines nivosus*; Strong et al. 2021).

Wild Horse and Burro Management

Wild horse and burro grazing may alter habitat conditions for fish and wildlife species, including reduced total vegetation and grass abundance and cover, lowered sagebrush canopy cover, increased shrub canopy fragmentation, lowered species richness, increased compaction in surface soil horizons, and increased dominance of unpalatable forbs (Manier et al. 2013). Wild horses and burros also compete for forage and water and have been documented aggressively defending water sources from native ungulates (Perry et al. 2015; Crist et al. 2019). In addition, the grazing and congregating of herd populations over AML can degrade riparian areas, decrease water quantity and quality, and increase soil erosion. These effects can reduce habitat quality for fish and wildlife species. Effects on habitats may also be more pronounced during periods of drought or vegetation stress (NTT 2011).

Fences used to manage livestock distribution represent a potential source of movement barriers and increased predation, as described in *Livestock Grazing*, above. In addition, water must be available year-round in herd management areas and wild horse territories, in compliance with the Wild and Free-Roaming Horses and Burros Act of 1971. This can lead to riparian areas receiving year-long use by wild horses and could modify riparian areas with additional fencing and troughs to accommodate year-long wild horse use. The range improvements would increase potential perch sites for avian predators and increase potential drowning hazards (water troughs). Artificial water sources of water may also increase the risk of West Nile virus in GRSG (Naugle et al. 2004). Moreover, there would be less water available for fish and wildlife in these areas. Conversely, range improvements are typically developed consistent with program guidance such as bird ladders to reduce drownings and maintain adequate water flow to maintain the spring source (BLM 2014).

Predation Management

Predation management would have similar effects as those described in **Section 4.2** for GRSG and would ultimately benefit wildlife species that overlap with GRSG habitats because there would be less predation pressure in these areas. Conversely, predator management may also adversely affect predatory wildlife populations that are the source of threats to GRSG.

ACEC Designation

ACECS are special management areas that are designed to protect important values such as fish and wildlife resources and habitat through restrictions on uses and surface disturbing activities. Management of the ACEC is designed to focus on the resource or natural hazard of concern, however this differs from area to area. Currently there are existing ACECs in Oregon that include GRSG as an important value (See **Section 4.11.1**, *ACECs and Research Natural Areas).* There is also considerable overlap of existing ACECs and GRSG habitat, which provides secondary protection for GRSG as well as other wildlife species. ACEC designation may be a useful tool for the BLM to effectively manage habitat not only for GRSG but for other wildlife species by restricting land use operation and disturbances in these areas.

4.5.2 Proposed RMP Amendment

Habitat Management Area Designation

Under the Proposed RMP Amendment, the BLM would manage approximately 2,056,000 acres (6%) more PHMA and 4,848,000 (18%) fewer acres of GHMA compared to Alternative 1 (**Table 2-15**). Compared to Alternative 5, the BLM would manage approximately 592,000 (2%) more PHMA and 75,000 (less than 1%) fewer acres of GHMA. This would lead to increased protection for other wildlife whose ranges overlap with PHMA but less protection for those whose ranges overlap with GHMA. However, PHMA would cover a larger area under the Proposed RMP Amendment compared with Alternative 1. Additionally, the management of PHMA with limited exceptions would provide additional protections for fish and wildlife and their habitats from several resource uses as described further below.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Impacts on fish and wildlife would be similar to those described for Alternative 5 for saleables, locatables, and fluid mineral objectives and allocations. Additionally, managing PHMA with limited exceptions as NSO with no waivers, exceptions, and modifications; closed to saleable minerals with fewer exceptions for new free use permits and expansion of existing pits; and closed to nonenergy leasable minerals including expansions, would provide further protections for fish and wildlife and their habitats in these areas. Additional impacts from minerals management are described under *Nature and Types of Effects.*

Lands and Realty

Under the Proposed RMP Amendment, avoidance criteria for major ROWs would be more stringent than those under Alternative 5. Further, the management of PHMA with limited exceptions as major ROWs exclusion with exceptions would provide additional protection for fish and wildlife and their habitats from these uses, similar to those described for Alternative 3, where all PHMA would be excluded from new ROW authorizations. This would decrease the probability of habitat degradation and fragmentation compared with Alternative 1.

Renewable Energy Management

Impacts from renewable energy management under the Proposed RMP Amendment would be similar to those described under Alternative 3, where PHMA would be exclusion areas. This would minimize the potential habitat impacts from wind and solar development to PHMA to a greater degree than avoidance areas because development would not be allowed under any condition. Habitat impacts to IHMA, which would be managed as ROW avoidance, would be minimized but to a lesser degree than exclusion areas because development would be considered on a case-by-case basis.

Mitigation and Adaptive Management

Impacts on wildlife from mitigation and adaptive management under the Proposed RMP Amendment would be similar to those described under Alternative 4. However, under the Proposed RMP Amendment, improved direction would be made for mitigation and adaptive management to improve implementation, which could reduce the likelihood of impacts on fish and wildlife species compared with Alternative 1.

Application of Habitat Objectives

Impacts on fish and wildlife from application of habitat objectives under the Proposed RMP Amendment would be the same as those described for Alternatives 3, 4, 5, and 6 (refer to **Appendix 10**).

Livestock Grazing Management

Impacts on fish and wildlife from livestock grazing management under the Proposed RMP Amendment would be the similar to those described under Alternative 4. However, under the Proposed RMP Amendment, OR would include an additional objective to avoid direct adverse impacts from livestock management in limited GRSG habitat, potentially reducing impacts to other wildlife species that overlap GRSG range, as discussed under *Nature and Types of Effects*. Additionally, NV/CA would make clarifying direction to improve implementation, which would reduce the likelihood of impacts compared with Alternative 1.

Wild Horse and Burro Management

Impacts to habitats from wild horse and burro management under the Proposed RMP Amendment would be the same as those described for Alternative 1.

ACEC Designation

The Proposed RMP Amendment would not result in any impacts from ACEC designation since it does not include management for ACECs.

4.5.3 Cumulative Effects

The cumulative impact analysis area includes all BLM-administered lands within the range of GRSG as well as other federally managed lands, and adjacent state, Tribal, county, and privately owned lands. The larger analysis area is necessary because some wildlife and special status species, including migratory birds, and big game move across this larger landscape and animals and plants depend on ecosystems that extend over larger areas. The time frame for the analysis of cumulative effects is 20 years.

Mineral exploration and development such as for fluid minerals (oil, gas, and geothermal), locatable minerals, leasable minerals, and mineral materials have and will continue to affect fish, wildlife and special status species. Other development like residential and industrial development, associated roads and ROWs (including pipelines, electrical transmission lines, infrastructure ROWs, and large renewable energy projects, such as solar and wind development projects), vegetation treatments, fire and fuels management, livestock grazing, wild horse and burro management (which includes gathers, fertility treatments, and removal of excess wild horses and burros from designated herd management areas), recreation, travel management, and GRSG goals, objectives, and planning efforts that are also likely to continue to affect fish, wildlife, and special status species.

Many of the actions described above have and will likely continue to alter habitat conditions, which then cause or favor other habitat changes. For example, wildland fire removes wildlife and special status species habitat features, and affected areas are more susceptible to weed invasion, soil erosion, and sedimentation of waterways, all of which further degrade habitats. In general, resource use activities, such as energy, mineral, and other developments have cumulatively impacted fish, wildlife, and special status species by causing habitat removal, fragmentation, weed spread, and disturbance from noise and increased human presence. Dispersed, organized, and concentrated recreation also promotes the spread of invasives and pollutants into the environment, habitat degradation from OHV use, and associated noise from an increase in visitors to BLM-administered lands. Land planning efforts and vegetation, habitat, and fuels treatments have offset some of these impacts by improving habitat connectivity, resistance, and resilience. Planning efforts for GRSG would also constrain certain uses such as mineral development, ROW authorizations, and grazing, and contribute to restoration of shrubland habitats. Additionally, planning efforts to protect aquatic species exist that constrain certain uses within 100 meters of riparian areas, fens, wetlands, and water impoundments. As such,

these planning efforts would reduce cumulative impacts on wildlife species associated with these habitat types.

Reasonably foreseeable vegetation treatments (**Appendix 14**) would improve habitat conditions for some wildlife and special status species such as small mammals, big game, birds, and invertebrates, such as insects and pollinators. These projects include hazardous fuels reduction, pinyon-juniper removal, emergency stabilization and rehabilitation, and invasive species control. Removing encroaching conifers would help maintain the extent of sagebrush habitat by reducing the potential for conversion to pinyon-juniper woodlands. These activities would improve the habitats' resistance to potential future disturbances, assisting in long-term habitat maintenance. Vegetation treatments would cause short-term impacts, such as noise disturbance, displacement of individuals, surface disturbance, erosion, and sedimentation. Mitigation measures such as the timing of treatments would be implemented to minimize the impacts on migratory birds. For other wildlife and special status species, short-term displacement could occur during vegetation treatments; however, these effects would be temporary and minor. Long-term impacts would potentially be enhanced habitat conditions and a reduced risk of catastrophic wildfire. Restoration activities would improve habitat conditions for sagebrush-dependent wildlife by increasing the availability of features used for nesting and shelter. Pinyon and juniper removal could reduce nesting and roosting opportunities for raptors, other migratory birds, and other arboreal species, however, the removal could have beneficial components for small mammal and bird species that occupy sagebrush habitats. Removing predator perches and nesting sites would benefit species that are vulnerable to avian predation. Opening the understory would allow sagebrush and perennial grasses to grow.

Climate change could cause an increase or decrease in temperatures and precipitation, as described further in **Section 3.2.12**, which would affect soil conditions, vegetative health, and water flows and temperature. Such changes would alter habitat conditions, potentially creating conditions that could favor certain species or communities, weeds, or pests. Future climate conditions will likely impact GRSG planning efforts to restore habitat by reducing sagebrush ecosystem resistance and resiliency in some areas of PHMA.

Under all the alternatives, there is at least one goal or objective in place focused on improvement of GRSG habitat and populations; if implemented across all management actions, achievement of this goal or objective would also reduce impacts to fish, wildlife, and special status species by helping to offset effects from activities which degrade habitat.

Comparison of Alternatives

Management under Alternative 1 includes restrictions on development, such as NSO and CSU stipulations on fluid minerals, locatable minerals, and other surface disturbing activities would be focused outside of PHMA, exclusion areas for some renewable energy development, and mitigation to reduce the total net impact on fish, wildlife, and special status species (3 or 5% disturbance cap, depending on the state). In summary, there would not be any significant changes to management that would cause an impact on fish and wildlife beyond current conditions and management practices. Therefore, this alternative would have some incremental contribution to cumulative impacts on wildlife species. This is because impacts, such as habitat alterations and disturbance, would not necessarily be dispersed, and concentrated areas of development could reduce habitat connectivity and functionality.

Conversely, under Alternative 2, there would be more areas open to fluid mineral leasing, thus posing greater impacts on fish, wildlife, and special status species. This is because Alternative 2 allows for more flexibility in the management of activities that can impact wildlife and their habitat.

Alternative 3 would include the fewest acres open and the most stringent restrictions for fluid mineral leasing. Alternative 3 would also provide the most protection for fish, wildlife, and special status species habitats within GRSG management areas because of increased restrictions, and in some cases the prohibition of surface disturbing activities (including mineral development, renewable energy development, ROW development, and travel development). In summary, Alternative 3 would provide the most protection and reduce the contribution of surface disturbances, but the lack of active vegetation management would have long-term detrimental cumulative impacts to wildlife and special status species to the greatest extent of all the alternatives. These protections would result in increased wildlife habitat connectivity and functionality.

Under Alternatives 4 and 5, mineral development would be allowed in HMA boundaries, which would increase potential impacts to fish, wildlife, and special status species in these areas as described in the *Nature and Types of Effects*. Like Alternative 3, both Alternatives 4, and 5 would require compensatory mitigation that would meet the requirements set by the BLM but may also be affected by state wildlife agencies or appropriate authority mitigation programs. This would offset impacts on fish, wildlife, and special status species but to a lesser degree than Alternative 3.

Impacts under Alternative 6 would be similar to impacts under Alternatives 4 and 5 except for the designation of ACECs, which may offer additional protection to fish and wildlife within them.

Under the Proposed RMP Amendment, management of PHMA with limited exceptions would reduce the contribution to cumulative impacts compared with Alternatives 1, 2, 4, 5, and 6. Management of PHMA as exclusion for renewable energy would also reduce the contribution to cumulative impacts.

4.6 SPECIAL STATUS SPECIES

In general, impacts on special status fish and wildlife species would be similar to those discussed under **Section 22.15**, Fish and Wildlife, and **Section 4.2**, Greater Sage-Grouse, while impacts on special status plant species would be similar to those discussed under **Section 22.13**, Vegetation. However, impacts on special status species may be greater than impacts on common species because population viability is already uncertain for special status species. A detailed analysis of impacts on federally listed and proposed species and designated and proposed critical habitat will be prepared in the biological assessment for this Proposed RMPA/Final EIS. The biological assessment is under development and will be included with the Final RMPA/EIS.

Those species more closely associated with sagebrush communities or whose ranges are largely coincident with PHMA and GHMA (e.g., Brewer's sparrow and to a lesser extent white-tailed prairie dog, black-footed ferret, pygmy rabbit, western burrowing owl, ferruginous hawk, Holmgren lupine, Beatley's buckwheat, and squalid milkvetch) would benefit from conservation measures designed to protect GRSG and sagebrush habitat.

Conversely, excluding or avoiding development in GRSG habitats most likely outside of PHMA and IHMA, in GHMA inclusions, may lead to increased development activity in other vegetation types (e.g., pinyon-juniper, mountain shrub, and aspen/spruce/fir). Special status species associated with these habitat types, such as pinyon jay, northern goshawk, Canada lynx, Columbian sharp-tailed grouse, sand cholla, Reese River phacelia, Eastwood milkweed, and BLM-sensitive bat species, may be adversely influenced to varying degrees, depending on alternative and development scenarios.

4.7 WILD HORSES AND BURROS

4.7.1 Nature and Type of Effects

Impacts under all alternatives would be limited to any future changes that may result in AML and/or acreage adjustment as well as reconsideration of herd management area designations that are based on achievement of GRSG habitat objectives for improving GRSG habitat conditions. Wild horse and burro grazing can have impacts on soils, vegetation health, species composition, water, and nutrient availability. These impacts can be more pronounced when wild horse and burro populations exceed AML levels. Actions taken by the BLM such as wild horse and burro gathers, and implementation of fertility or birth control treatments can be used to manage their population levels. A growing body of research suggests that natural predation may also play a role in managing feral horse and burro populations. Andreasen et al. (2021) found that cougars in the Great Basin, for example, preyed successfully on horses of all age classes, with some female cougars relying heavily on horses year-round. Although cougar predation at landscape scales is unlikely to limit feral horse population growth, it could still serve as an important ecological factor in certain contexts. Similarly, Lundgren et al. (2022) discovered that cougar predation can create trophic cascades involving feral equids and vegetation. The impacts from wild horse and burro management on these resources are discussed in their respective sections.

Most herd management areas contain GRSG habitat in a sagebrush vegetation community. Overall management direction is to manage for healthy populations of wild horses and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. All herd management areas are managed to achieve and maintain the AML. Initially, the AMLs for herd management areas are established in RMPs at the outset of planning and adjusted based on monitoring data throughout the life of the RMP. Priorities for gathering excess wild horses and burros to achieve and maintain AML are based on population inventories, resource monitoring objectives, gather schedules, holding space availability, and budget. Gathers can be conducted in emergency situations when the health of the population is at risk due to lack of forage or water. In some situations, wildfire may be considered as reasoning for an emergency gather. Across all alternatives, use of contraceptives and other population growth suppression to manage wild horse and burro numbers could be implemented to assist in the achievement and maintenance of AML. Currently, based on the BLM's population estimates, the wild horse and burro populations within 177 of the HMAs is 274% higher than the higher limit of the set AML (BLM 2024a).

Implementing management for the protection of GRSG generally involves reducing or otherwise restricting land uses and activities to levels that are more consistent with the protection of GRSG and their habitat. Ground disturbing activities such as mineral extraction, recreation, or construction activities in ROWs all may remove vegetation and thus reduce forage availability, reduce the ability of wild horses and burros to move freely across herd management areas, or cause general disturbance of an individual band of wild horses or burros (refer to **Table 3-2**). **Table 3-2** displays the total number of herd management areas, and their associated AMLs, administered by BLM by state. **Table 3-3** shows acres of herd management areas within GRSG HMAs. Protecting areas from surface disturbing activities for the purpose of protecting GRSG would also protect forage for wild horses and burros and limit conflicts with humans or surface disturbance. These land uses and activities typically reduce forage and water availability or otherwise unintentionally disturb wild horse and burro populations, which may necessitate the need to adjust the established AML to meet GRSG habitat objectives.

Impacts on wild horses and burros and the ability of herd management areas to support AMLs may occur within herd management areas where management options are restricted for the protection of GRSG. Impacts from range improvement restrictions would generally vary based on type of range improvement

affected; restrictions on fences would improve wild horse and burro habitat by allowing free range, while limitations on projects that could enhance forage and water availability would not help to support the established AML. For instance, a herd management area within the planning area may not have open water, and thus wild horses and burros are supported exclusively through water developments.

4.7.2 Proposed RMP Amendment

Impacts to GRSG and their habitats from wild horse and burro management under the Proposed RMP Amendment would be similar to those described for Alternative 1. That is, the Proposed RMP Amendment would require a 3% disturbance cap on human surface-disturbing activities in PHMA. It would incorporate RDFs consistent with applicable law in PHMA, GHMA, and IHMA and would also require all human disturbances to result in a net conservation gain for GRSG and their habitat. Lek buffers would also be required.

Collectively, these GRSG conservation management actions would increase mitigation requirements for land use authorizations. This would result in more complex project designs, could exclude infrastructure placement in the most cost-effective locations, and would result in overall greater development costs. A corresponding effect could be a reduction in the number of authorization applications received for activities in PHMA and longer, more complicated review periods for those that are proposed in PHMA.

Protections afforded to GRSG and their PHMA or GHMA habitats would benefit wild horses and burros where herd management areas overlap these areas. This is because habitat conditions and forage would be improved, there would be less impact from human disturbances, and wildfire would be strategically managed in habitats. Temporary or long-term management changes to wild horses and burros may be necessary to achieve and maintain the desired habitat condition. Examples are reducing AMLs, designations, removals, movement patterns, and forage access. Alternative 1 would require more intensive management, particularly in the boundaries of SFAs.

4.7.3 Cumulative Effects

The cumulative impacts analysis area for wild horses and burros and herd management areas includes lands administered by the BLM, Forest Service, and other federal agencies, as well as adjacent state, Tribal, county, and privately owned lands surrounding the planning area. This includes all herd management areas that overlap with the planning area. The temporal limit of this analysis would be the life of this plan, or approximately 20 years.

Impacts to wild horses and burros managed for AML inside herd management areas are typically caused by the same activities which impact vegetation and water resources. Current and reasonably foreseeable actions in and near GRSG habitat that are considered PHMA (and IHMA in ID) or GHMA would influence the availability of resources for wild horses and burros across the different states analyzed in this EIS. Past, present, and reasonably foreseeable actions which limit the creation or maintenance of range improvements or remove or modify forage would combine cumulatively with the actions outlined in this plan to impact wild horses and burros over the short and long term. Generally, cumulative impacts on wild horses and burros from current and reasonably foreseeable actions are similar to those described under **Section 4.3.1**, Wild Horses and Burros.

Past, present, and reasonably foreseeable actions within the cumulative impact analysis area that have affected and will continue to affect wild horses and burros include mineral exploration and development of fluid minerals, locatable minerals, leasable minerals, and mineral materials. Additionally, ground disturbing development like residential and industrial construction (including renewable energy development),

associated roads and ROWs, vegetation treatments, fire and fuels management, recreation, travel management, and GRSG goals, objectives, and planning efforts are also likely to continue to affect wild horses and burros.

Comparison of Alternatives

Management under Alternative 1 would be the 2015 Plan amendments. Development, including fluid and locatable minerals development, and other surface disturbing activities would be focused outside of PHMA and other exclusion areas. Under Alternative 1, there would not be any significant changes that would lead to additional impacts on wild horses and burros and herd management areas beyond current conditions and management practices. This alternative would have some incremental contribution to cumulative impacts on wild horses and burros where herd management area do not overlap with PHMA.

Under Alternative 2, there would be more areas open to energy and mineral development and other ground disturbing activities, leading to a greater contribution to the cumulative impacts described above when compared with Alternative 1.

Alternative 3, all wild horses and burros would be removed from existing PHMA and proposed ACECs—resulting in short term disturbances from round-up activities. Alternative 3 would also make the fewest acres available for fluid mineral leasing and other ground disturbing activities, therefore protecting vegetation where those restrictions are implemented. However, Alternative 3 would also make the greatest number of acres of livestock grazing unavailable, in some cases, this may contribute to the cumulative impacts on wild horses and burros when combined with other actions, as limitations on livestock grazing could limit the availability of watering sources used by wild horse and burros.

Under Alternatives 4, 5, 6, and the Proposed RMP Amendment, energy and mineral development would be allowed in HMA boundaries, which would increase potential impacts to forage and other resources used by wild horses and burros as described in **Section 4.7.1**, Wild Horses and Burros. Impacts on forage and habitat conditions inside of herd management areas from mineral development, renewable energy development, and ROW development would vary depending on the location of the proposed development but as shown on **Map 3.22** (**Appendix 1**), herd management areas are most prevalent in Wyoming, Oregon, and Nevada. The contribution to cumulative effects among these alternatives would be greatest under Alternative 5, then decreasing with Alternative 4, 6, and the Proposed RMP Amendment.

4.8 LIVESTOCK GRAZING

4.8.1 Nature and Type of Effects

Impacts on livestock grazing are generally the result of activities that affect forage levels, areas available for grazing, the class or kind of livestock, the timing of use, the interval between grazing periods, intensity of grazing, placement and management of range improvements, and livestock handling techniques in grazing allotments.

Greater Sage-Grouse Management

Protecting GRSG habitat can directly affect livestock grazing if management requires limitations on areas open to grazing or available AUMs, modification of grazing strategies, or limitations on maintenance or construction of range improvements. This could increase time and cost to permittees and lessees or impact the ability of permittees and lessees to fully use permitted AUMs. The impacts of additional direct costs on permittees and operators are discussed in **Section 4.12**, Social and Economic Conditions.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Energy and mineral development can directly impact livestock grazing. During the exploration and testing phase of mineral development, the footprint of disturbance is usually small and localized; therefore, minimal acres available for livestock grazing would be directly impacted. During the exploration phase, development and human presence can lead to impacts on livestock dispersal and unauthorized grazing use could occur, increasing time and cost to permittees and lessees. Outside of the exploration and testing phase, surface-disturbing mineral development directly affects areas of grazing in the short-term during construction of well pads, roads, pipelines, and other associated facilities. Potential impacts include an increased potential for the introduction and proliferation of invasive plants that are often unpalatable. Other potential impacts are changes in available forage, reduced forage palatability because of dust on vegetation, limits on livestock movement, harassment, and temporary displacement of livestock.

Improving roads for mineral development can facilitate livestock management if it improves operators' ability to maintain infrastructure or improve grazing distribution. Development may also provide other indirect benefits including but not limited to access to locations for supplement placement. Properly implemented Best Management Practices (BMPs) and reclamation mitigation measures could help to maintain rangeland health and forage levels for livestock. Reducing mineral development in GRSG habitat could reduce potential impacts on grazing.

Renewable Energy Management

Wind and solar energy development could directly impact livestock through limitations on use of the portions of developed areas. Solar energy development typically leads to removal of livestock grazing within the footprint of the developed site. ROWs used to gain access to developed sites could remove forage permanently. The BLM would notify permittees at least 2 years in advance of any proposed reduction in authorized use in the allotment, including complete removal of grazing within a portion of or the entirety of an allotment.

Lands and Realty Management

Areas managed as ROW avoidance or exclusion could hinder or prevent obtaining access to an allotment or installing a structural range improvement. Restrictions on ROWs may indirectly benefit livestock grazing by reducing construction impacts (such as dust, displacement, and introduction of invasive plants) from development of other types of ROWs in the long term. Restrictions on ROWs may indirectly impact livestock grazing by reducing construction impacts from development of these ROWs (such as dust, displacement, and introduction of invasive plants) in the long term. Lands and realty actions taken to protect GRSG habitat would involve avoiding or excluding ROWs (e.g., for power lines, pipelines, and other structures) or land transfers in GRSG habitat. They may also slightly decrease disturbance in these areas. If development is relocated to areas outside of GRSG habitat, but still within a grazing allotment, these areas may see an increase in construction-related disturbance or displacement of livestock.

Livestock Grazing Management

Changes in livestock grazing management could impact grazing opportunities in a variety of ways. For example, implementing livestock grazing management requirements to benefit GRSG could affect livestock grazing by changing required management actions. Management requirements could increase short-term and

long-term costs to permittees and lessees and decrease AUMs, particularly when they require one or more of the following:

- Removal or modification of structural and nonstructural range improvements
- Modification of a grazing strategy and terms and conditions of permits, including but not limited to:
- Changes to the kind or class of livestock grazed
- Change in season-of-use
- Timing or duration of grazing use
- Changes to the pattern of rest-rotation within allotments and pastures
- Changes to area of use

These management requirements could result in direct and indirect economic impacts on individuals, companies, and the local community. For example, if a ranch is dependent seasonally on forage on public lands, reducing or eliminating AUMs on public lands would affect the entire ranching operation by reducing the total amount of available forage (Torell et al. 2002).

Some management changes may require a short-term output of cost for permittees and lessees but could result in long-term benefits. For example, construction of structural range improvements such as fencing or water developments, or use of nonstructural and non-ground disturbing range improvements such as mineral blocks to improve livestock distribution and allow use of a larger portion of the rangeland would generally enhance rangeland health in the long term. These management changes would also have short-term costs which may be borne by the BLM, permittees or lessees, or other partners. Constructing off-site water sources and fencing riparian vegetation and spring sources could keep livestock away from sensitive riparian areas and provide a cleaner more reliable source of water for livestock. Water developments and fencing could increase costs for permittees and lessees should they be fully or partially responsible for the cost of construction. Other requirements could increase annual operating costs. Examples of this are increased time feeding animals on base property, more complex pasture rotations or increased stockmanship such as herding or fence riding, which would require increased labor and fuels costs for moving animals.

When lands are devoted to another public purpose excluding grazing, the agency may compensate the permittee or lessee for the range improvement projects constructed under a range improvement permit or cooperative agreement, in accordance with 43 CFR Part 4120.3-6(c) (1995).

Wild Horse and Burro Management

When livestock and wild horses or burros occupy the same area, their needs for water and forage may be competitive. In extreme circumstances, wild horses and burros could outcompete livestock temporarily and could preclude livestock access to certain water sources. Livestock and wild horse and burro conflicts could include fence damage. Prioritizing wild horse and burro gathers in herd management areas and herd areas in priority GRSG habitat to meet established AMLs would reduce forage competition between wild horses and burros and livestock.

4.8.2 Proposed RMP Amendment

Greater Sage-Grouse Management

Rangewide Environmental Consequences

Under the Proposed RMP Amendment, requiring compensatory mitigation for activities described in **Table 2-4** to be in place when an exception is granted would reduce the likelihood of reduced available forage for livestock compared with Alternative 1. Further, the disturbance cap would apply to both existing and

proposed infrastructure authorizations, subject to valid existing rights, while wildfire and agriculture would not be included in the disturbance cap calculation. This could lead to more development and increased impacts on livestock grazing operations, forage, and increased human-livestock conflicts compared with Alternative 1. No exceptions to the 3% disturbance cap would be allowed at the HAF fine scale habitat selection area, which would limit the removal of forage or disturbance to livestock at this scale, compared with Alternative 1.

State-Specific Environmental Consequences

Under the Proposed RMP Amendment, Wyoming and Montana would have a 5% disturbance cap with a 3% disturbance cap scale applied at the HAF fine scale habitat selection area. This action would reduce potential development which would reduce the impacts to livestock grazing. Wildfire and agriculture would be included in the disturbance calculations for Wyoming and Montana in the Proposed RMP Amendment which would reduce the contribution of other human-made surface disturbance activities and overall would help to maintain forage available for livestock.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Increasing the acres subject to NSO under the Proposed RMP Amendment would reduce the HMA acres affected and potential impacts on livestock grazing operations and forage. Prioritizing projects that avoid, minimize, reduce, rectify, and/or adequately compensate for direct and indirect impacts to PHMA/IHMAs, along with technical COAs, would also reduce impacts on livestock grazing operations and forage compared with Alternative 1. The addition of PHMA with limited exceptions managed as NSO with no waivers, exceptions, or modifications, closed to saleable and closed to non-energy leasables would further reduce impacts to livestock grazing and forage.

Renewable Energy Management

Managing PHMA in all states as ROW exclusion areas for wind and solar energy development would reduce impacts on livestock grazing from disturbance associated with renewable energy development compared with Alternative 1. Managing PHMA with limited exceptions as exclusion with no exceptions would provide further protection to livestock grazing and available forage. Managing GHMA as avoidance areas for wind and solar energy development in all states would decrease the potential for impacts associated with renewable energy development but to a lesser extent than in exclusion areas.

Lands and Realty Management

Managing PHMA in all states and IHMAs as ROW avoidance areas but allowing for exceptions and opening GHMA to ROW development would increase the potential for impacts on livestock grazing and forage compared with Alternative 1. However, management of PHMA with limited exceptions as exclusion for major ROWs would provide additional protection for livestock grazing and forage from these uses, similar to those described for Alternative 3.

Livestock Grazing Management

Rangewide Environmental Consequences

Impacts to livestock grazing under the Proposed RMP Amendment would be similar to those described under Alternatives 4 and 5.

State-Specific Environmental Consequences

In Oregon, requiring avoidance of direct adverse impacts in limited GRSG habitat from range improvements would impose further requirements on operators and could constrain the location of range improvements. There would be additional impacts to livestock grazing associated with key RNAs (refer to **Appendix 17** for a full description of the effects of the alternatives on livestock grazing in these areas). Specifically, the BLM would include additional livestock grazing management objectives and actions to minimize or reduce impacts to GRSG and habitat compared with Alternative 1. This could lead to the prohibition of range improvement construction as well as adjustments to existing AUMs to meet these management objectives. Additionally, where land health standards for GRSG habitat are not met and existing livestock grazing is a significant causal factor, adjustments to livestock grazing practices would be made at the authorization, allotment, or activity plan level.

Wild Horse and Burro Management

Impacts to livestock grazing from wild horse and burro management would be the same as described under Alternative 5. That is, management of wild horse and burro populations to be within established AMLs could reduce forage competition between wild horse and burro populations and domestic livestock in some areas compared with Alternative 1.

4.8.3 Cumulative Effects

The cumulative impacts analysis area for livestock grazing includes lands administered by the BLM, Forest Service, and other federal agencies as well as adjacent state, Tribal, county, and privately owned lands surrounding the planning area. Impacts to permittees' base property and changes to surface owned by other agencies but administered by the BLM could impact livestock grazing across a larger landscape than the planning area. Ongoing and future activities in and near the cumulative impacts analysis area could influence livestock grazing and forage conditions within the planning area.

Current and reasonably foreseeable actions in and near GRSG habitat that are considered PHMA (and IHMA in ID) or GHMA would influence grazing operations and livestock grazing permitting across the different states analyzed in this EIS. The temporal limit of this analysis would be the life of this plan, and the life of grazing decisions made as a result of the actions made through the record of decision.

Past, present, and reasonably foreseeable actions which modify or prohibit livestock use, limit the creation or maintenance of range improvements, or remove or modify forage would combine cumulatively with the actions outlined in this plan to impact livestock over the short and long term. Generally, cumulative impacts on livestock grazing from current and reasonably foreseeable actions are similar to those described under **Section 4.7.1**, Livestock Grazing.

Past, present, and reasonably foreseeable actions within the cumulative impact analysis area that have affected and will continue to affect livestock grazing operations and livestock forage include mineral exploration and development of fluid minerals, locatable minerals, leasable minerals, and mineral materials. Additionally, ground disturbing development like residential and industrial construction (including renewable energy development), associated roads and ROWS, vegetation treatments, fire and fuels management, wild horse and burro management, recreation, travel management, and GRSG goals, objectives, and planning efforts are also likely to continue to affect livestock grazing.

Vegetation management, including fire and fuels management, is becoming more broadly consistent across federal landownerships. The cumulative effects of historical activities have directly or indirectly contributed impacts on livestock forage, such as increased shift of native plant community size, distribution, and risk of

invasion or expansion of invasive species. As a response to these shifts in vegetation communities, the BLM has completed a PEIS that evaluates creating and maintaining a system of fuel breaks, as well as conducting fuels reduction and rangeland restoration activities in the Great Basin region. This landscape scale PEIS analyzes potential effects of reducing fuel loading and restoring rangeland productivity within Idaho, Oregon, Nevada, northern California, and Utah in order to protect and conserve the sagebrush-steppe ecosystem from loss or fragmentation as a result of wildfires. Similar vegetation management projects may be implemented by other federal and state land management agencies, as well as private landowners, including hazardous fuels reduction, pinyon-juniper removal, emergency stabilization and rehabilitation (ESR), and invasive species control, all of which could impact the availability of forage for livestock.

Comparison of Alternatives

Alternative 1 management actions are on the 2015 plan amendments. This includes restrictions on development, such as land use and surface-disturbing activities, that would occur within HMAs and would limit impacts to livestock grazing and forage. All states would include language to maintain and enhance sagebrush habitats with the intent of conserving GRSG populations. In summary, there would not be any significant changes to management that would cause an impact on livestock grazing operations beyond current conditions and management practices.

Under Alternative 2, there would be more areas open to oil and gas development and exploration and thus more potential for surface disturbance and removal of forage for livestock. Alternative 2 would remove GHMAs in Utah for wild horse and burro management, which would increase the potential for reductions in forage quality and quantity. Additionally, development could lead to exclusion of livestock from the development footprint, reducing the available area for livestock grazing.

Alternative 3 would make all PHMA unavailable to livestock grazing. The BLM may have to construct and maintain a large amount of fencing, particularly in areas with mixed surface ownership, to effectively make grazing unavailable. Exclusion of grazing on BLM-administered lands may intensity grazing use on private lands or cause operators to reduce the scale of their operations on private lands. This alternative would have the greatest cumulative adverse effects on livestock grazing than any of the other action alternatives.

Under Alternatives 4, 5, 6, and the Proposed RMP Amendment, mineral development would be allowed in HMA boundaries, which would increase potential impacts to forage in these areas as described in **Section 4.4.1**, Livestock Grazing. Impacts on forage conditions and livestock grazing operations from mineral development, renewable energy development, and ROW development will vary by location.

4.9 LANDS AND REALTY (INCLUDING WIND AND SOLAR)

4.9.1 Nature and Type of Effects

The effects on the lands and realty program are typically the result of management that excludes or avoids ROWs in certain areas, authorizes of leases or permits, or requires stipulations on land use activities.

Within a BLM ROW exclusion area, the authorization of new ROWs is not allowed under any conditions. A ROW avoidance area may be available for ROW location but may require special stipulations such as resource surveys and reports, construction and reclamation engineering, long-term monitoring, special design features, special siting requirements, Standards for Boundary Evidence risk assessment certificates, and timing limitations.

Management that restricts ROW development in a certain area will likely eventually increase the concentration of ROW development in adjacent areas where restrictions are not present. Increased ROW

density can limit new siting options in non-restricted areas, decrease service reliability to rural areas, increase conflict among facilities, and intensify impacts on other resources and uses.

Co-locating infrastructure in existing ROWs, corridors, or disturbed areas reduces land use conflicts, limits disturbance to the smallest footprint, and limits impacts on GRSG and their habitats. Where restrictions are applied, habitat impacts would be mitigated where exceptions were allowed for co-location of new ROWs within existing ROWs. Co-location policies also clarify the preferred locations for utilities and potentially simplify processing on BLM-administered lands. Co-locating can also limit options for infrastructure development and could reduce network redundancy and potentially affect service reliability in some areas and add mileage and construction costs to the transmission line.

4.9.2 Proposed RMP Amendment

Under the Proposed RMP Amendment, lands in PHMA would be managed as ROW exclusion areas for utility-scale wind and solar. Major ROWs in PHMA would be managed as ROW avoidance, and minor ROWs in PHMA would be managed as avoidance as per direction in the 2015 GRSG plan amendment (with State-Specific Differences identified for Colorado, Idaho, Montana/Dakotas, Oregon, and Wyoming). Designated corridors would remain open to consideration of new major ROW development. Within areas of PHMA with limited exceptions, lands would be managed as exclusion without exception for utility scale wind and solar, and exclusion for major ROWs but designated corridors would remain open to consideration of new major ROW development. PHMA with limited exception would remain avoidance for minor ROWs. GHMA would be open for major and minor ROWs but with applicable state minimization measures from 2015 and 2019, and compensatory mitigation to maintain habitats supporting GRSG populations consistent with state agency designations (e.g., restoration, connectivity), and to preclude negative impacts to any adjacent PHMA. Impacts would be similar to those in the current plan (Alternative 1) and Alternative 2, but additional state-specific requirements outline in **Section 4.2**, Greater-Sage-Grouse, would provide additional protections for GRSG. GHMA would be open with applicable state mitigation requirements from 2015 and 2019 GRSG amendments. ROW exclusion and avoidance areas could result in less development of state and private lands where ROW infrastructure, such as a transmission line, would be needed across adjacent BLM-administered lands. The proposed RMP amendment would respect valid existing rights, despite new restrictions or exclusions described in this amendment.

4.9.3 Cumulative Effects

Cumulative impacts on lands and realty would be the result of past, present, and reasonably foreseeable actions that restrict ROW authorizations within the planning area. The spatial scale of the project for lands and realty is the planning area and the temporal scale is 20 years. Many of the states in the planning area are heavily dependent on extractive industries that require ROWs to operate and provide end users with products. These industries include oil and gas development, renewable energy generation, power transmission, and fiber optics. Any criteria that cause a change in ROW management action may have a direct effect on proposed projects in the planning area.

As populations continue to grow and shift geographically, there will be an increased demand for ROW authorizations that would occur under all of the alternatives. Each of the alternatives contains restrictions, stipulations, and limitations; when coupled with present and reasonably foreseeable actions longer planning and approval processes could result. This could lead to delays for future projects including transmission lines, mineral developments, and telecommunication sites that occupy HMAs across the planning area.

In addition to the direct impacts of ROW decisions, these actions can influence adjacent and nonfederal lands by extending habitat fragmentation beyond the immediate project area. This fragmentation, combined with other development pressures, can exacerbate cumulative impacts on GRSG populations by increasing human activity, reducing contiguous habitat, and promoting the spread of invasive species, which in turn degrades habitat and increases the frequency of wildfire events.

However, renewable energy projects, like wind and solar, offer significant benefits by reducing carbon emissions and mitigating climate change, which is a threat to GRSG through habitat impacts and disease spread (e.g., West Nile virus). While there are localized impacts to GRSG and their habitats, the long-term environmental benefits of renewable energy contribute to ecosystem resilience and GRSG conservation.

Comparison of Alternatives

Under Alternatives 1 and 2, project planning would be the most complex as a variety of land management actions, stipulations, and restrictions for ROWs are present. This could lead to increased project costs, longer timelines, or abandonment of proposed projects. Abandonment and delays of existing and planned projects could lead to increased costs and lower levels of service for consumers due to supply constraints and increased project costs. Alternative 3 would make all PHMA ROW exclusion, which may prevent development of adjacent private lands where a ROW would need to cross public lands. As such, it would have the greatest contribution to cumulative impacts on lands and realty authorizations. Alternatives 4 and 5 apply to entire planning area which could provide for a consistent project planning approach that is not dependent on individual state plan restrictions found in Alternatives 1, 2, and 3. This could streamline the planning process for projects, including those that span large areas and differing land ownership types by reducing state-by-state restrictions on ROWs. This may allow for a less time-consuming planning, permitting, and approval process. The Proposed RMP Amendment would result in similar cumulative impacts as those discussed under Alternatives 4 and 5 but with more stringent requirements for meeting the ROW avoidance exceptions. Additionally, the Proposed RMP Amendment would manage PHMA with limited exceptions, imposing even stricter protections by excluding major ROWs with exceptions and excluding utility-scale solar and wind projects without exceptions. These exclusions could prevent the development of adjacent private lands where a ROW would need to cross public lands.

A planning process to update the Solar Energy Development Programmatic EIS (BLM and USDE 2012) is currently underway to identify areas of BLM-administered lands available for, or excluded from, solar energy development. That planning process would defer to the allocation decision for solar energy decisions regarding GRSG to those in this Proposed RMP Amendment/Final EIS. Decisions made based on the ongoing Solar PEIS revision may change the availability of lands for solar energy development outside of GRSG habitat. However, given the ample lands available for solar energy development in each state, none of the management actions in the GRSG EIS alternatives would constrain the availability of lands estimated to be needed to meet the demand for solar energy development on public lands through 2045 (see **Appendix 12** for further discussion).

Additionally, each state in the planning area has developed conservation plans for state and private lands not under the jurisdiction of federal plans. Of these plans, only the Wyoming, Montana, and Oregon plans are regulatory in nature, with the state of Nevada also requiring mitigation.

4.10 MINERAL RESOURCES

4.10.1 Fluid Minerals (Including Geothermal)

Nature and Type of Effects

Closing areas within GRSG habitat to fluid mineral leasing would directly impact the fluid minerals program by prohibiting the development of those resources on federal mineral estate (see **Section 4.12**, Social and Economic Conditions (Including Environmental Justice)) for associated economic impacts. Fluid mineral operations might be limited in their choice of project locations and might develop in areas that are more challenging to access or result in less efficient development because more ideal areas could be closed to leasing. Operators may choose not to develop within the area at all. Under more restrictive alternatives, restrictions on BLM and federally administered lands might push development onto non-federal and private land and have indirect effects on GRSG and federal fluid minerals.

Management actions that prohibit or restrict surface occupancy or disturbance (such as TLs, NSO, CSU, and limitations on the density of surface disturbance) overlying federal fluid mineral resources would also directly impact the development of those resources by placing limitations on the siting, design, and operations of fluid mineral development projects. This might force operators to use more costly development methods than they otherwise might have used. The application of widespread TLs could result in equipment shortages and other development inefficiencies because of bottlenecks during the limited time period in which certain activities would be allowed. Restrictions on oil and gas leasing on federal lands and minerals could also result in impacts on adjacent nonfederal minerals, especially in areas where the BLM-administered lands are interspersed with non-federal lands. In these areas, BLM decisions that manage federal minerals as closed to oil and gas leasing, or manage BLM-administered lands as ROW avoidance or exclusion areas could result in a reduction in oil and gas activity on adjacent nonfederal minerals if it is no longer economical or feasible to develop minerals due to limitations on expanding operations into federal minerals, or if pipelines, roads, or transmission lines are needed on federal lands to access the nonfederal minerals.

In areas where NSO stipulations are applied, federal fluid minerals could be leased, but the leaseholder/operator would have to use offsite methods such as directional or horizontal drilling to access and develop the mineral resource. The reach of directional and horizontal drilling is limited, meaning some minerals may be inaccessible in areas where an NSO stipulation covers a large area, where no leasing is allowed on surrounding lands. Directional and horizontal drilling is not effective in developing certain types of fluid mineral accumulations, in geologic formations where directional or horizontal drilling is ineffective areas which have NSO stipulations are applied may not be able to be economically developed. Recent advancements in drilling technology have significantly reduced surface disturbance and fragmentation impacts associated with fluid mineral development in some areas. For example, in Wyoming, directional drilling has increased by a factor of 8 and horizontal drilling by a factor of 40 over the past decade (Applegate and Owens, 2014). Modern fields can now often be developed using a single pad per section with multiple directional or horizontal wells, minimizing the need for additional surface infrastructure. These improvements, including horizontal laterals that now extend two to three miles, have greatly reduced the overall footprint of development. Application of controlled surface use (CSU) stipulations allow some use and occupancy of the surface. CSU stipulation allows the BLM to require special operational constraints beyond those specified in 43 CFR Part 3101.1-2, or to require protective measures (restrictions on noise levels) to protect GRSG. A CSU stipulation can influence the location and level of operations within the subject area.

TL stipulations may be necessary to protect GRSG and their habitats from impacts of development. These stipulations are necessary if habitat impacts cannot be mitigated within the standard 60-day suspension of

operation period afforded by regulation. Areas where TL stipulations are applied would be temporarily closed to fluid mineral exploration and development, surface-disturbing activities, and intensive human activity during identified time frames based on seasons or GRSG breeding times. While some operational activities, such as production and maintenance, would be allowed at all times, construction, drilling, completions, and other operations considered to be intensive in nature would not be allowed during the restricted time frame. Most activities can be initiated and completed outside of the dates specified in the TL stipulation.

Applying COAs, which include RDFs and conservation measures, to existing leases would directly impact fluid mineral operations. These RDFs and conservation measures would include standards such as noise restrictions, height limitations on structures, design requirements, water development standards, remote monitoring requirements, and reclamation standards. Application of these requirements through COAs could impact fluid mineral operations by increasing costs if it resulted in the application of additional requirements or use of more expensive technology than would otherwise have been used by operators. Impacts of these COAs would be mitigated where exceptions limit their application. This would occur where a COA was not applicable or where site-specific consideration merited slight variation. When considering exploration and development on areas leased for fluid mineral resources in PHMAs (and IHMA in ID), including geothermal, application of the RMP lease stipulations, minimization measures, and RDFs/BMPs as APD COAs will be considered through completion of the environmental record of review (43 CFR Part 3162.5 and 36 CFR Part 228.108), including appropriate documentation of compliance with NEPA.

Placing limits on geophysical exploration could reduce the availability of data on fluid mineral resources and could increase costs and risks of fluid mineral development if the limits required use of more expensive technology or did not allow detailed characterization of some areas. TLs on geophysical exploration would delay exploration and development activities and could cause equipment shortages because much of the exploration would need to occur during the same time period.

Requiring master development plans and unitization could cause direct impacts on fluid minerals through increased costs of fluid mineral extraction resulting from delays in the permit approval process until additional site-specific planning efforts are completed. Unitization typically has been initiated at the operator's discretion and can increase development efficiency.

Management actions creating ROW exclusion or avoidance areas could indirectly prevent or increase the cost of fluid mineral extraction by limiting the available means for transporting fluid minerals to processing facilities and markets. New natural gas pipelines could not be built in an ROW exclusion area. Habitat impacts would be mitigated where exceptions were allowed for collocation of new ROWs within existing ROWs. Identification of ROW avoidance areas, while not creating absolute barriers to use of the area for access roads or pipelines, or for locating surface facilities on federal lands for the purpose of accessing private minerals, could make permissible facilities infeasible for technical or economic reasons. Some other potential management actions or BMPs could also affect costs that would make a project infeasible, such as ROW collocating requirements applied to a new pipeline along an existing road that follows a long, indirect, or topographically difficult route. ROW exclusion and avoidance areas will limit natural gas line construction which would lead to more flaring of gas, which has resource waste and air quality implications. This would hamper the ability to get natural gas to domestic and export markets.

Proposed RMP Amendment

Rangewide Environmental Consequences

Under the Proposed RMP Amendment, impacts to fluid minerals would be similar to those described for Alternative 5 for fluid mineral objectives and allocations. In addition, management of PHMA with limited exceptions would be as NSO with no waivers, exceptions and modifications which would further limit the potential for fluid mineral development in these areas. Requiring coordination with project proponents to promote measurable conservation objectives could add constraints to fluid mineral development but would allow project proponents input. Overall, the Proposed RMP Amendment would have more restrictions on fluid mineral development compared to Alternative 1. GHMA would be open rangewide, but with the state variations as noted below.

State-Specific Environmental Consequences

Exceptions in PHMA vary in CO, WY, MT/DK, OR, and NV/CA. For areas already leased, WY allows for exceptions to NSO within 0.6 miles if the development will not impact GRSG habitats and GRSG behavior. MT would not allow exceptions within 0.6 miles of an active lek, and CO would extend the NSO to 1.0 mile protecting these breeding habitats. In ID, OR, and NV/CA the exceptions would apply to areas beyond 3.1 miles of active leks. These state variations would allow for some additional fluid mineral developments in certain instances and locations.

The oil and gas lease stipulations summarized in **Appendix 2** would be applied in MT/DK; these stipulations would add restrictions to oil and gas developments as described in in *Nature and Types of Effects*. Applying a 5% disturbance cap at the project scale in MT/DK and WY, and a 3% disturbance cap at the HAF fine scale area would limit fluid mineral developments in certain areas, although it could allow for more potential fluid mineral development rangewide. Compensatory mitigation must be in place when an exception is granted, as described under Alternative 4. To grant an activity based on compensatory mitigation in Colorado, the compensation project must be planned, funded, and approved in coordination with the State of Colorado which could include additional requirements. Impacts from the NSO in WY would be the same as described for Alternative 5, meaning similar protections would apply.

Impacts from consistency in stipulations in MT/DK HMAs and from closing the Upper Missouri River Breaks National Monument to fluid mineral leasing and development would be the same as those described for Alternative 3. This means that closing PHMA to fluid mineral leasing would eliminate the potential for fluid mineral developments more than under Alternative 1, though valid, existing leases may still be developed.

In GHMA OR would retain a NSO designation, and UT would be NSO near leks and apply seasonal limitations. MT/DK would apply a NSO within 0.6 miles of active leks and crucial winter GRSG ranges, and UMRBNM would be closed. WY would apply NSO within 0.25 miles of active leks (this would also apply in SHMA). CO and NV/CA would apply CSUs and seasonal limitations around leks. These state-specific variations would add constraints to fluid mineral developments when compared to Alternative 1 and are similar to those analyzed in Alternative 5.

Cumulative Effects

The cumulative impact analysis area used to analyze cumulative impacts on fluid mineral resources is the planning area, regardless of mineral ownership. The cumulative impact analysis area includes all lands and mineral estate within the range of GRSG including other federally managed lands, and adjacent state, Tribal, county, and privately owned lands. The time frame for cumulative environmental consequences for future actions is 20 years. Ongoing, planned and expected future actions in and near the cumulative impact analysis

area would influence conditions surrounding fluid mineral development and the development of supporting infrastructure in the cumulative impacts analysis area. The closures, restrictions, and stipulations considered in the alternatives and discussed in the context of the decision area for analyzing direct and indirect impacts, are analyzed here in the context of the entire planning area to assess their contribution to cumulative impacts on fluid mineral resources.

Mineral leasing, exploration, and development are occurring and will continue to occur throughout the planning area. These include activities associated with fluid minerals (oil, gas, and geothermal), locatable minerals, leasable minerals, and mineral materials. Impacts associated with mineral exploration and development in GRSG habitat relate to surface and subsurface disturbance from exploration and development actions and infrastructure constructed to support these activities. The surface and subsurface disturbance from these activities contribute to habitat removal, alteration, and fragmentation, changes in GRSG use patterns, and the potential for invasive plant introduction.

Past, present, and reasonably foreseeable development trends for fluid minerals and locatable minerals in the planning area are included in the RFD updates for those resources, **Table 14-1** lists many projects, plans and actions that could or are likely to impact fluid mineral exploration, leasing, and development. Past, present, and reasonably foreseeable actions and conditions in the cumulative impact analysis area that have affected and will likely continue to affect fluid mineral leasing and development include, past, present, and continued mineral exploration, development, leasing, and management decisions on BLM-administered lands as well as on other federal, state, and Tribal lands.

State laws, regulations, and permitting for fluid mineral development activities intended to prevent or reduce environmental or public health impacts would likely confer incidental protection to GRSG and could reduce levels of fluid mineral development. Similarly, policy and land use plan decisions by the BLM, other federal agencies, and state agencies, that would apply closures, restrictions, or stipulations on fluid mineral leasing and development intended to protect other resources, could result in reductions in the availability of fluid minerals for development. The level of development of oil and gas resources is in large part dependent on global resource prices which can be impacted by a variety of factors such as the cost of development, changes in demand, geopolitical instability, new technology, and the availability of alternative energy sources including geothermal development. The cumulative impact analysis area for fluid minerals includes all lands within the range of GRSG including other federally managed lands, and adjacent state, Tribal, county, and privately owned lands, however due to the global nature of the oil and gas markets certain actions, projects or trends that are further removed can also contribute to cumulative impacts on oil and gas. Areas with a high potential rating, and areas with existing and historical developments are more likely to be the focus of future development interest. Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect fluid minerals are existing and planned fluid mineral development projects outside the decision area, changes to BLM policy or requirements; changes to land use plan allocations; GRSG plans developed by individual states, especially state plans that have regulatory authority (Wyoming, Montana, Nevada, and Oregon); other multi-state plans and actions conducted by the BLM or other federal agencies, such as the westwide energy corridors plan, and the designations of special management areas such as wilderness areas or national monuments. Reductions in fluid mineral development in the planning area may occur because of restrictions applied by any of these plans or actions, or by plans and actions not known at this time. These reductions would not vary by alternative and would have cumulative impacts on fluid minerals similar to those of the management actions being considered in this Proposed RMP Amendment/Final EIS.

Comparison of Alternatives

Under all alternatives, the current trends for oil and gas development activities in the planning area are expected to continue, however the locations and intensity of development would likely experience changes in some areas due to the impacts of the alternatives. The management actions proposed under this Proposed RMPA/Final EIS would cumulatively impact fluid mineral development through surface use restrictions (e.g., closures, and NSO, CSU, and TL stipulations) that ultimately would decrease the amount of oil and gas development in the planning area during the planning period. Closures and surface use restrictions, such as NSO stipulations, could also cause an operator to move to nearby private, tribal, or state land if similar resources are available and recoverable with no such restrictions. However, many state plans or state fluid mineral regulations require actions to avoid, minimize, or mitigate impacts from land uses on GRSG, which would likely result in some restrictions on fluid mineral development within GRSG habitat. Surface use restrictions could also prevent or restrict the development of some infrastructure necessary for fluid mineral development. The application of disturbance caps or limitations proposed under this Proposed RMPA/Final EIS could cumulatively impact fluid mineral development through limitations on additional development in some areas.

Alternative 1 reflects the HMA boundaries from the 2015 amendments. Most states are NSO (in PHMA and IHMA) and/or have seasonal restrictions. PHMA is also subject to density and disturbance limits. Colorado closes PHMA within 1 mile of leks to fluid mineral leasing.

In Alternative 2, PHMA management would be the same as Alternative 1, except Colorado changed the area within 1 mile of an active lek from closed to NSO for both PHMA and GHMA. In GHMA, management would be the same as Alternative 1, except Colorado changed the closure areas to NSO.

Under Alternative 3, management would focus on maximum protection of GRSG. Alternative 3 would conserve and manage GRSG habitats to support persistent, healthy populations, consistent with the BLM's sensitive species policy and in coordination with state wildlife agencies. In areas with large, contiguous areas of BLM-administered lands, conservation and management should maintain existing connectivity between GRSG populations. This effect would be limited in areas with BLM-administered lands interspersed with lands managed by other agencies or individuals. With all of PHMA closed to new fluid mineral leasing, this alternative would be the most restrictive and limit development of fluid mineral resources more than other alternatives.

Cumulative impacts on fluid minerals would be greater under Alternative 4 compared with Alternatives 1 and 2 due to the acreage that would be managed as PHMA, but impacts would be less than Alternative 3. For those HMAs open to leasing under Alternative 4, the BLM would evaluate parcels identified in EOIs and determine which to analyze for potential inclusion in a lease sale. This evaluation process will follow the BLM's policies for lease sales. The amount of fluid mineral acreage available for leasing under this alternative is similar to Alternative 1. However, areas that would be leased under Alternative 4 would depend on received EOIs and evaluated based on fluid mineral and GRSG habitat criteria. Areas in proximity to existing production and areas where mitigation efforts could minimize habitat impacts will have higher priority review and therefore will be more likely to be leased and developed.

Alternative 5 would have similar cumulative impacts as Alternative 4, though impacts would be less due to less acreage being managed as PHMA under Alternative 5. Under Alternative 6, ACECs would be added to the proposed management. ACECs would be managed as open to leasing subject to NSO stipulations with an exception/modification to allow occupancy if there are drainage concerns from adjacent development and if it can be demonstrated that no direct or indirect impacts on GRSG or their habitats will occur. Compared

to Alternative 5, Alternative 6 would apply NSO on additional acres, resulting in a decrease in fluid mineral leasing and development. Under the Proposed RMP Amendment, PHMA would be open to leasing subject to NSO with exceptions/modifications.

Cumulative impacts would be greater under the Proposed RMP Amendment compared to Alternatives 1, 2, 4, and 5 but less than Alternative 3 due to the management of PHMA with limited exceptions which would likely result in a decrease in fluid mineral development in these areas.

4.10.2 Nonenergy Solid Leasable Minerals

Nature and Type of Effects

Closing an area to nonenergy solid mineral leasing would directly impact nonenergy solid leasable minerals to the extent such minerals are known to exist by removing the possibility of any such mineral resources in that area from being accessed and extracted.

Management actions creating ROW exclusion or avoidance areas would directly and indirectly impact nonenergy solid leasable mineral extraction by limiting the available means for accessing mineral resources and transporting nonenergy solid leasable minerals to processing facilities and markets. For example, solution mining of trona requires essential infrastructure like wells, pipelines, and roads. While these can affect GRSG habitat, construction timing and methods are coordinated with state and federal agencies to minimize impacts. Nonenergy solid leasable mineral operations may be moved to private lands where access is easier, thereby resulting in a loss of federal royalty income if the federal minerals could not be accessed from the private lands, but also reducing the number of operations on federal mineral estate. However, while access from private lands may be possible in some cases, it is not always feasible or economical. In areas with mixed land ownership, such as the checkerboard pattern, developing resources often requires ROWs over federal land, making reliance on private access impractical. ROW avoidance areas could allow for limited ROW development, so impacts of avoidance areas would be less severe than those of ROW exclusion areas. Habitat impacts would be mitigated where exceptions were allowed for collocation of new ROWs within existing ROWs.

Application of RDFs, including such standards as noise restrictions, height limitations on structures, design requirements, water development standards, remote monitoring requirements, and reclamation standards, would place additional requirements on exploration and development.

Proposed RMP Amendment

Rangewide Environmental Consequences

Closure of PHMA but allowing for expansion of existing leases would reduce restrictions on nonenergy leasable mineral development in PHMA compared with Alternative 1. By not allowing expansion of existing leases in PHMA with limited exceptions, the Proposed RMP Amendment would limit nonenergy leasable mineral extraction and could increase costs for some operators who would have to find new sites to develop in order to expand operations.

State-Specific Environmental Consequences

In WY, expansion of existing operations would be permitted but subject to CSUs and TL to minimize disturbance to GRSG. In PHMA with limited exceptions, WY would be closed except in cases of human health and safety. In CO, PHMA would have TL for construction, drilling or completions within 4 miles from occupied leks from March 1 to July 15 to conserve breeding birds and habitats. GHMA (and SHMA in WY) would be open but state-specific minimization measures would be applied to conserve GRSG and their habitats. The addition of the state-specific minimization measures could further constrain nonenergy leasable

mineral development in GHMA. NV/CA would allow project level considerations that demonstrate no impact to GRSG in PHMA, which may allow for additional development in certain instances. In ID IHMA would be open in Known Phosphate Leasing Areas (KPLAs) subject to RDFs and buffers, IHMA outside KPLAs, open subject to disturbance thresholds, RDFs and buffers.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect nonenergy leasable minerals are existing and planned nonenergy leasable development projects outside the decision area. Cumulative impacts on nonenergy leasable mineral development focuses on the impacts of conservation measures to protect GRSG. Management actions in the form of surface use restrictions such as closing areas to new leasing of nonenergy leasable minerals, prohibitions on surface mining, or creating ROW exclusion or avoidance areas, would impact nonenergy solid leasable mineral extraction by limiting the available means for accessing mineral resources and transporting nonenergy solid leasable minerals to processing facilities and markets. Additional management actions that would cause impacts on nonenergy leasable minerals are defined by results from application of RDFs, including such standards as noise restrictions, height limitations on structures, design requirements, water development standards, remote monitoring requirements, reclamation standards, and additional requirements on exploration and development. Closures and surface use restrictions could also cause an operator to move to nearby private, Tribal, or state land if similar resources are available with fewer such restrictions, however many states apply management actions to protect GRSG.

Comparison of Alternatives

Under Alternative 1 most of the PHMA and IHMA in the planning area is closed to new leasing of nonenergy leasable minerals but states can consider expansion of existing leases. Idaho keeps known phosphate leasing areas open to leasing, and Wyoming keeps the Known Sodium Leasing Area open to exploration and consideration for leasing and development but closes it to prospecting permits. In some Wyoming field offices sodium leasing will be considered on a case-by-case basis and would be subject to conditional requirements. Wyoming and Montana have restrictions based on density and disturbance limits. Applying lek buffer distances when approving actions could also restrict development of infrastructure related to nonenergy solid leasable mineral development, as could application of RDFs. There is no specific allocation for GHMA but most states have minimization measures.

Under Alternative 2, PHMA all states would apply the same management and expect the same resulting impacts on nonenergy leasable minerals as described under Alternative 1. The only change is that Nevada would add exception criteria to the closure in PHMA, described under the Nevada Environmental Consequences section. Individual states would have different mitigation measures that could influence the cumulative impacts under Alternative 2 but impacts on nonenergy leasable minerals would be similar to Alternative 1.

Under Alternative 3, more acres would be affected by closures, all PHMA would be closed to leasing, and fringe leases to expand existing mines would not be permitted in areas managed as closed. This would increase the level of cumulative impacts on nonenergy leasable minerals by reducing the amount of the planning area available for leasing and development of these resources, thus preventing development of known reserves and undiscovered deposits in PHMA which would reduce the availability of important minerals such as phosphate and sodium for use.

Under Alternative 4 nonenergy leasable minerals would be managed the same as under Alternative 1, all states are closed to leasing nonenergy leasable minerals in PHMA but can consider expansion of existing leases. Wyoming has seasonal restrictions, and Wyoming and Montana are subject to density and disturbance limits. IHMA (Idaho) is open in known phosphate lease areas, and Wyoming keeps the Known Sodium Leasing Area open to exploration and consideration for leasing and development but closes it to prospecting permits. In some Wyoming field offices sodium leasing will be considered on a case-by-case basis and would be subject to conditional requirements. The impacts would be the same as described under Alternative 1, above.

Alternative 5 and the Proposed RMP Amendment would have the management and same impacts as Alternative 4. However, under the Proposed RMP Amendment PMHA with limited exceptions would be closed to new leases including fringe acreage leasing, this would prevent expansion of existing operations in these areas which could reduce the availability of some nonenergy leasable minerals. Alternative 6 would have the same as Alternative 5 except the ACECs would be closed to new leasing and to fringe leasing expansion associated with existing operations. Impacts would be the same as described under Alternative 1 except that any existing operations within ACECs could not expand on federal mineral estate and no new operations would be possible in ACECs, which could reduce the availability of some nonenergy leasable minerals.

4.10.3 Coal

Nature and Type of Effects

Closing an area to new coal leasing would directly impact coal production. This would be the result of removing the possibility of coal resources in that area from being accessed and extracted. In some cases, mining operations may move to nearby private lands, thereby reducing the number of operations on federal mineral estate. Indirect impacts include loss of coal production for public use and for generating sales and tax revenues and federal royalties from production, as well as higher cost of location of surface facilities and adverse financial impact on lessee to accessing a portion of mineral estate from nearby private land.

Reduced access to existing coal leases such as NSO or equivalent on all or parts of new leases, ROW exclusions on lands needed for road and utility access, and restrictions on amount or location of surface disturbing activities on new or existing leases would impact coal production. Indirect impacts include reduced coal production for public use and for generating lease sales and tax revenues and federal royalties from production. In areas with reduced access, applying NSO stipulations would restrict the ability of coal resources to be developed or extracted. To avoid these restrictions, operators may relocate, which would reduce coal development on federal mineral estate and resulting royalties.

Management actions creating ROW exclusion or avoidance areas could indirectly impact coal extraction by limiting the available means for accessing coal resources and transporting coal to processing facilities and markets. Coal operations may be moved to nearby state or Tribal lands where access is easier, thereby reducing the number of operations on federal mineral estate. ROW avoidance areas could allow for limited ROW development, so impacts of avoidance areas would be less severe than those of ROW exclusion areas. Habitat impacts would be mitigated where exceptions were allowed for collocation of new ROWs within existing ROWs. Habitat impacts would be mitigated where the area needed for coal processing and transportation infrastructure is included in the lease boundary. Indirect impacts include reduced coal production for public use and for generating lease sales and tax revenues and federal royalties from production.

The checkerboard land pattern, where alternating sections of land are privately and federally owned, poses potential challenges for large-scale mining operations, which rely on accessing both private and federal lands. Restrictions like ROW exclusions or NSO stipulations can indirectly impact these operations, leading to economic impacts, including reduced federal royalties, which can also affect state income.

Measures such as seasonal closures, burial requirements for electric distribution lines, noise abatement, visual screening, and specialized fencing would reduce development in otherwise permissible areas (fewer leases, fewer or smaller expansions of existing mines), particular for marginal coal resource areas or during periods of low market prices for coal. Indirect impacts include reduced production of coal for public use and for generating lease sale and tax revenues and federal royalties from production as well as adverse financial impact on lessee (especially for restrictions on existing leases).

Proposed RMP Amendment

Rangewide Environmental Consequences

Impacts under the Proposed RMP Amendment would be the same as under Alternative 4. That is, under the Proposed RMP Amendment, the consideration of PHMA as essential habitat for unsuitability evaluation in Colorado, Montana/Dakotas, Utah, and Wyoming states that PHMA would be removed, as some areas of PHMA do not meet essential habitat criteria. Almost all essential habitat is likely to overlap with PHMA so the impacts would be approximately the same as described under Alternative 1. Coordination with the appropriate State agency and the determination of essential habitat for maintaining GRSG as per the suitability criteria at 43 CFR Part 3461.5(o)(1) will consider site-specific information associated with lease nomination areas as part of the unsuitability process. The Proposed RMP Amendment will not modify any existing suitability and unsuitable determinations. The management under the Proposed RMP Amendment would apply rangewide, but the planning area in Idaho, Nevada, California, and Oregon does not have coal mineral in deposits with a reasonably foreseeable possibility of development so no impacts on coal would occur in these states.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect coal are existing and planned coal development projects outside the decision area and federal coal policy decisions.

Closing an area to new coal leasing would directly impact coal production. This would be the result of removing the possibility of coal resources in that area from being accessed and extracted.

Comparison of Alternatives

Under Alternative 1, Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming manage PHMA as "essential habitat" for unsuitability evaluation. This would contribute to cumulative impacts on coal resources by preventing the development of federal coal resources in PHMA outside of existing leases.

Under Alternative 2 all states would apply the same management as under Alternative 1, except Utah where determination of essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1) would be done in coordination with the State. Management and impacts on coal resources would be approximately the same as described under Alternative 1. Idaho, Nevada, California, and Oregon did not address coal due to absence of coal mineral in deposits with a reasonably foreseeable possibility of development, and no change in cumulative impacts is expected in these states.

Under Alternative 3, all areas managed for GRSG would be PHMA. All essential habitat would be identified as part of future unsuitability criteria. Compared to Alternative 1 where all PHMA would be considered as "essential habitat" for unsuitability evaluation, this change in management might give flexibility to consider leasing in small areas that were included in PHMA but do not meet the criteria for essential habitat, such as important connectivity areas. Impacts of this management change would likely be minimal because the amount of PHMA that does not meet essential habitat criteria is small. Impacts of this alternative would otherwise be the same as described under Alternative 1.

Under Alternative 4 the consideration of PHMA as essential habitat for unsuitability evaluation in Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming would be removed as some areas of PHMA may not meet essential habitat criteria. However almost all essential habitat is likely to overlap with PHMA so the impacts would be approximately the same as described under Alternative 1.

The proposed management and cumulative impacts under Alternatives 5, 6, and the Proposed RMP Amendment would be the same as under Alternative 4.

4.10.4 Locatable Minerals

Nature and Type of Effects

Recommending areas for closure to the mining laws for locatable exploration or development does not restrict any activities and therefore, such recommendation does not have any impacts. The BLM could ask the Secretary of the Interior to propose and make a withdrawal of the land from location and entry under the Mining Law of 1872 pursuant to Section 204(a) of FLPMA. Proposing and making a withdrawal is not a land use planning process. Should the Secretary propose a withdrawal, the proposal would require environmental and other analysis under NEPA and other applicable authorities before the land could be withdrawn. For purposes of this planning initiative, the alternatives analysis includes a description of the likely environmental effects should the Secretary propose and make a withdrawal in the future (e.g., reduced potential for behavioral disturbance and habitat loss/alterations).

If lands are withdrawn by the Secretary, the only locatable mineral resources that may be developed on withdrawn lands during the term of the withdrawal are those associated with mining claims that the BLM has determined to be valid; consequently, production of locatable mineral resources on federal mineral estate may decrease during the term of the withdrawal if such resources are situated on lands where there are no valid mining claims. If minerals of interest are not known to occur on the lands within the withdrawal, then the withdrawal would not have an effect, even where there are no mining claims.

Even where there are valid claims existing as of the effective date of the withdrawal or preceding segregation, production of locatable mineral resources may also be reduced by a withdrawal due to the additional administrative and financial requirements associated with exploration and mining on withdrawn lands. This BLM verification process can take several years in some cases. Operators are also required by regulation to pay the cost for the BLM's verification of mining claim validity. The additional regulatory process and cost could delay or curtail mineral exploration and development on withdrawn lands during the term of the withdrawal, assuming minerals of interest occur within the withdrawn lands. Alternative 3 also includes ACECs as a conservation measure. Designating areas as ACECs in an RMP could impact production of locatable mineral resources because such designations would impose additional administrative and financial requirements certain exploration operators. Operators are required to file a plan of operations for any surface disturbing activities greater than casual use in those areas, regardless of the acreage involved, in accordance with 43 CFR Part 3809.11(c)(3). The requirement for plans of operations within ACECs may

result in longer timeframes and additional costs to developers for those exploration operations occurring on fewer than five acres that would otherwise have been allowed under a notice.

Under all alternatives, the BLM would request that locatable mineral operations apply design features to locatable minerals operations to benefit GRSG. These measures could be voluntarily implemented by the operator and would become enforceable if incorporated in the plan of operations approval. To the extent a design feature or best management practice to benefit GRSG is required to comply with applicable state or federal law or is otherwise required to prevent unnecessary or undue degradation as defined in 43 CFR Part 3809, the BLM may require the operator to incorporate the design feature or best management practice in its plan of operations.

Where disturbance caps are applied, surface disturbance from locatable operations would be counted towards the disturbance cap, but the BLM may not prevent, unduly restrict, operations in areas where the disturbance cap was exceeded.

Proposed RMP Amendment

Rangewide Environmental Consequences

Under the Proposed RMP Amendment, no areas would be recommended for withdrawal. All public domain lands would be open unless currently withdrawn. This would result in no effects on locatable minerals.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect locatable minerals are existing and planned locatable mineral operations and withdrawal decisions, both of which occur outside of the RMP process. The Secretary proposes and makes withdrawals not through BLM land use planning but according to a separate process pursuant to section 204 of FLPMA. In areas withdrawn from location and entry under the Mining Law, production of mineral resources is generally lower compared with similarly mineralized areas that are not withdrawn; thus a withdrawal potentially decreases production of locatable mineral resources on federal mineral estate. Locatable mineral resources are associated with the geological formations or units they are found within, which are typically localized and do not encompass large areas. Withdrawals may impact the availability of certain mineral resources over a large area, or they may, not impact any minerals of interest. An assessment of locatable mineral occurrence potential is important to provide context associated with the impacts of any particular withdrawal.

BLM authorization of locatable mineral resources within areas withdrawn from location and entry under the Mining Law is also subject to additional processing and cost considerations as compared to mining operations on lands that are not withdrawn. The BLM will not approve a plan of operations or allow notice-level operations to proceed on withdrawn lands until a mineral validity examination report has been completed that confirms that every mining claim on which operations are proposed was existing and valid at the date of withdrawal and remains valid. If the BLM determines that some or all of the mining claims on which operations are proposed are invalid, it will disapprove the proposed operations, and the mineral resources would not be developed. Mineral validity examination reports can take several years to complete and can cost hundreds of thousands of dollars. Withdrawals and other actions that increase the costs of locatable mineral development would cumulatively impact locatable mineral development as these actions ultimately could decrease the amount of locatable mineral resources produced in the planning area during the planning period.

Comparison of Alternatives

Alternative 1 recommended the withdrawal of all SFAs, from location and entry under the United States mining laws. This recommendation already occurred in the 2015 Plans and had no impact.

No recommendations for the withdrawal of SFAs from location and entry under the United States mining laws are made under Alternative 2, except in Montana which did not remove the recommendation for withdrawal of SFAs language as described in Alternative 1.

Under Alternative 3, the PHMA would be recommended for withdrawal from location and entry under the United States mining laws. Recommending areas for withdrawal from location and entry under the U.S. mining laws does not restrict any activities and therefore, such recommendation does not have any impacts. A withdrawal is initiated and considered not through land use planning but through a separate process outlined in section 204 of FLPMA. Only the Secretary may withdraw lands through a Public Land Order. If the Secretary were to withdraw the lands as recommended in Alternative 3, there would be limited opportunities for locatable mineral development in the decision area. Alternative 3 would designate parts of the planning area as ACECs. Pursuant to 43 CFR Part 3809.11(c)(3), in ACECs operators must file a plan of operations for all operations causing surface disturbance greater than casual use. Processing plans of operations is more time-consuming than processing an exploration notice. Additionally, designation of an ACEC would increase costs to those operators who would otherwise conduct exploration under a notice, and potentially reduce development of locatable mineral resources on BLM-administered mineral estate in the planning area that would have resulted from exploration that could have been done under a notice. The requirement for a plan of operations for all locatable mineral activities causing surface disturbance greater than casual use would likely result in less impact on locatable minerals than a withdrawal.

Alternatives 4, 5, and the Proposed RMP Amendment would not recommend any areas for withdrawal from locatable mineral entry. This alternative would not contribute to cumulative impacts on locatable minerals because recommendations for withdrawal have no impact.

Alternative 6 would designate parts of the planning area as ACECs. Pursuant to 43 CFR Part 3809.11(c)(3), in ACECs operators must file a plan of operations for all operations causing surface disturbance greater than casual use. Processing plans of operations is more time-consuming than processing an exploration notice. Additionally, designation of an ACEC would increase costs to those operators who would otherwise conduct exploration under a notice, and potentially reduce development of locatable mineral resources on BLM-administered mineral estate in the planning area that would have resulted from exploration that could have been done under a notice. The requirement for a plan of operations for all locatable mineral activities causing surface disturbance greater than casual use would likely result in less impact on locatable minerals than a withdrawal.

4.10.5 Mineral Materials

Nature and Type of Effects

The predominant mining method for mineral materials is surface mining; therefore, any restrictions on surface-disturbing activities effectively close the subject areas to mineral material mining unless an exception is provided. Demand for mineral materials is generated primarily from road maintenance needs, as well as commercial projects and public use. Closing areas to mineral material disposal would directly impact mineral materials by removing the possibility of mineral resources in that area from being accessed and extracted for use. In areas closed to mineral material disposal users would have to transport materials needed for road maintenance and other uses from farther away resulting in increased costs associated with transportation of

the material and make projects more expensive to pursue in some areas which would cause cancelled projects and poorer road conditions in some areas. Where areas are closed to mineral material disposal, new pits could be relocated to nearby areas open to disposal if feasible. If demand for mineral materials could not be met by pits operated on federal lands, pits could be moved onto private or state lands where resources exist, this would generally increase costs associated with road construction and maintenance and other uses conducted by state, county and local governments which are able to develop federal mineral materials free of charge under free use permits. Closing an area to mineral material sales but not to new free use permits would remove this impact of increased costs from road maintenance and other mineral material uses by state, county, and local governments and non-profit organizations which are eligible for free use permits, but would still result in impacts on commercial and private users. Another effect is the potential for mineral materials mining to shift from the BLM to state or private lands. In that case, the impacts of mining could be shifted to areas where such impacts would be a nuisance to farmers and residential areas. Management which proposes closing existing mineral materials pits would exacerbate these impacts by causing more immediate relocation of sources and reductions in mineral materials production. In areas where closed but with an exception for expansion of existing pits impacts on both private users and state, county and local governments would likely be reduced in the short term as these users could continue using existing sources, but if resources at and around existing locations are exhausted as is likely at some locations in the longer term unless resources at and around the site are exhausted.

Applying TLs and seasonal travel restrictions could delay extraction of mineral material resources. County road districts and other users would be required to schedule their projects around the TL, which could result in the need to stockpile materials off-site and handle materials twice, thereby increasing costs.

Management prohibiting or restricting the construction of new roads and limiting reroutes and upgrades could make accessing mineral material deposits more costly or infeasible.

Managing areas as ROW avoidance or exclusion would decrease new construction of infrastructure and thereby decrease demand for mineral materials in those areas. This could result in a decrease in the amount of material extracted, and the number or size of mineral material pits on federal mineral estate. New mineral material pits may not be able to be developed in areas managed as ROW avoidance or exclusion because new infrastructure to these pits could not be constructed in exclusion areas and would be difficult to construct in avoidance areas. In many cases access to a mineral material development is included as part of the permitted operational area and as a result would not need a separate ROW permit. In most cases areas managed as ROW exclusion would also be managed as closed to mineral material development.

In ROW avoidance areas the BLM may manage and maintain existing routes. Some route improvements could be made for fuel breaks and to allow for quicker wildfire suppression response in GRSG habitat. In these situations, there will be a demand material for road maintenance and improvement (via Free Use Permit to the BLM) from pits in GRSG HMAs.

Closing areas to fluid mineral leasing would preclude oil and gas development in those areas which would reduce demand for mineral materials for use constructing well pads and roads. Application of NSO stipulations could have the same effect if the stipulations prevented oil and gas development.

Proposed RMP Amendment

Rangewide Environmental Consequences

Under the Proposed RMP Amendment, PHMA would be closed, but open for new free use permits and open for the expansion of existing pits, management in PHMA with limited exceptions would add restrictions

on where new free use permits and expansions of existing pits could be developed, increasing the potential for reduced development or increased costs associated with developing mineral materials in these areas.

State-Specific Environmental Consequences

In PHMA and PHMA with limited exception, OR and WY would be open for new free use permits if the BLM can verify the area proposed for development is not habitat and would not adversely impact any adjoining GRSG habitat. This may allow for some additional saleable mineral development in certain instances. IHMA in ID would be open as would SHMA in WY. The impacts would be similar to Alternative 5.

In ID PHMA, the exception for new saleable mineral free use permits or expansion of existing permits would be less restrictive than Alternative 5, which may allow for additional saleable mineral development. Lek buffers would be reduced in IHMA and further reduced in GHMA, resulting in similar effects to those described for Minerals Management under Alternative 1.

In MT/DK PHMA and PHMA with limited exceptions would be closed to new large-scale mineral material sales but open to small-scale sales actions (less than 20 cubic yards), free use permits, and expansion of existing pits, subject to certain criteria. The allowance for small scale sales under this alternative would allow for slightly more development than under Alternative 5 but due to the limitation the on size of these sales the impacts would be effectively the same as under Alternative 5.

Cumulative Effects

Past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have affected and will likely continue to affect mineral materials are existing and planned mineral material development projects outside the decision area. The predominant mining method for mineral materials is surface mining; therefore, restrictions on surface-disturbing activities would effectively close or limit mineral material mining in the subject areas unless an exception is provided. Demand for mineral materials is generated primarily from road maintenance needs, commercial projects, and public use. Closing areas to mineral material disposal would directly impact mineral materials by removing the possibility of mineral resources in that area from being accessed and extracted for use under new contracts. Where areas are closed to mineral material disposal, new mines could relocate to nearby areas open to disposal if feasible. If demand for mineral materials could not be met by pits operated on federal lands, pits could be moved onto private, state, or Tribal lands where resources exist, this would generally increase costs associated with road construction and maintenance conducted by state, county and local governments which are able to develop federal mineral materials free of charge under free use permits. Closing an area to mineral material sales but not to new free use permits would remove this impact on road maintenance and other uses by state, county, and local governments, but would still result in impacts on commercial and private users.

Comparison of Alternatives

Under Alternative 1, mineral material development would be restricted in PHMA and IHMA (variable by state). Mineral material disposal from the 47 existing community pits in GRSG habitat would be subject to timing restrictions. These timing restrictions could impact some operations by preventing use of the pit at certain times of the year which would result in additional costs due to transporting materials from further away or stockpiling material in advance, and therefore reduce overall development of federal mineral materials in the planning area.

Under Alternative 2 proposed management and impacts would be similar to those described under Alternative 1, except in Idaho which would manage PHMA and IHMA as closed to new mineral material

sales, but open for new free use permits and expansion of existing pits, and Nevada which would allow certain exceptions to the closures. Compared to Alternative 1 these changes would allow more material use which would reduce the contribution to cumulative impacts on mineral materials.

Under Alternative 3, all areas managed for GRSG would be PHMA and mineral minerals would be closed to disposal in all PHMA. This would result in the termination and closure of all existing BLM mineral material sales, free use permits and community pits; and prevent the development and use of mineral material resources across the entire decision area. Compared to Alternative 1 this would result in a greater contribution to cumulative impacts on mineral materials in the cumulative impacts area.

Under Alternative 4, proposed management and impacts on mineral material development would be the same as described under Alternative 1, except in Idaho which would implement the same management as other states and manage PHMA and IHMA as closed to new mineral material sales, but open for new free use permits and expansion of existing pits. Compared to Alternative 1 these changes would allow more material use which would reduce the contribution to cumulative impacts on mineral materials.

Under Alternative 5, proposed management and cumulative impacts on mineral material development would be the same as described under Alternative 4. Under Alternative 6, proposed management and impacts on mineral material development would be the same as described under Alternative 4, except that ACECs would also be considered under this alternative. Under Alternative 6, ACECs would be closed to new all new mineral material sales and operations, except for free-use permits issued in order to support maintenance needs for existing local roads to ensure public safety.

Under the Proposed RMP Amendment proposed management and cumulative impacts on mineral material development would be the same as described under Alternative 4, except that within PHMA with limited exceptions the Proposed RMP Amendment would add additional criteria including a maximum size to the approval of new free use permits and expansions of existing pits. This could reduce the availability of mineral materials in and around these areas.

4.10.6 Oil Shale and Tar Sands

Nature and Type of Effects

Certain management actions and allocation-based decisions could impact the feasibility, amount, and type of development associated with oil shale and tar sands. Depending on the alternative selected, areas within some GRSG habitat management areas would be subject to surface disturbance thresholds, timing restrictions, and other GRSG protection measures. Managing public lands as ROW exclusion or avoidance areas could impact road and facility construction to access and develop those leases.

Proposed RMP Amendment

Rangewide Environmental Consequences

Colorado, Idaho, Utah, and Wyoming contain significant oil shale resources overlapping the planning area. Colorado, Idaho, and Wyoming manage these resources as fluid leasable minerals so management and impacts would be same as described under the Fluid Minerals section above.

Under the Proposed RMP Amendment, proposed management and impacts on oil shale and tar sands development would be the same as described under Alternative 1. Specifically, Colorado, Idaho, Utah, and Wyoming contain significant oil shale resources overlapping the planning area. Colorado, Idaho, and Wyoming manage these resources the same as fluid leasable minerals so management and impacts would be the same as described under Fluid Minerals for Alternative 1. The Proposed RMP Amendment impacts in

Utah are described below. Tar sands resources overlapping the planning area only exist in Utah; management and impacts on tar sands in Utah are described below.

In Utah, the BLM anticipates differing effects for oil shale and tar sands from these other states. The Proposed RMP Amendment does not change existing leasing allocation decisions for oil shale and tar sands in Utah because the ROD for the Allocation of Oil Shale and Tar Sands Resources on BLM-administered lands in Colorado, Utah, and Wyoming closed all mapped occupied GRSG habitat on BLM-administered lands to oil shale and tar sands leasing and development with the exceptions of the pending lease application in the Asphalt Ridge Special Tar Sands Area and the White River Oil Shale Research, Development, and Demonstration site and Preference Lease Right Area (BLM 2013c). Within these two areas, leasing and development would be allowed to occur. Depending on the alternative selected, GRSG habitat that overlaps the above-mentioned areas may be subject to the changes in surface disturbance thresholds, and mitigation requirements. Additionally, managing surrounding lands as ROW exclusion or avoidance areas could impact road and facility construction to access and develop those leases.

Under the Proposed RMP Amendment, no disturbance cap would be applied to anthropogenic disturbance in GHMA. The existing and pending leases would be in GHMA under the Proposed RMP Amendment, so oil shale and tar sands development could continue to occur subject to stipulations and other restrictions applied in the Vernal RMP (White River Oil Shale Preference Right Lease Area) and site-specific NEPA analyses. In GHMA, oil shale and tar sands development, as well as associated ROWs, would be subject to lek buffers and mitigation requirements, which could impact oil shale and tar sands and ROW development by restricting new surface development or requiring habitat compensation efforts.

Cumulative Effects

Analysis of the cumulative impacts on oil shale and tar sands focuses on the impacts of conservation measures to protect GRSG. These impacts could result from closure of an area to oil shale and tar sand development. In Utah, the ROD for the Oil Shale and Tar Sands Programmatic EIS (BLM 2013c) closed all of the federal mineral estate in mapped occupied GRSG habitat in Utah to oil shale and tar sands leasing except for the portion of the White River Oil Shale Research, Development, and Demonstration Preference Right Leasing Area overlapping habitat and the tar sands lease in the Asphalt Ridge Special Tar Sands Area. Management placing limitations on surface disturbing activities including the application of a disturbance cap would limit surface activities in these areas which could result in a reduction of production from oil shale and tar sands in these areas, contributing to cumulative impacts on these resources.

Under all alternatives, oil shale and tar sands development could continue to occur on federal mineral estate in Utah outside of HMAs in areas designated as open by the Oil Shale and Tar Sands Programmatic EIS. Oil shale and tar sands development could also continue to occur on state, private, and Tribal mineral estate.

4.11 ACECs AND RESEARCH NATURAL AREAS

4.11.1 Greater Sage-Grouse ACECs

General Description

ACEC designations highlight areas where special management attention is needed to protect important historical, cultural, and scenic values, or fish and wildlife or other natural resources. For the detailed analysis of effects of the alternatives and the Proposed RMP Amendment on the ACECs identified for designation under Alternatives 3 and 6, refer to **Appendix 5**, Evaluation of Areas of Critical Environmental Concern for Greater Sage-Grouse Habitat. Nature and Type of Effects

Management actions that protect resources (such as surface-disturbance restrictions and management for desired habitats) would help maintain and improve the relevant and important values within ACECs. Management actions that create the potential for resource degradation could impact the relevant and important values for which an ACEC is designated.

Improperly managed livestock grazing could impact ACEC values, depending on what the values are for each ACEC, by increasing the potential for soil erosion, increasing annual grasses, reducing perennial native vegetation, and affecting the plant communities that are the values for which the ACEC was designated. Wild horses and burros, have the capability of overutilizing vegetation, causing degradation of soil and vegetative resources as described for livestock grazing. Closing ACECs to livestock grazing could help protect relevant and important values by eliminating soil and vegetation disturbance associated with livestock grazing. However, properly managed grazing can be compatible with GRSG. Additionally, closing ACECs to all grazing may also increase the risk for wildfire due to increased fuel loads. As described in **Appendix 21**, livestock grazing is managed to meet or make progress toward land health standards, thus reducing the likelihood of adverse effects.

Energy and mineral development could impact ACEC values by increasing soil erosion potential and by removing or disrupting unique vegetation. Where GRSG habitat exists, energy and mineral development could degrade and fragment habitat. Construction, operation, and maintenance could disturb GRSG populations. The protections and limitations needed to maintain the relevant and important values of each ACEC are included in the plans that manage those ACECs. Additionally, closing ACECs to fluid mineral leasing or applying NSO stipulations would help protect relevant and important values in unleased areas.

Identifying ACECs as ROW exclusion or avoidance areas would protect relevant and important values by reducing or eliminating impacts from development requiring a ROW permit. Such developments include utilities, access roads, and renewable energy projects. Impacts from ROW development on GRSG habitat include compaction, erosion, and potentially habitat fragmentation.

HMA allocations provide a comprehensive management framework, covering a diverse array of management actions and restrictions in Alternatives 1-6 and the Proposed RMP Amendment, effectively capturing GRSG habitat and all of ACEC proposed for protection in Alternatives 3 and 6. ACEC designation adds a layer of specificity, enabling a more targeted approach to address unique relevant and important values that might not be fully covered by broader allocations. ACEC designation emphasizes and prioritizes specific concerns within designated areas, offering a mechanism to address nuances that may not be sufficiently addressed by an overarching HMA framework. Refer to **Appendix 5** for a detailed analysis of effects of the alternatives and the Proposed RMP Amendment on the ACECs identified for designation under Alternatives 3 and 6.

4.11.2 Research Natural Areas (Oregon Only)

Refer to **Appendix 17**, Proposed RMP Amendment and Analysis for key Research Natural Areas in Oregon for the analysis of effects of the alternatives on the key Research Natural Areas (RNAs) addressed in Oregon by this RMP Amendment.

4.11.3 Nature and Type of Effects

Any alternative closing all or portions of RNAs to livestock grazing could provide ungrazed comparison areas for research. In these areas, as well as the RNAs with properly management grazing, natural processes (such as plant growth and recovery, freeze-thaw periods, and microbial activity in the soil surface that results in recovery from these habitat impacts and maintains site stability and health) will predominate (BLM 2020c, p. 4-40) and all RNAs remain available for nonmanipulative research and data gathering on relatively unaltered

plant communities. Additionally, RNAs could provide opportunities for understanding how ecosystems respond to climate change.

The consequences of excluding livestock grazing from all or portions of RNAs may result in other habitat impacts such as an escalation in fine fuels, potentially heightening susceptibility to wildfires, which in turn could pose a threat to relevant and important values.

Management to protect GRSG under the various alternatives would likely provide additional protections for existing ACECs and, at a minimum, would provide complementary management. This would be particularly true in ACECs where GRSG conservation was identified as a value.

For the detailed analysis of key RNAs, refer to **Appendix 17**, Proposed RMP Amendment and Analysis for Key Research Natural Areas in Oregon. This appendix provides excerpts and background information from the 2015 (and 2019) BLM Oregon GRSG EIS and plan amendment efforts, as well as newer information about the BLM Oregon key RNAs relevant to this current planning and analysis process.

4.12 Social and Economic Conditions (Including Environmental Justice)

4.12.1 Nature and Type of Effects

There are different types of social and economic impacts that could occur from BLM decisions outlined under the alternatives. Impacts could be associated with market conditions or nonmarket and social conditions. Effects on social and economic conditions and environmental justice populations could be temporary or long term. Communities and groups could be directly impacted or indirectly impacted. Lastly, impacts on economic contributions, social conditions, and environmental justice populations could vary across different geographical regions. These differences in types of social, economic, and environmental justice impacts are discussed in the following subsections with how they relate to potential changes from BLM decisions that change each resource.

Fluid Minerals (Oil and Gas) Management

BLM decisions regarding changes in restrictions and stipulations on fluid mineral leasing for the protection of GRSG could affect local economies and social conditions within communities throughout the planning area by inhibiting new oil and gas development or by making it more difficult to sustain current levels of fluid mineral activity in the future (See **Section 4.10.1**, Fluid Minerals).

Some market impacts from changes in oil and gas operations include changes in jobs, income, economic output, and tax revenue that result from drilling and completion expenditures as well as oil and gas production revenue. Direct market impacts are the changes in economic contributions that occur to the oil and gas industry, such as displaced fluid mineral jobs. Secondary market impacts include changes in jobs, income, and economic output that occur in industries other than fluid mineral industries, such as job reductions in manufacturing industries that supply the equipment needed for mineral extractions or economic output reductions in the retail sector due to reduced personal expenditures of mineral employees. Changes in oil and gas activity also can impact revenue streams to federal, state, and local government through reduced revenues from royalties, rents, bonus bids, severance taxes, ad valorum taxes, other local and state taxes and fees, and sales and use taxes.

Another secondary market impact could stem from changes in the provision of public services and infrastructure as a result of changes in spending by the government sector. Declines in production will reduce revenue streams to state and local governments and likely lead to budget shortfalls, which will create challenges to provide existing levels, quality, or quantity of public services as well as maintaining existing

infrastructure. These public services and infrastructure that are funded by mineral revenue, such as education, road maintenance, parks and recreation, policy and fire management, as well as social services, provide lots of value to local communities because they help support and ensure safeguards are in place for those who might not have the resources themselves. These public services are especially important to small rural communities that have limited alternatives for these services.

Closely interconnected with the impacts on market and economic activity are impacts on nonmarket and social conditions.[1] These impacts on social and nonmarket conditions due to changes in fluid mineral development are impacts that cannot be measured through market mechanisms, and they include direct changes to the lifestyles and culture of those who rely on the mining industry for employment and income. Secondary nonmarket or social impacts on the surrounding communities from potential changes in oil and gas development and production could include changes in access to clean air, health and safety from changes in air quality and GHG emissions, and visitor and viewer enjoyment from changes in air quality (Su and Lee 2022). Communities could face adverse impacts on these resources under alternatives and in areas where fluid mineral leasing would be managed as CSU, if there is an increase in mineral development (see **Section 4.13**, Air Resources and Climate).

Potential changes in oil and gas development could impact surrounding communities through changes in preservation of non-use values. Non-use values include those placed on protected open spaces and GRSG and other wildlife for future use, for the use of future generations, or for merely its existence, which would especially impact communities of interest who value protection of GRSG. The non-use values also include those placed on preserving the economics and culture of historical mining towns for potential future enjoyment, for the use of future generations or for merely its existence; these non-use values would especially impact those communities of interest who value mineral development.

Economic and social impacts from changes in fluid minerals due to BLM management decisions would vary substantially across regions, depending on how reliant the regions are on the oil and gas and mineral sectors compared with the reliance on other sectors. The regions in the analysis areas that historically have relied on the mineral industry for employment and labor income and that have had large volumes of oil and gas production on federal lands are most of the analysis area in Colorado, eastern Montana, southern Nevada, southwestern North Dakota, northwestern South Dakota, central and northeastern Utah, and most of the analysis area in Wyoming (see **Figures A-1 to A-10** in **Appendix 13**). Changes to economic and social conditions from changes in the oil and gas industry as described above would impact the communities in these regions more than other regions in the analysis areas (see **Section 3.11**, Social and Economic Conditions and **Appendix 13**, Socioeconomic Baseline Report).

Restrictions on oil and gas leasing on federal lands and minerals could also extend to affect economic and social conditions due to potential changes in oil and gas activity on adjacent nonfederal lands and minerals, especially in areas where the BLM-administered lands are not contiguous. In these areas, BLM decisions that manage federal land and minerals as closed to oil and gas leasing or manage BLM-administered lands as ROW avoidance or exclusion areas could result in a reduction in oil and gas activity on adjacent nonfederal minerals if it is no longer economical or feasible to develop minerals due to limitations on expanding operations across federal and nonfederal minerals or if pipelines and transmission lines are needed on federal lands to access the nonfederal minerals (see **Section 4.10.1**, Fluid Minerals [Including Geothermal]), for more information on impacts on oil and gas activity on nonfederal minerals and land due to BLM decisions on BLM-administered

[1] Impacts on other social conditions that are not considered in this effort, such as impacts on social conditions due to changes in visual resources, will be considered during the implementation level NEPA analysis.

land). If there is a reduction in oil and gas activity on nonfederal minerals and land, there could be further impacts on economic and social conditions, similar to those described above, including reductions in jobs, labor income, economic output, tax revenue, and impacts on social cohesion, way of life, and culture for those communities that rely on mineral development for economic opportunities. If there is a reduction in oil and gas activity on state lands due to BLM decisions on nearby federal lands and minerals, there could be impacts on access and quality of public services, such as education, which is funded by revenue collected from mineral production on state trust lands in states across the analysis area.

Many market and nonmarket impacts from changes in oil and gas operations are likely to occur gradually over the long term, with some impacts beginning in the near-term. This is due to the fact that management changes would generally be applied to new leases. Impacts would be concentrated in regions with economies that are dependent on mineral activities. In these regions, economic impacts would likely last until the displaced mining workforce can train and find jobs in other industries. Once the displaced employees find employment in other industries, there will likely be a return of social cohesion and culture across local communities. If displaced workers are unable to find sufficient employment opportunities in other industries, then the impacts could continue. Communities that experience significant out migration due to workers searching for other employment opportunities may not recover the shared culture and sense of community that was enjoyed during more prosperous times.

Nonenergy Leasable Minerals Management

Many of the market impacts associated with potential changes in nonenergy leasable minerals due to changes in restrictions and stipulations on leasable minerals would be similar to the market impacts associated with changes in oil and gas operations (See **Section 4.10.2**, Nonenergy Leasable Minerals, for the impacts of changes in restrictions and stipulations on nonenergy leasable minerals extractions). These include changes in direct and secondary jobs, income, and economic output, tax revenue, and public services and infrastructure that result from changes in nonenergy leasable extraction expenditures expenditure and associated public revenues.

Additional economic and social impacts from potential changes in nonenergy leasable mineral extraction due to an increase in restrictions could occur from secondary impacts on prices and availability of household products, especially those products made from trona, which is a nonenergy leasable mineral largely found in southwest Wyoming (90% of trona comes from this region; see **Section 3.9.2**, Nonenergy Leasable Minerals). Restrictions on mineral leasing on BLM-administered lands could increase costs associated with mineral extraction by requiring operators to find other nonfederal lands for their operations, if other nearby lands are available and hold the desired subsurface minerals. However, there is limited ability to shift large scale operations to other nonfederal lands because nonenergy leasable minerals are not abundantly available. Additionally, access to nonfederal lands for extracting nonenergy leasable minerals may not be feasible or economical, especially in areas with mixed land ownership, such as the checkerboard pattern, where developing resources often requires ROWs over federal land. The increase in costs associated with greater restrictions on mineral leasing on BLM-administered lands will likely be passed onto consumers in the form of higher prices for household products containing trona, such as glass, baking soda, and lithium batteries, in the short term. These household products are considered consumer staples and the demand for consumer staples tend to be inelastic, which means consumers are limited in their abilities to react or adjust their purchase quantities when there are fluctuations in price (Anderson et al. 1997). Impacts on prices of consumer staples tend to affect populations with lower income more than other populations due to the limited disposable income that is available to absorb the increases in prices. Restrictions on mineral leasing will likely not result in immediate closures of mines, and many current mines have stores of trona built up

that could be used to sustain production in the short term. As restrictions on nonenergy leasing continue in the long term or if it is not possible to find nearby lands outside of GRSG HMAs with nonenergy leasable materials, there could be impacts on the availability of household products made from trona due to the potential continued constraints on nonenergy leasable mineral extractions. These secondary impacts on product prices and availability can be just as important for local economies as the direct impacts, especially in areas where trona extraction plays a large role in the economy, such as in Wyoming, as well as in rural areas and areas with large low-income populations (see **Section 4.10.2**, Nonenergy Leasable Minerals).

Nonmarket and social impacts from changes in nonenergy leasable mineral extraction due to the BLM management decisions are the same as those from changes in oil and gas operations.[2] These impacts include direct changes to lifestyles and culture, especially for those who rely on the mining industry for employment and income and those in the mineral communities of interest. Secondary nonmarket or social impacts on the surrounding communities from changes in nonenergy leasable minerals due to fewer restrictions could include changes in access to and clean air, health and safety from changes in air quality and GHG emissions, and visitor and viewer enjoyment from changes in air quality. Additionally, potential changes in nonenergy leasable minerals could impact surrounding communities through changes in preservation of non-use values. Non-use values include those placed on protected open spaces and GRSG and other wildlife for future use, for the use of future generations, or for merely its existence, which would especially impact communities of interest who value protection of GRSG. The non-use values also include those placed on preserving the economics and culture of historical mining towns for potential future enjoyment, for the use of future generations or for merely its existence; these non-use values would especially impact those communities of interest who value mineral development.

Economic and social impacts from changes in nonenergy leasable minerals would have larger impacts in regions that are reliant on leasable mineral sectors compared with the reliance of other sectors. These regions that have historically had higher percentages of employment and labor income than the state and have had nonenergy leasable mineral production on federal lands are Rio Blanco County in northwestern Colorado, Caribou County in southeastern Idaho, Carbon and Emery counties in central Utah, and Sweetwater County in southwestern Wyoming (see **Figures A-1 to A-10** in **Appendix 13** and **Section 3.11**, Social and Economic Conditions and **Appendix 13**, Socioeconomic Baseline Report).

Similar to impacts from changes in oil and gas operations, market and nonmarket impacts from changes in nonenergy leasable mineral extractions are likely to occur over the long term. This could result in some mining operations closing if they were unable to expand or moving future operations to other locations. These impacts are likely to last until the displaced mining workforce is able to gain employment with other companies or in other industries. If the workers are required to leave the area to find employment, then the social and economic impacts in the regions that were dependent on mining could last longer.

Locatable Minerals Management

The implications of potential withdrawals from locatable mineral entry for the protection of GRSG are explained in detail in **Section 4.10.4**, Locatable Minerals. Many of the market impacts associated with potential changes in locatable mineral extraction would be similar to the market impacts associated with leasable mineral extractions. These include changes in direct and secondary jobs, income, and economic output, tax revenue, and public services and infrastructure that result from changes in locatable extraction

[2] Impacts on social conditions due to changes in other resources that are not considered in this effort, such as impacts on social conditions due to changes in visual resources, will be considered during the implementation level NEPA analysis.

expenditures and associated public revenues. If the Secretary were to withdraw lands pursuant to the separate process outlined in Section 204 of FLPMA, existing mining claims within the withdrawal area would not be withdrawn, even if they are within GRSG HMAs. BLM decisions on protection for GRSG would impact existing claims through the requirements of future validity examinations, which would increase costs to the claimants and could delay timing of development (see **Section 3.9.4**, Locatable Minerals, **Section 3.11**, Social and Economic Conditions (Including Environmental Justice), and **Appendix 13**, Socioeconomic Baseline Report).

Nonmarket and social impacts from changes in locatable mineral extraction due to the BLM decisions are the same as those associated with changes in leasable mineral extractions. These impacts include direct changes to lifestyles and culture, especially for those who rely on the mining industry for employment and income and those in the mineral communities of interest. Secondary nonmarket or social impacts on the surrounding communities from changes in locatable minerals due to fewer restrictions could include changes in access to clean air, health and safety from changes in air quality and GHG emissions, and visitor and viewer enjoyment from changes in air quality. Potential changes in locatable mineral extraction could impact surrounding communities through changes in preservation of non-use values. Non-use values include those placed on protected open spaces and GRSG and other wildlife for future use, for the use of future generations, or for merely its existence, which would especially impact communities of interest who value protection of GRSG. The non-use values also include those placed on preserving the economics and culture of historical mining towns for potential future enjoyment, for the use of future generations or for merely its existence. Non-use values would especially impact those communities of interest who value mineral development.

Economic and social impacts from changes in locatable minerals would have larger impacts in regions that are reliant on locatable mineral sectors than other areas. Counties in the analysis areas in Nevada and Wyoming, where there are higher potential for locatable minerals, would likely face larger impacts on economic and social conditions due to the large number of existing open claims in the states (see **Figures A-1 to A-10** in **Appendix 13** and **Section 3.11**, Social and Economic Conditions and **Appendix 13**, Socioeconomic Baseline Report).

Similar to impacts from changes in leasable minerals, market and nonmarket impacts from changes in locatable mineral extractions are likely to occur over the long term. This could result in some mining companies closing or moving operations to other locations. The economic and social impacts would likely last until the displaced mining workforce is able to gain employment with other companies or in other industries. If the workers are required to leave the area to find employment, the social and economic impacts in the regions that were dependent on mining could last longer.

Mineral Materials Management

Market impacts associated with potential changes in mineral materials extraction due to BLM management decisions on lands closed to mineral materials disposal largely relate to changes in costs to those who extract mineral materials due to reduced access to free resources (see **Section 4.10.5**, Mineral Materials for impacts on mineral materials extraction due to the BLM management decisions for the protection of GRSG). In areas where federal sources of mineral materials are closed to noncommercial disposal, those who extract mineral materials would likely need to relocate to nearby areas open to disposal on federal lands. If nearby areas on federal lands are not available, extraction would need to relocate to nearby private or state lands where resources exist. This change in location of extraction would increase costs due to the need to transport the minerals from the new location to where they are needed. The further away the mineral

materials pits are from where they are needed, the higher the cost and the more potential for increases in noise, dust, and truck traffic from transporting mineral materials. The increase in cost could cause delays or cancelations in projects that use mineral materials, such as road maintenance and construction of infrastructure. Delays and cancelations in construction and maintenance projects would impact the surrounding communities who rely on the roads and infrastructures (see **Section 3.10.5**, Mineral Materials, **Section 3.12**, Social and Economic Conditions and **Appendix 13**, Socioeconomic Baseline Report for more information on current conditions of mineral materials).

Secondary impacts from BLM decisions on lands closed to mineral materials could occur from changes in the ability to use mineral materials to improve road access for fire suppression activities. The construction, maintenance, and effectiveness of fuel breaks can be impacted by availability of mineral material pits.

A change in access to mineral materials due to the BLM decisions would likely have impacts on nonmarket and social conditions for the surrounding communities. These impacts include access to clean air, health, and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality under alternatives with lands that are not closed to mineral materials disposal and extraction. In areas where the BLM lands are closed to mineral materials disposal, and there is a shift of the mineral materials extraction to state or private lands, the sites of extraction could be closer to local residents and there could be more potential for interaction between local residents and communities and mining operations. This shift in location of mining activities could impact qualify of life in the nearby communities by resulting in an increase in noise, dust, and traffic. The magnitude of the impacts on the nearby communities depends on the local characteristics, and further analysis would need to be conducted during the implementation level NEPA to determine the location and intensity of impacts.

Economic and social impacts from changes in public access to mineral materials would have larger impacts in regions that have higher numbers of new or existing free-use permits issued or quantity of extractions under the free-use permit. Regions include counties in the analysis areas in Colorado, Idaho, Montana, Nevada, and Wyoming (see **Figures A-1 to A-10** in **Appendix 13** and **Section 3.12**, Social and Economic Conditions) and **Appendix 13**, Socioeconomic Baseline Report).

Market and nonmarket impacts from changes in public access of mineral materials are likely to be short term. The economic and social impacts, such as increased costs, would likely occur for near-term infrastructure construction or maintenance projects, which could range from a season to several years. Those with free-use permits would likely be able to locate other sources of mineral materials, given the wide-spread availability of the resource. Resources might be available in nearby BLM lands outside of HMAs, allowing for continued use of free-use permits. In other areas, users would need to purchase the extracted mineral materials, which could lead to impacts for as long as the minerals are needed.

Renewable Energy (Geothermal, Wind, and Solar) Management

BLM decisions regarding changes in restrictions and stipulations on renewable energy, including geothermal, wind and solar energy, for the protection of GRSG could affect local economies by restricting the siting of new renewable energy projects (See **Section 4.9**, Lands and Realty and **Section 4.10**, Mineral Resources). Changes in the land closed to leasing for geothermal development and the land open to leasing but with stipulations could impact the local jobs, income, economic output, and tax revenue that results from changes in well drilling and completion expenditures as well as production of geothermal energy and associated public revenues. Direct market impacts from changes in geothermal development include changes in economic activity that occur in industries related to renewable energy, such as water well drilling and related structures and electric power generation. Secondary market impacts include changes in economic contributions that

occur in industries other than the renewable energy sector as well as changes in public services and infrastructure due to reduced tax revenues, including state tax revenues on wind, solar, and geothermal production and nameplate capacity. For wind and solar, changes in land managed as ROW avoidance and exclusions areas could result in operators choosing other locations for wind or solar facilities, however, choosing an alternative location might not be possible or feasible or it could be very costly if there is not available transmission, as ROW avoidance and exclusion areas also applies to transmission line projects. Potential secondary impacts could include impacts on economic conditions due to restrictions on siting of renewable energy facilities and transmission on federal lands that would also impact siting on nonfederal lands, especially in areas where the BLM-administered lands are not contiguous. These potential secondary impacts on economic conditions could include reductions in lease rents for renewable energy on state lands, which could impact disbursements to local governments and public services that rely on these funds.

In addition to impacts on economic conditions from changes in potential renewable energy development due to BLM decisions, there could be impacts on social and nonmarket conditions from the BLM decisions regarding renewable energy ROW. While renewable energy projects, such as wind and solar, generally provide positive environmental benefits, including reductions in greenhouse gas emissions and improvements in air quality, there may still be localized concerns regarding access to clean air, health, and safety, and visitor and viewer enjoyment from changes in air quality, during construction and operation phases, under alternatives with fewer restrictions on development. Way of life, culture, and visitor and viewer enjoyment could be affected if there is an increase in renewable energy development due to less restrictions, especially for those communities of interest that value open spaces and historical agricultural areas.

BLM decisions that encourage co-locating infrastructure in existing ROWs and corridors could reduce adverse impacts on visitor and viewer enjoyment, way of life, and culture for those who value open spaces by limiting the surface disturbance to a consolidated area. However consolidating infrastructure could lead to impacts on economic conditions due to increased risk of multiple system failures, issues with service reliability, and potential increased construction cost for additional transmission line length to reroute the transmission lines to existing corridors.

Economic impacts from changes in renewable energy development due to BLM management decisions could vary across regions, depending on the quality of the renewable resource and the potential for renewable energy. The counties in the Nevada analysis area would be most impacted by BLM management decisions that change geothermal development and production due to the high potential for future development (see **Appendix 12**, Reasonably Foreseeable Development Scenario). The states that have operating wind and solar projects in the analysis areas are Nevada, Oregon, Utah, and Wyoming (see **Figures A-1 to A-10** in **Appendix 13**). Changes in economic activity stemming from changes in renewable energy development would impact these regions more than other regions in the planning area (see **Section 3.11**, Social and Economic Conditions (Including Environmental Justice) and **Appendix 13**, Socioeconomic Baseline Report). Counties in the analysis areas in Idaho, North Dakota, South Dakota, and Wyoming that collect taxes on wind, solar, or geothermal production and nameplate capacity would also be more impacted by potential changes in renewable energy activities than other areas due to the potential loss in tax revenue.

Impacts on economic conditions, such as increased construction costs, due to changes in lands available for ROW for wind and solar development would likely be short term, and the impacts would be diminished upon completion of the wind or solar facilities or transmission lines. If the changes in lands available for wind or solar ROW development prevent any solar or wind projects in nearby areas due to lack of available transmission lines, the impacts would likely be longer-term. Economic impacts from changes in potential

geothermal development are likely to occur over the long term, as displace workers look for employment elsewhere or in other industries.

Livestock Grazing Management

Impacts on local economies and social conditions associated with changes in livestock grazing can occur due to BLM decisions that directly or indirectly reduce availability of areas for grazing, forage levels (including decisions that may shift mineral, renewable energy, or ROW developments to areas where there would be a greater level of disturbance or removal of forage for livestock), timing of use and intervals between grazing periods, placement and management of range improvements and water developments. These management decisions could impact economic and social conditions through increased costs and a reduction in the number of livestock produced that partially graze on BLM lands, which would result in a reduction in the economic value of livestock produced (See **Section 4.8**, Livestock Grazing for more detail on impacts on livestock grazing).

Impacts on economic conditions due to a change in the economic value of livestock produced that partially graze on BLM lands include changes in jobs, income, and economic output. Direct market impacts are the changes in economic contributions that occur to industries associated with livestock production, such as reduced labor income for workers in these industries. Secondary market impacts include changes in jobs, income, and economic output that occur in industries other than livestock production industries, such as job reductions in manufacturing industries that supply the equipment needed for livestock grazing or ranching or economic output reductions in the retail sector due to reduced personal expenditures of workers in livestock production industries. Changes in livestock grazing due to BLM decisions could also impact the local and regional economic resilience and stability for ranching and farming communities, especially if these communities also are susceptible to boom and bust economic cycles due to a reliance on mineral development for economics.

Impacts on economic conditions associated with changes in livestock grazing also occur due to BLM decisions that limit maintenance or construction of range improvements or water developments. These limitations could increase time and cost to permittees and lessees or impact the ability of permittees and lessees to fully use permitted AUMs. Another secondary market impact is associated with changes in prices and availability of meat products due to rangewide restrictions on livestock grazing. An increase in restrictions on livestock grazing or a reduction in available forage on BLM-administered lands would likely require many ranchers and farmers to use private lands to provide forage for their livestock, which could result in increases in costs to ranchers and farmers. An increase in cost for forage could lead to ranchers passing on the costs to consumers in the form of an increase in price of meat and animal products, or an increase in cost could result in closures of ranches and farms that are unable to operate with the higher costs, especially as margins for meat producers have tightened recently (Casey 2023). If there are a large number of ranch closures, there could be impacts on availability of meat and animal products to the local and regional communities. As restrictions continue, there will likely be greater impacts on prices and availability of meat and animal products. The level of impacts would depend on the level to which any proposed management resulted in changes to the overall availability of public land forage and livestock operators' ability to adapt production practices and mitigate increased production costs. While changes to the market are seen more at a regional or national scale, secondary impacts on prices and availability of meat can be a large concern for certain local economies, especially in rural areas and areas with large low-income populations (see the subsection on *Environmental Justice* and see **Section 4.8**, Livestock Grazing).

Changes in livestock grazing on public lands can also impact other market mechanisms such as property values. Research has demonstrated that in most cases BLM-administered land grazing permits increase ranch property value beyond the additional price of forage provided because federal permits are perceived as adding semi-private open space to the property (see for example Rimbey et al. 2007). Restrictions to grazing on BLM-administered lands could affect property values for ranches that serve as base property for affect grazing permits. The extent of any impact could vary depending on the extent of restrictions of grazing on BLM-administered and USFS lands, whether a grazing permit is not renewed in its entirety, and the land management decisions in the selected alternative. Premium to property values associated with a federal grazing permit is a result of amenity perception rather than ownership since federal grazing permits authorize the grazing of livestock on public lands but do not convey any right, title, or interest of the lands to the permit holder.

Closely interconnected with the impacts on market and economic activity associated with livestock grazing are impacts on nonmarket and social conditions. These impacts on social and nonmarket conditions due to changes in livestock grazing include direct changes to the lifestyles, culture, and sense of place of those who rely on access to forage on federal land for their farming and ranching operations. Many rural communities have expressed concerns that ranching operations could go out of business if there were more restrictions on livestock grazing on BLM-administered lands. Ranch closures would affect the well-being of the local population and community as well as lead to less social cohesion across the communities and impact the quality of infrastructure and public services. Many ranch owners as well as local residents in communities that rely on ranching and farming place a high value on living in a rural area, with easy access to open spaces and western ranch scenery. Ranch owners value the ability to work outdoors, work with their hands, and to care for animals. Many Ranch owners get a sense of pride with sustainable ranching operations and maintaining rangeland health. Many community members in areas with a lot of grazing on BLM-administered lands value the social cohesion and the friendliness and cordiality that often comes with other members of the community. Reductions in available forage for livestock grazing on BLM-administered lands that could result in ranch closures would reduce access and quality of these resources and values that make up the lifestyle in many communities across the analysis area.

Reductions in BLM lands available for livestock grazing would likely require ranching operators to acquire leases or permits for forage from non-federal lands or purchase additional feed to continue livestock production. Purchased feed and forage from non-federal lands tend to be more costly, so the increase in input costs could put economic strain on some ranches. Due to the increased costs, some ranches might decide to sell all or part of their land to create ranchettes or for development activities, which could create land fragments with more fencing. Additional land fragmentation in GRSG habitat could have an adverse impact on GRSG populations. Selling and fragmenting longstanding ranches could affect social conditions and nonmarket values, such as social cohesion and loss of quality of nonmarket values associated with open space, and it could result in unexperienced or out-of-state buyers taking ownership of the land, which could further reduce social cohesion or lead to land degradation due to improper grazing techniques from the unexperienced buyers (Gosnell and Travis 2005).

Economic and social impacts from changes in livestock grazing due to BLM decisions would vary substantially across regions, depending on how many permits within BLM-administered allotments would be affected, the availability of alternative forage in the area, how reliant the region is on the agriculture industry compared with the reliance on other industries, and the type of ranches in the area (see **Section 3.11**, Social and Economic Conditions and **Appendix 13**, Socioeconomic Baseline Report). Changes to economic and social conditions from changes in livestock grazing would more heavily impact the communities in regions that rely

on grazing on federal lands and in regions that have a large quantity of small and midsize family farms and ranches where the operators' primary occupation is farming or ranching.[3] Small and midsize ranches tend to have fewer resources and flexibility to adjust business operations due to changes in livestock grazing on federal lands than other types of ranches. These ranches could be more sensitive to changes in cost, leading to more closures or more decisions to sell their private lands, which could lead to more land fragmentation, as discussed above. These small and midsize ranches are located across most of the analysis area in each state of the planning area (see **Section 3.11**, Social and Economic Conditions and **Appendix 13**, Socioeconomic Baseline Report).

Changes in livestock grazing from BLM decisions are likely to have long term impacts on market and nonmarket conditions, especially in rural areas that rely on the agriculture industry due to the limited alternative resources and opportunities for employment in these areas.

Wild Horse and Burro Management

Some stakeholders value the existence of wild horses due to their symbolism in of the American west and value the opportunity to view wild horses and burros on the range. Removal of wild horses could therefore impact social values associated with the existence of wild horses, and the ability to view and enjoy wild horses and burros.

Wild horses and burros can provide recreation opportunities (in terms of viewing), which in turn can result in visitor spending and associated economic contributions. One example is the opportunities provided for wild horse and burro viewing along scenic byways.

The level of impacts of management would depend on the degree to which wild horses and burros would remain part of the landscape on BLM-administered lands, and the level to which the ability to continue to view wild horses and burros would be impacted. The timeline for implementation of any management changes, if approved, would be impacted by congressional budget appropriations and the associated wild horse and burro management including gathers, storage capacity, and adoption rate. Impacts to values associated with wild horses and burros would be likely occur over time.

Greater Sage Grouse Conservation

Economists and policy makers have long recognized that rare, threatened, and endangered species have nonmarket values composed of use and non-use values as well as economic values, including those associated with active use through viewing, fishing, or hunting and those associated with existence, option, and bequest values. Studies published in peer-reviewed scientific journals for bird species with similar characteristics find average stated willingness-to-pay between $19 and $77 per household per year in order to restore a self-sustaining population or prevent regional extinction (see **Appendix 13**, Socioeconomic Baseline Report). Since GRSG protection is a public good available to all households regardless of where they are located, if similar per-household values apply, then the aggregate regional nonuse value as well as impacts on access to these values if changes were made from BLM decisions could be substantial. The BLM did not quantify the aggregate value because of several factors, including uncertainty associated with the comparability of the existing studies to the GRSG context and the documented difference between stated and actual willingness-to-pay.

[3] Small family ranches are those with annual gross cash farm income less than $350,000 and midsize family ranches are those with annual gross cash farm income of at least $350,000 but less than $1 million. See **Section 3.11**, Social and Economic Conditions (Including Environmental Justice) and **Appendix 13**, Socioeconomic Baseline Report for more information on the types of ranches in the analysis area).

There are many resource and social values of GRSG ecosystems that could be impacted by BLM decisions. Non-market values associated with populations of GRSG, including use value associated with wildlife viewing as well as non-use value generally correspond to the degree of habitat protection associated with each alternative. The more restrictive an alternative is on habitat disturbance, the more it will favor non-market values associated with the GRSG and their habitat. The specific level of habitat protection associated with maximizing non-market value has not been determined. Additional social impacts from BLM management decisions on GRSG conservation include impacts on Tribal interests and cultural resources, especially subsistence, from changes in GRSG populations. Habitat conservation could negatively impact road realignment projects near Tribal reservations and plans to expand reservation boundaries because the reservation is surrounded by PHMA.

Environmental Justice

Environmental justice populations could be disproportionately and adversely impacted directly and indirectly through changes in several resources due to BLM decisions.

Environmental justice populations could be directly disproportionately and adversely impacted by BLM decisions on GRSG through disturbance of cultural resources such as locations or landscapes associated with trust or treaty assets, traditional beliefs, sacred sites, resource gathering areas, hunting and fishing areas, ancestral sites, and human remains. Under alternatives with fewer stipulations and restrictions on resource use and less protection of GRSG populations, ground disturbance would likely impact these cultural resources. These ground disturbing activities that impact cultural resources in the planning area include mineral exploration and development, renewable energy development, construction of road or pipelines, and other surface disturbing activities. Cultural resources are especially important to those who identify as American Indian and Alaska Native for spiritual, traditional, and cultural activities, so BLM decisions that result in disturbance or alter visual qualities of these cultural resources could disproportionately impact American Indian and Alaska Native populations. These impacts on environmental justice populations are likely to be stronger in areas that were identified as containing environmental justice populations and areas that have more surface disturbing activities, such as mining and livestock grazing, and the impacts are likely to be long term and last until the end of the surface disturbing activity. See **Section 4.17**, Tribal Interests and **Section 4.16**, Cultural Resources.

BLM decisions that impact conservation of GRSG habitats and access to the cultural values of GRSG through fewer restrictions on surface disturbing activities would adversely and disproportionately impact environmental justice populations. Subsistence resource availability could be reduced from decisions and activities that impact wildlife habitats such as mineral development. Under alternatives with fewer restrictions on surface disturbing activities and less protection of GRSG habitats, changes to availability of subsistence resources and uses would adversely and disproportionately impact environmental justice populations. Subsistence is an important use of BLM-administered lands for American Indian and Alaska Native populations and some low-income populations across the analysis area. Decreased subsistence resource availability would adversely affect sociocultural systems due to the importance of subsistence in the cultural identity of American Indian and Alaska Native populations, social organization, social cohesion, transmission of cultural values, and community and individual well-being. Decreases in subsistence resource availability would reduce opportunities for engaging in subsistence activities potentially increasing social problems. Due to the importance to American Indian and Alaska Native populations of subsistence hunting, environmental justice populations would be disproportionately impacted from reduced access to big game habitats. Additionally, low-income populations would bear disproportionate effects of reductions in access to subsistence resources because they are more likely to lack the resources to purchase an equivalent quality

of food or to travel greater distances to find it. See **Section 4.5**, Fish and Wildlife, and **Section 4.17**, Tribal Interests and **Section 4.16**, Cultural Resources.

Environmental justice populations could be indirectly disproportionately and adversely impacted through regional or national market changes in prices and availability of meat and household products due to rangewide restrictions on grazing or restrictions on mineral development. Restrictions in grazing or mineral development on BLM-administered lands could increase the costs of producing meat and household products, which could then be passed onto consumers through higher prices. Meat and household products are considered consumer staples, and consumption of these products is usually consistent across seasons, so they tend to have inelastic demands, which means consumers of these products have limited ability to adjust consumption as prices increase. If restrictions continue, there could be impacts on availability of meat and household products. Increases in prices and decreases in availability of food and household products tend to disproportionately impact low-income households and individuals, because low-income populations have more limited alternatives for food and household products than the general public and because food and household product purchases make up a higher percentage of disposable income for low-income households. These impacts on environmental justice populations are likely to be stronger in areas that were identified as containing environmental justice populations. The impacts on environmental justice populations from price and availability of food and household products through BLM management decisions on greater restrictions are likely to occur over the long term, based on implementation of changes to GRSG management. See subsections in this section on *Nonenergy Leasable Minerals* and *Livestock Grazing* as well as **Section 4.10.2**, Nonenergy Leasable Minerals, and **Section 4.8**, Livestock Grazing.

BLM decisions that impact nonmarket and social conditions from changes in air quality through increased exposure to particulate matter (PM), increased risk of wildfire smoke, and increased fugitive dust emissions, under alternatives with fewer restrictions on mineral extraction and surface disturbing activities, could disproportionately impact environmental justice populations. Environmental justice populations often face greater vulnerabilities to particulate matter pollution, wildfires, and fugitive dust from surface disturbance (Davies et al. 2018). Increased exposure to particulate matter can cause a variety of health problems, including respiratory infections, heart disease, or cancer. Because environmental justice populations are often located near sources of PM pollution, they are more likely to be exposed to higher levels of particulate matter pollution (Tabuchi and Popovich 2021). See **Section 4.13**, Air Resources and Climate.

BLM decisions that impact nonmarket and social conditions from changes in GHG emissions could disproportionately impact environmental justice populations, under alternatives with fewer restrictions on surface disturbing activities and in areas where fluid mineral leasing would be managed as CSU, if there is an increase in mineral development and activities. Environmental justice populations are often located in areas that are vulnerable to impacts from climate change, such as areas that are prone to drought or flooding (Cho 2020). If mineral exploration and development and other surface disturbing activities are not managed in a way that minimizes GHG emissions, environmental justice populations could be adversely and disproportionately impacted due to GHG emissions that could have a negative impact on the climate (Cho 2020). Vegetation disturbance could reduce the ability to absorb carbon dioxide and lead to decreased carbon sequestration around communities, including environmental justice populations. The decrease in carbon sequestration could contribute to climate change impacts, which could disproportionately and adversely impact environmental justice populations. See **Section 4.13**, Air Resources and Climate.

Impacts on economic conditions may occur across the area (as discussed in the *Fluid Minerals (Oil and Gas), Renewable Energy (Geothermal, Wind, and Solar),* and *Livestock Grazing* subsections, above). Additional screening

and consideration of environmental justice populations and analysis of any disproportionate and adverse impacts will occur at the implementation stage at a scale commensurate with the scope and scale of management actions being considered to provide additional protections for local GRSG populations. Depending on conditions at that time, communities with environmental justice concern may change.

4.12.2 Proposed RMP Amendment

All impacts would be the same as described for Alternative 5 except for the impacts described below.

Fluid Minerals (Oil and Gas) Management

Rangewide Environmental Consequences

The number of wells anticipated to be drilled and completed over the planning period, under the Proposed RMP Amendment, would be the same as under Alternative 5 in all states except for Wyoming, so the market impacts on jobs, labor, income, economic output from oil and gas development and operations would also be the same as described under Alternative 5 for these states (see **Table 4-8**, below). Under the Proposed RMP Amendment, compared with Alternative 1, oil and gas production revenue and well development expenditures are expected to decrease in Wyoming (see **Section 4.10**, Mineral Resources for a discussion on impacts on oil and gas activity). On annual average, oil and gas production revenue and well development expenditures in the Wyoming analysis area is expected to result in about 1,400 fewer total jobs (about 600 fewer direct jobs), about $110 million less in total labor income (about $64 million less in direct labor income), and about $717 million less in economic output (about $559 million less in direct economic output), than under Alternative 1, throughout the state. Additional details for state-specific direct, indirect, and induced impacts are included in **Appendix 18**.

Table 4-8. Average Annual Economic Contributions from Oil and Gas, Under the Proposed RMP Amendment

State[1]	Type of Impact[2]	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Colorado (Low Scenario)	Direct	6,948	6,948	835,579,681	835,579,681	4,210,876,842	4,210,876,842
	Total	19,116	23,572	1,572,945,903	1,999,834,792	6,469,461,097	7,437,254,132
Colorado (High Scenario)	Direct	13,366	13,366	1,607,628,515	1,607,628,515	8,094,956,453	8,094,956,453
	Total	36,759	45,318	3,024,814,147	3,844,614,938	12,436,843,453	14,296,431,664
Idaho	Direct	10	10	576,005	576,005	2,998,007	2,998,007
	Total	20	22	1,128,152	1,214,830	4,871,080	5,178,863
Montana	Direct	1,922	1,922	284,762,972	284,762,972	1,318,085,631	1,318,085,631
	Total	5,046	5,299	467,912,653	484,846,192	1,893,586,767	1,939,453,416
Nevada	Direct	18	18	249,165	249,165	6,374,761	6,374,761
	Total	41	42	2,133,031	2,182,516	11,445,990	11,681,292
North Dakota	Direct	275	275	31,990,856	31,990,856	406,307,567	406,307,567
	Total	551	573	46,571,864	47,955,782	466,716,295	471,407,239
South Dakota	Direct	89	89	7,090,932	7,090,932	34,541,446	34,541,446
	Total	238	264	14,081,147	15,735,559	61,206,393	66,872,391
Utah	Direct	2,368	2,368	162,438,183	162,438,183	1,619,804,067	1,619,804,067
	Total	5,204	7,059	309,658,031	453,626,368	2,125,280,538	2,450,509,848
Wyoming	Direct	11,089	11,089	1,085,144,628	1,085,144,628	10,691,456,750	10,691,456,750
	Total	24,865	24,886	1,908,227,615	1,909,712,421	13,474,139,017	13,478,773,144

State[1]	Type of Impact[2]	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Total Planning Area (Low Colorado Scenario)	Direct	22,720	22,720	2,407,832,421	2,407,832,421	18,290,445,070	18,290,445,070
	Total	55,083	61,717	4,322,658,396	4,915,108,461	24,506,707,178	25,861,130,327
Total Planning Area (High Colorado Scenario)	Direct	29,137	29,137	3,179,881,256	3,179,881,256	22,174,524,682	22,174,524,682
	Total	72,726	83,463	5,774,526,641	6,759,888,606	30,474,089,534	32,720,307,858

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.
[1] There were no oil and gas developments projected for California and Oregon.
[2] Total impacts include direct, indirect, and induced impacts.

The decrease in projected oil and gas activity in Wyoming, under the Proposed RMP Amendment, would result in reductions in tax revenues by about $69 million in royalty revenue, $25 million in state severance tax revenue, $26 million in ad valorem tax revenue, and $208,000 in and gas conservation tax revenue, compared with Alternative 1. Additionally, a reduction in oil and gas activity, in Wyoming, under the Proposed RMP Amendment, could lead to a decrease in revenue from rents, bonus bids, and sales and use taxes, compared with Alternative 1. The reductions in tax revenues could put strain on local governments' budgets and could impact public services that are offered to the communities, including education. There could be impacts from BLM decisions on lifestyles and culture for those in mineral development communities of interest, especially for those individuals who rely on oil and gas extraction for employment.

The reduction in the acreage available for fluid mineral leasing in Wyoming could reduce the development-related impacts on nonmarket and social conditions associate with changes in air and GHG emissions, compared with Alternative 1.

Renewable Energy (Geothermal, Wind, and Solar) Management

Rangewide Environmental Consequences

Under the Proposed RMP Amendment, PHMA would be an exclusion area for utility scale wind and solar energy testing and development. Lands encompassing major ROWs and utility-scale wind and solar in PHMA would be managed as ROW avoidance areas with more stringent criteria. Impacts on economic and social conditions due to BLM decisions on PHMA, under the Proposed RMP Amendment, would be the same as under Alternative 4.

The number of geothermal plants developed would be the same as under Alternative 1 in all states (see **Appendix 12**, Reasonably Foreseeable Development Scenario, for more detail), so the impacts on jobs, labor, income, and economic output from geothermal development would also be the same as described under Alternative 1 (see **Table 18-6** in **Appendix 18** for direct, indirect, and induced impacts by state). Utility scale wind and solar projects in PHMA would be managed as ROW exclusion areas, under the Proposed RMP Amendment (see **Appendix 12**, Reasonably Foreseeable Development Scenario, for more detail). These BLM management decisions could result in operators relocating development of wind and

solar facilities to other locations that are not restricted. However, relocating wind and solar operations might not be possible or feasible, if access to transmission lines is limited, due to the high costs associated with building transmission lines and because ROW avoidance and exclusion areas would impact transmission lines as well. As noted under Alternative 1, if additional lines of transmission are needed, this could result in impacts on economic contributions of wind and solar.

4.12.3 Cumulative Effects

The following discussion analyzes the cumulative impacts on social and economic conditions as well as impacts on environmental justice concerns. This analysis considers the past, present, and reasonably foreseeable actions that may impact these conditions. The cumulative effects analysis covers a 20-year timeframe, corresponding to the duration of the Greater Sage-Grouse Resource Management Plan. The spatial scope encompasses the rangewide planning area.

Economic Interest and Conditions

Planning and implementation decisions within planning areas that overlap the analysis area in this current effort could also affect future development. The BLM decisions in the federal resource management and land use plans throughout the planning area could contribute to cumulative impacts on the local and regional economies and the social conditions of local communities. These decisions could lead to changes in employment, income, tax revenue, and economic output on top of the impacts discussed in **Section 4.11**, Social and Economic Conditions (Including Environmental Justice), as well as impacts on nonmarket and social conditions. The combined impact from these efforts could cause strain on the local economies, especially those that are reliant on industries that would be more likely impacted such as mining and agriculture industries as well as industries related to renewable energy development.

The state GRSG conservation plans and efforts could lead to cumulative impacts on economic contributions. The requirements in the state GRSG conservation plans would likely vary from state to state, which would increase costs for operators as they navigate the differing restrictions and requirements. The type of state GRSG conservation plan could lead to cumulative impacts. Some conservation plans are regulatory in nature, such as the plans in Wyoming, Montana, and Oregon as well as Nevada's mitigation requirement, while the other plans are voluntary compliance. This difference could cause some confusion and conflict or create barriers to entry of markets in different areas for operators.

In May 2024, the BLM published the final rule for Conservation and Landscape Health (the Public Lands Rule), which promotes restoration of public lands and water, supports informed decision-making, and protects healthy landscapes. The Public Lands Rule creates frameworks for tools that promote investment in restoration and mitigation that can help offset the impacts on the environment from development on public lands. The management actions considered in this effort are consistent with the Public Lands Rule. The Public Lands Rule is not expected to impact oil and gas operations, so there will likely not be cumulative impacts on economic conditions due to changes oil and gas activity from the Public Lands Rule. Additionally, the Public Lands Rule is not expected to contribute to cumulative impacts on economic conditions from changes in livestock grazing. The Public Lands Rule allows opportunities for grazing permittees to hold conservation leases to improve land health, and these leases could generally be compatible with grazing allotments meeting land health standards.

Past, present, and reasonably foreseeable mineral leasing, exploration, and development will likely contribute to cumulative impacts on employment opportunities and fiscal revenues in local and regional economies that have historically been reliant on mineral extraction. Even in areas with a small percentage of employment in

the mining sector, there could be impacts to the local economy, because mining often provides high-wage employment opportunities that are not easy to replace or find alternatives (see **Section 3.11**, Social and Economic Conditions and the Socioeconomic Baseline report). Updates to the federal oil and gas regulatory framework, including changes in minimum bid requirements and royalty and rental rates included in the Inflation Reduction Act, could affect future levels oil of gas activity on federal lands. These higher rates will increase the cost to develop federal oil and gas resources leased on or after August 16, 2022, but there is insufficient information to determine how these changes will impact federal oil and gas development given how dynamic and complex the global oil market is. Competitive federal leases are anticipated to remain competitive with leases on private and state lands which already impose higher rental and royalty rates, and operators' decisions related to exploration and extraction will continue to be based on global market conditions and trends, and individual firms' strategic goals and profit margins (US Department of the Interior 2021).

In areas that have historically relied on fossil fuels as an economic driver for employment, income, economic output, and fiscal revenue streams, as demand continues to shift to lower carbon energy sources, the continued decline in production of higher carbon energy sources such as coal could have compounding, cumulative impacts in communities that could also be impacted by GRSG BLM management decisions that would restrict mineral development, including oil and gas, nonenergy leasable minerals, locatable minerals, and mineral materials. Since 2012, coal mining jobs across the US have decreased by over 48,000 (Sachs 2023). Counties in the analysis areas that have oil and gas production on federal lands and have seen a decline in coal extraction over the last five years include Moffat and Rio Blanco counties in Colorado; Rosebud County in Montana, Carbon and Sevier counties in Utah; and Campbell, Converse, Lincoln, and Sweetwater counties in Wyoming. These regions are more likely to see compounding cumulative impacts from the transition away from coal combined with impacts due to BLM decisions on oil and gas leasing. For BLM decisions on nonenergy leasable minerals, the counties that are likely to face cumulative impacts combined with the decline in coal due to their reliance on nonenergy leasable minerals are Rio Blanco County in Colorado, Carbon County in Utah, and Lincoln and Sweetwater counties Wyoming. Lastly, regions in Colorado, Montana, Utah, and Wyoming could also face cumulative impacts due to the decline in coal extraction. For locatable minerals, the level of cumulative impacts and locations of impacts depend on whether the Secretary actually withdraws the recommended areas from location and entry under the Mining Law of 1872 pursuant to the separate process outlined in section 204 of FLPMA (see the Socioeconomic Baseline Report and **Section 3.11**, Social and Economic Conditions (including Environmental Justice). The decrease in economic conditions from the decline in the coal industry would put additional strain on these regions and make it more difficult for local governments to support and sustain the public services that are important to the communities (see the Socioeconomic Baseline Report and **Section 3.11**, Social and Economic Conditions).

Past, present, and reasonably foreseeable nonenergy mineral leasing, exploration, and development will likely contribute to the impacts on local and regional economies. Management actions in other planning efforts in the form of surface use restrictions such as closing areas to new nonenergy leasable mineral, prohibitions on surface mining, or creating ROW exclusion or avoidance areas, could impact local economics due to potential changes in nonenergy solid leasable mineral extraction by limiting the available means for accessing mineral resources and transporting nonenergy solid leasable minerals to processing facilities and markets.

Past, present, and reasonably foreseeable locatable mineral extraction will likely contribute to the impacts on local and regional economies. Any actions (including any future withdrawals) that increase the costs of locatable mineral development would cumulatively impact locatable mineral development and the local

economies, through changes in employment, labor income, output, and tax revenue, as these actions ultimately could decrease the amount of locatable mineral availability and development in the planning area during the planning period.

Past, present, and reasonably foreseeable mineral materials extraction will likely contribute to the impacts on local and regional economies. The predominant mining method for mineral materials is surface mining; therefore, restrictions on surface-disturbing activities would effectively close or limit mineral material mining in the subject areas unless an exception is provided. If feasible mineral materials extraction could relocate to nearby areas; however, this would likely result in increased costs associated with transportation or fees, if operations are moved to private or state lands. This increase in cost could result in cumulative impacts on the local economies.

Past, present, and reasonably foreseeable ROWs will likely contribute to the impacts on local and regional economies. These projects include development of pipelines and electricity transmission and distribution infrastructure as well as development of wind and solar. The BLM is working on a Solar Programmatic EIS to take steps to update its 2012 Western Solar Plan, which could have cumulative impacts on economic contributions. The on-going revisions on the Solar Programmatic EIS consider removing the slope requirement which may allow for more land available to ROW authorization. In May 2024, the BLM published the final rule for Rights-of-Way, Leasing, and Operations for Renewable Energy, which promotes wind and solar development through reduced acreage rents and capacity fees and improved BLM application processes. This rule could have cumulative impacts on economic contributions associated with renewable energy development. As there continues to be an increased diversification of energy sources, there will likely be an increase in demand for renewable development on public lands. This increase is likely to be more pronounced in certain areas and states, such as California, Nevada, Utah, and Wyoming, where there has historically been interest in renewable energy development and there will likely continue to be development. Labor income for employment in industries associated with renewable energy development and operations tends to be lower than labor income for employment mining industries. This means that as economies transition to more renewable energy, there could continue to be cumulative impacts from lower wages (see **Section 4.8**, Lands and Realty).

The BLM will continue to issue livestock permits on land that is available to livestock grazing. These permits could contribute to the impacts on local and regional economies. Livestock grazing and operations can be affected by BLM decisions on vegetation management and surface disturbing activities such as mineral exploration and ROW development as well as changing environmental conditions. These cumulative impacts on livestock grazing can affect costs incurred by ranchers and farmers, which would have cumulative impacts on the regional economies through changes in jobs, income, and economic output.

In many states, such as in Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming, farming and ranching can provide economic stability for communities that are susceptible to boom and bust cycles due to historical dependence on mining industries that have fluctuated over time. In these regions, there could be cumulative impacts on the change in economic resilience and stability from BLM decisions that impact both grazing and mineral development, which are important sectors for these communities.

Nonmarket and Social Conditions

The BLM decisions in the federal resource management and land use plans throughout the planning area could contribute to cumulative impacts on the local and regional economies and the social conditions of local communities. These management decisions could lead to changes in social conditions and access to

nonmarket values on top of the impacts discussed in **Section 4.11**, Social and Economic Conditions. These impacts include changes in access to and cost of products and resources, values from open spaces, values from wildlife species including GRSG. Potential impacts also could include changes in way of life and culture, social cohesion, and preservation of ecosystem services, such as services provided from GRSG and GRSG habitats.

The Public Lands Rule, published in May 2024, promotes restoration of public lands and water, supports informed decision-making, and protects healthy landscapes through creating frameworks for tools that allow opportunities to invest in restoration and offsetting impacts on the environment from development on public lands. Through use of these tools, the Public Lands Rule could contribute to impacts on social conditions and access and quality of nonmarket values through increased access to clean air and healthy, open spaces, and ecosystem services.

Past, present, and reasonably foreseeable vegetation, and wildfire fuels management that impact GRSG habitat will likely contribute to the impacts on communities through changes in access to nonmarket values. Potential for severe wildfire could result in damage to GRSG habitat, which could result in cumulative impacts on access to nonmarket values associated with GRSG and GRSG habitat, such as values from cultural and subsistence resources and nonuse values. The risk of wildfires could be higher under Alternative 3 due to the reduction lands available for livestock grazing, which would remove permitted livestock grazing on a large portion of the landscape (see **Section 4.4** for further analysis on the impacts of grazing on wildfires).

Environmental Justice

The BLM decisions in the federal resource management and land use plans throughout the planning area could contribute to impacts on environmental justice communities, if the BLM decisions lead to changes in water or air quality of the surrounding communities, access to subsistence resources or use, access to cultural resources, among others; however, these impacts would depend on site-specific conditions and analysis.

Execution of state GRSG conservation plans, which could impact access to resources or subsistence activities on nonfederal lands, could lead to cumulative impacts on environmental justice communities.

GRSG planning efforts could contribute to cumulative impacts by placing more constraints on mineral development in areas where GRSG habitats overlap with big game high priority habitats, which could reduce health impacts from oil and gas production and development. These could lead to disproportionate impacts on environmental justice communities, because environmental justice communities, such as low-income households, tend to live closer to mineral developments (Proville et al. 2022); however, specific impacts on environmental justice populations would likely depend on other site-specific factors that will be examined more at the implementation-level NEPA analysis.

Climate change could lead to impacts on many resources and could contribute to adverse and disproportionate impacts on environmental justice populations. These impacts from climate change include increases risk and severity of wildfires, which can lead to damage and destruction of property, cultural resources, and impact public health and safety, increases in drought and reductions in forage for livestock, increases in risk of flooding, changes in subsistence resource access due to changes in climate and invasive species, and reductions in water supply. These impacts would likely have adverse and disproportionate impacts on environmental justice populations due to the limited resources available to mitigate impacts and because environmental justice populations are often located in areas that are vulnerable to impacts from climate change, such as areas that are prone to drought or flooding (Cho 2020); however, specific impacts

on environmental justice populations would likely depend on other site-specific factors that will be examined more at the implementation-level NEPA analysis.

Comparison of Alternatives

Contributions to cumulative impacts from BLM management decisions are discussed below for each alternative.

Alternative 1 management actions would be based on the 2015 plan amendments. This includes restrictions on development that would occur within HMAs. All states would include language to maintain and enhance sagebrush habitats with the intent of conserving GRSG populations. Anticipated levels of economic activities associated with mineral exploration and development, renewable energy development, and livestock grazing on BLM-administered lands would continue from current conditions, and they would continue to support jobs, labor income, economic output, and tax revenue, which would continue to support public services. In areas where mineral development is open subject to stipulations, there would continue to be impacts on air quality and GHG emissions, which could disproportionately and adversely impact environmental justice populations. Additionally, there would continue to be impacts on GRSG and subsistence resources, which could impact access to nonmarket use and non-use values and could adversely and disproportionately impact environmental justice populations, especially those who value subsistence resources.

Under Alternative 2, there would be more areas open to fluid mineral leasing, which could result in an increase in supported jobs, labor income, and economic output, compared to Alternative 1. However, due to the increase in areas open to fluid mineral leasing there would be the potential for more surface disturbance, which could reduce access to values associated with GRSG and GRSG habitat. In areas that are open to mineral development, there could be greater impacts on air and water quality, than under Alternative 1, and these impacts could disproportionately and adversely impact environmental justice populations.

Alternative 3 would close all areas in PHMA to mineral development, ROW development, and livestock grazing. Alternative 3 would be the most restrictive on economic activities across all alternatives. The restrictions could lead to large cumulative, combined impacts on local economies and communities, especially those areas that rely on mining and agriculture for employment such as Caribou County in Idaho; Big Horn and Fallon counties in Montana; Pershing County in Nevada; and Big Horn, Converse, Crook, and Sublette counties in Wyoming. These impacts could include cumulative impacts on jobs, labor income, economic output, tax revenue, public services, and economic stability. Additionally, the impacts could include social cohesion, and access to nonmarket values associated with historical mining and agricultural communities as detailed in the direct and indirect impacts discussion. The impacts from restrictions could extend to nonfederal lands and minerals in areas where the BLM-administered lands are not contiguous, which could further lead to cumulative impacts economic and social conditions, especially for those rural communities that rely on mining for economic opportunities.

Alternatives 1, 2, 4, 5, 6, and the Proposed RMP Amendment would support higher levels of economic activity in natural resource-dependent economies across the planning area relative to Alternative 3. Management actions that lead to a change oil and gas activity, under alternatives 4, 5, 6, and the Proposed RMP Amendment, could result in the same economic conditions as Alternative 1 in some areas (Montana, Nevada, North Dakota, South Dakota, and Utah), could support an increase in jobs, labor income, economic output, and tax revenue in some areas (Colorado and Idaho), or could lead to a reduction in jobs, labor income, economic output, and tax revenue in other areas (Wyoming). The management actions under Alternatives 4, 5, 6 and the Proposed RMP Amendment could affect social conditions and quality of life in

some communities. However, due to the increase in areas open to mineral development there would be the potential for more surface disturbance, which could reduce access to values associated with GRSG and GRSG habitat. In areas that are open to mineral development, there could be greater impacts on air and water quality than under Alternative 1, and these impacts could disproportionately and adversely impact environmental justice populations.

Table 4-9. Types of Effects Resulting from Reasonably Foreseeable Actions

Reasonably Foreseeable Scenarios	Examples from Appendix 14 (Reasonably Foreseeable Actions)	SE Indicator Discussion
Transition from fossil fuel development	Closure of coal powered power plants and coal mines	Loss of jobs and revenue
	Implementation of Inflation Reduction Act	Unclear impact on jobs and revenue – could push development to state and private lands; Increased royalty and rents could offset less quantity of federal development.
	BLM CO GJFO and CRVFO RMPA	Preferred alternative would lead to cumulative impacts that would reduce jobs and revenues from oil and gas. There would be compounding impacts and stress put on the local communities
	BLM CO Big Game and Gunnison Sage Grouse RMPA	Restrictions for oil and gas development in Moffat, Routt, Mesa, and Jackson are applicable for all three wildlife RMPAs. Hence, the predicted job and revenue loss in **Chapter 4** is the same as the cumulative job effort of these BLM CO planning efforts.

4.13 AIR RESOURCES AND CLIMATE

4.13.1 Air Quality

This section presents potential impacts on air quality and climate from implementing management actions presented in **Chapter 2**. Existing conditions concerning air quality are described in **Chapter 3**.

Nature and Type of Effects

Air quality is measured by the concentration of air pollutants and changes in air quality-related values, such as visibility and atmospheric deposition (e.g., nitrogen and sulfur deposition on soils and vegetation, and acidification of sensitive water bodies). Emissions of hazardous air pollutants could potentially result in localized increased risk of impacts on human health. Criteria and hazardous air pollutants can negatively impact human health in a variety of ways. Exposure to air pollution most often affects the respiratory system, and is often also associated with pulmonary, cardiovascular, and neurological impairments (EPA 2023f). Children and other high-risk groups, such as the elderly, pregnant women, and individuals with chronic heart and lung diseases, are especially susceptible to impacts from air pollution (EPA 2023f).

Actions that increase emissions of air pollutants can result in negative effects on air quality related values, including visibility and atmospheric deposition. An increase in SO_2, NO_2, PM_{10}, and $PM_{2.5}$ emissions can result in decreased visibility, increased atmospheric nitrogen and sulfur deposition on soils and vegetation, and acidification of sensitive water bodies. Fugitive dust could potentially result in increases in ambient concentrations of PM_{10} and $PM_{2.5}$ resulting in localized impacts on vegetation and increases in atmospheric deposition. Particulate matter also contributes to haze and limits visibility (EPA 2023g). Ground-level ozone, which is formed by a chemical reaction between volatile organic compounds and nitrogen oxides, contributes to smog, which limits visibility (EPA 2023h). Particulate matter emissions (fugitive dust) are primarily caused by earth-moving activities and vehicular traffic on unpaved roads and surfaces associated with development and operation. While PM_{10} emissions are largely caused by fugitive dust, and primary $PM_{2.5}$ emissions can be partially attributed to fugitive dust, secondary $PM_{2.5}$ primarily stems from chemical reactions with gaseous emissions.

Greater Sage-Grouse Management

Implementing management for the protection of GRSG generally involves reducing or otherwise restricting land use and activities that disturb GRSG habitat. These land uses and activities often also emit air pollutants. Wildland fires, particularly uncontrolled wildfires, can significantly affect air quality by introducing large amounts of particulate matter, CO, atmospheric mercury, ozone precursors, and volatile organic compounds into the air, affecting both visibility and human health (British Columbia 2023). By improving landscape resiliency to wildfire and soil degradation, protection of the GRSG habitat would result in a general improvement in air quality. By restricting land uses that may emit air pollutants, protection of GRSG habitat would result in a general improvement in air quality. However, such restrictions could shift such development and associated impacts to state, tribal, or private lands, where GHG emissions and surface disturbance would still occur.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Activities related to fluid mineral leasing and development can result in emissions produced during all phases of fluid mineral development—from exploration, construction, and operational phases of the project to well plugging, site closure, reclamation, and abandonment. Oil and gas development results in short-term and long-term emissions of criteria pollutants and hazardous air pollutants from vehicle use, drill rigs, construction equipment use, disturbance of soils, and leaks, flaring, or venting of natural gas. Limiting oil and gas leasing and resultant development with the purpose of reducing disturbance to GRSG and their habitat could reduce air pollutant emissions or at a minimum, move sources to a different location.

Activities associated with the development of nonenergy minerals and mineral materials (saleable minerals) generate fugitive dust particles and gaseous tailpipe emissions from large equipment. Activities such as blasting, excavating, loading, and hauling of overburden and mineral resources, and wind erosion of disturbed and un-reclaimed mine areas, produce fugitive dust. Crushing, storage, and handling facilities are common stationary point sources for particulate matter. Air pollutant emissions that could be expected to result from solid mineral development are CO, NOx, particulates (PM_{10} and $PM_{2.5}$), SO_2, ground level ozone, and some EPA listed hazardous air pollutants (e.g., Benzene, Formaldehyde, and Acetone). Actions that limit leasing or development of nonenergy leasable minerals and mineral materials within GRSG habitat areas could reduce non-oil and gas emissions by limiting exploration, construction, and operations associated with nonenergy leasable minerals and mineral materials developments. However, restrictions on travel associated with such resources could result in creating longer trips by redirecting travel around sensitive areas, and thereby increasing travel-related emissions.

Lands and Realty Management

Activities related to surface disturbances (e.g., construction of facilities, roads, and transmission lines, wind and solar energy plants) can result in particulate emissions from fugitive dust, exhaust emissions, and other criteria pollutant emissions from soil disturbances, construction-related travel, use of heavy equipment, and long-term effects associated with road use and maintenance. A number of the management actions under the alternatives address surface disturbances pertaining to GRSG core and connectivity habitat areas, nesting/early brood-rearing habitats, winter habitats, and winter concentration areas. In addition, some of the action alternatives restrict activities by date, density, and any reclamation activities proposed. All proposed actions associated with restricting or prohibiting surface disturbing activity for GRSG core and connectivity habitat areas, nesting/early brood-rearing habitats, and winter habitats and concentration areas specified could reduce air emissions by limiting travel and activity. However, the restrictions on travel could result in creating longer trips by redirecting travel around sensitive areas, and thereby increasing travel-related emissions. In addition, some of the actions that restrict activities in March through May could redirect emissions toward the other months (such as winter), thereby increasing ozone potential in areas subject to winter ozone formation.

Proposed RMP Amendment

Under the Proposed RMP Amendment, impacts on air quality would be managed through a combination of conservation measures and limitations on development.

Under the Proposed RMP Amendment, fluid mineral resource allocations would be guided by stringent lease stipulations and minimization measures that would reduce emissions from fluid mineral activities. Managing PHMA with limited exceptions as NSO with no waivers, exceptions, or modifications would contribute to stronger protection for air quality in these areas compared with Alternative 1. There would be more restrictions on saleable minerals, mineral materials, and coal development, resulting in fewer impacts compared with Alternative 5. Impacts on nonenergy leasable minerals would be similar to impacts under all other alternatives.

The Proposed RMP Amendment would designate PHMAs as exclusion areas for utility-scale wind and solar projects to prioritize habitat conservation and minimize impacts on air quality, similar to the approach under Alternative 1. Additionally, within PHMA with limited exceptions, utility-scale wind and solar projects would be excluded with no exceptions and major ROWs would be excluded with exceptions, offering enhanced protection to air quality in these areas. Renewable energy development would follow established guidelines, with PHMA excluded from utility-scale projects and GHMAs open for development under specific mitigation measures to address potential air quality impacts. ROW avoidance designations in the Proposed RMP Amendment would aim to reduce air quality impacts by strengthening protections within avoidance areas and promoting use within designated corridors, more stringent than the strategies outlined in Alternative 5.

Under the Proposed RMP Amendment, livestock grazing management would align with the management under Alternative 5, focusing on minimizing air quality impacts through flexible and effective grazing practices.

Cumulative Effects

The cumulative impact analysis area for air quality includes the airsheds that encompass the lands within the range of GRSG habitat, regardless of land ownership. The larger cumulative analysis area is chosen because air pollutants can be transported into and/or out of the planning area and affect pollutant concentrations in the ambient air. The cumulative impact analysis timeframe for air quality is chosen based on the expected

duration of the GRSG RMPA, which is approximately 20 years. The BLM's regional air quality model (Ramboll 2023) is incorporated by reference as a representation of future cumulative air quality.

In general, air pollution is cumulative in the way that exceedances of ambient air quality standards are based on existing conditions which depend on past and present development. Any change in the level of emission generating activities would affect existing pollutant concentrations in the cumulative impact analysis area. Past, present, and reasonably foreseeable actions that contribute to the cumulative impacts on air quality include mineral exploration and development such as fluid minerals (oil, gas and geothermal), locatable minerals, leasable minerals, and mineral materials; urban and industrial development including major and minor ROWs (e.g., for roads, pipelines, electrical transmission lines, infrastructure, and large renewable energy projects, such as solar and wind development projects); vegetation treatments; fire and fuels management; livestock grazing; and recreation and travel management. The nature and type of impacts from actions considered for the cumulative impact analysis are as described under the *Nature and Type of Effects.*

The cumulative impacts on air quality from all sources within the cumulative impact analysis area include direct emission of air pollutants from burning fossil fuels (e.g., vehicles and heavy equipment) and from wildland fire. Closing areas to mineral material development could increase impacts to air resources if additional transportation is needed to carry mineral materials to centrally located facilities, rather than being developed and processed in close proximity. However, restrictions to development on BLM lands might push development onto state, tribal or private land, which could result in indirect impacts as described under *Nature and Types of Effects.* Indirect cumulative impacts on air quality arise from the generation of secondary pollutants, such as ozone, stemming from other compounds in the atmosphere. Additionally, surface disturbance can generate dust, contributing to regional visibility degradation. This clarification underscores that ground-level ozone is a result of these secondary pollutants, not a precursor. Cumulative air quality impacts can also indirectly affect vegetations and aquatic ecosystems through pollutant depositions (e.g., acid rain). Impacts to air quality from past, present, and reasonably foreseeable actions, when added to the impacts under each alternative can either offset impacts from emissions (e.g., by limiting development and/or improving vegetation conditions) or contribute to pollutant concentrations in ambient air. These impacts would be similar to those described under *Nature and Type of Effects.*

Climate change trends which include an increasing trend in occurrence and severity of drought conditions, extreme weather, and more uncontrolled extreme wildfires can exacerbate the cumulative impacts on air quality. Extreme weather conditions and severe drought conditions can increase erosion potential and acres of disturbance, resulting in higher potential for fugitive dust formation. Furthermore, extreme temperatures particularly during a period of drought increase the potential for uncontrolled severe wildfires which further contribute to the cumulative air quality impacts from increased emissions.

Impacts to air quality from solar development include increased pollutant concentrations near the solar project development site during construction and reclamation activities (e.g., activities that involve burning fuel and surface disturbance, as described under *Nature and Types of Effects).* Maintenance and operation of solar projects would result in significantly smaller emissions from vehicle and equipment operation. An increase in solar development is expected to reduce the dependence on fossil-fuel-based energy productions and indirectly reduce associated emissions, which continue to be a primary source of emissions.

Comparison of Alternatives

Alternative I, which is primarily based on management actions from the 2015 plan amendments, would continue to contribute to the cumulative impacts from past, present, and reasonably foreseeable actions. This would result in air quality that resembles current local and regional conditions and follows known air

quality trends. According to the modeled ambient air pollutant concentrations from BLM's 2032 Western U.S. Photochemical Air Quality Modeling Study (Ramboll 2023), with the exception of particulate matter, circa 2032 cumulative emissions are not expected to result in exceedances of National Ambient Air Quality Standards (NAAQS) for the portions of the planning area that overlap with the model's study area (Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming only). Exceedances of $PM_{2.5}$ and PM_{10} in parts of the planning area in Colorado, Montana, South Dakota, Utah, and Wyoming were estimated, primarily due to modeled emission from wildfires.

An increase in air quality impacts from development of mineral and renewable energy projects under Alternative 2 would add to impacts from past, present, and reasonably foreseeable actions that also result in emissions, to increase cumulative impacts compared with Alternative 1, while the countervailing impacts of vegetation treatments and fire and fuels as well as any potential for replacement of emissions from fossil fuels through use of renewable sources for energy production would be the same as those under Alternative 1. Therefore overall, Alternative 2, would result in an increase in cumulative impacts, compared with Alternative 1.

Alternative 3, which has the most restrictions and resource protection measures among the alternatives, would offset the air quality impacts from past, present, and reasonably foreseeable actions to the greatest degree compared with cumulative impacts under Alternative 1. Therefore, Alternative 3 would result in the lowest cumulative air quality impacts among the alternatives.

Under Alternative 4, since mineral and renewable energy development can occur in HMAs, there may be an increase in impacts to air quality from development-related emissions and surface disturbing activity, compared with Alternative 1. However, cumulative impacts on air quality would depend on site- and/or state-specific adjustments.

Similar to Alternative 4, development can occur in HMAs under Alternatives 5 and 6. This would increase the potential for added contribution to cumulative air quality impacts in the form of increased pollutant concentrations, which when added to impacts from past, present, and reasonably foreseeable actions would result in increased cumulative air quality impacts compared with Alternative 1. However, compared with Alternative 4, fewer restrictions on development under Alternatives 5 and 6 would result in a greater contribution to cumulative air quality impacts.

The Proposed RMP Amendment introduces targeted management strategies aimed at improving air quality compared to Alternative 1. By designating PHMA as avoidance areas for major ROWs, exclusion for utility-scale solar and wind projects, and exclusion with no exceptions in areas designated as PHMA with limited exceptions, and by implementing state-specific minimization measures in GHMA, the plan seeks to limit activities that could degrade air quality. Enhanced guidelines for fluid mineral leasing, including exclusion with no waivers, exceptions, or modifications in PHMA with limited exceptions, along with restrictions on saleable and nonenergy minerals, are expected to further reduce air quality impacts, making the Proposed RMP Amendment more effective at protecting air quality than Alternative 1.

4.13.2 Climate Change and Greenhouse Gases

Nature and Type of Effects

Management actions that can affect climate change include actions that increase emission of GHGs, and those that create, eliminate, or damage carbon sinks and sequestration on BLM-administered lands. These include mineral exploration, development, and production activities; livestock grazing, wild horses and burros, and wildlife, wildland fire, vegetation management, rangeland management, and infrastructure development.

Protection of GRSG habitat may move sources of GHGs to different locations but may not change the amount of GHG emissions.

Greater Sage-Grouse Management

Management activities that plan to protect and enhance GRSG populations involve management that restrict or reduce land use and activities that can involve surface disturbance and/or GHG emissions. Conservation activities to this effect can be expected to increase vegetation cover (e.g., sagebrush habitat) and enhance the soil, thereby increasing the amount of carbon that can be sequestered from the atmosphere and stored in the landscape in plants and organic soil. However, such restrictions could shift such development and associated impacts to state, tribal, or private lands, where GHG emissions and surface disturbance would still occur.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Emission of GHGs occurs during all phases of mineral exploration, development, operation, and reclamation. Vehicles and construction equipment that are used in mineral development emit GHGs from combustion of fossil fuels. Restricting or closing areas to mineral exploration and development activities would reduce or eliminate GHG from such activities where such restrictions or closures occur. Surface disturbance from mineral development and exploration activities can also reduce the carbon sequestration potential of the land.

Lands and Realty Management

ROW projects that involve construction activities would continue to emit GHGs (e.g., from operation of heavy construction equipment and vehicles), and result in surface disturbance which can reduce carbon sequestration potential of the land (e.g., from damaged soils and vegetation). Impacts from solar and wind projects are typically on large areas (several thousand acres) and can require major land disturbance which can reduce carbon sequestration potential in the land. At the project construction stage, solar and wind projects emit GHGs from heavy equipment and vehicles which are used to transport workforce and building material. Less available acreage for solar and wind energy projects could increase the use of fossil fuel for energy development, which emit higher levels of GHGs from operation and downstream emissions.

Livestock Grazing Management

Grazing can impact emission of GHGs and improper grazing can affect vegetation, soils, and water resources (Beschta et al. 2014; Ripple et al. 2014; Gerber et al. 2013). GHG emissions of livestock grazing include methane emissions that can result from manure management and digestive process of most livestock and GHG emissions from vehicles and heavy equipment use (e.g., rangeland management or transporting livestock). Conversely, sustainable livestock grazing can have beneficial effects by reducing fuel loads, reduction in wildfire potential, and improving soil conditions and biological diversity. Grazing, under improved management, can increase carbon sequestration potential of the soil and promote root production (Chen et al. 2015). As described in **Appendix 21**, livestock grazing is managed to meet or make progress toward land health standards, thus reducing the likelihood of adverse effects.

Wild Horse and Burro Management

While there is limited data on GHG emissions from wild horses and burros, there is a growing body of literature which suggests GHG emissions from livestock and wildlife species are similar (Manzano et al. 2023; Wilson and Edwards 2008) likely due in part to occupying similar ecological niches (Manzano and White

2019). As such, this analysis assumes wild horses and burros, wild ungulates, livestock, and wildlife species all contribute similar GHG emissions.

Proposed RMP Amendment

The Proposed RMP Amendment would apply a balanced approach to development while minimizing impacts through specific management strategies compared with Alternative 1. The Proposed RMP Amendment would control fluid mineral resource development with stringent lease stipulations, reducing emissions and preserving carbon sequestration. There would be more restrictions on saleable minerals and coal development, resulting in fewer impacts. In PHMA with limited exceptions, these restrictions for fluid minerals would be further strengthened by disallowing waivers, exceptions, and modifications, thus retaining carbon sequestration and limiting GHG emissions in these areas.

For renewable energy development, the Proposed RMP Amendment is similar to Alternative 1 by designating PHMA as exclusion areas to protect GRSG habitat. However, in PHMA with limited exceptions, renewable energy development would be excluded with no exceptions, specifically for utility-scale solar and wind projects. Development in GHMA would remain allowed with mitigation measures. The Proposed RMP Amendment also emphasizes stronger protections within ROW avoidance areas, more stringent than Alternative 5, to promote the use of designated corridors. In areas designated as PHMA with limited exceptions, the Proposed RMP Amendment would take a stricter approach, with ROW exclusion for major ROWs with only specific exceptions permitted. Together, these restrictions would further reduce GHG emissions and retain carbon sequestration compared with Alternative 1. Additionally, livestock grazing would be managed similarly to Alternative 5, focusing on minimizing conflicts and reducing emissions through careful management practices compared with Alternative 1.

Cumulative Effects

Climate change is a global issue, therefore the cumulative impact analysis area for climate change includes lands within the range of GRSG habitat regardless of land ownership, the nation, and the globe. The time frame for cumulative impacts on climate change depends primarily on the cumulative effects of GHGs and the cumulative change in carbon sequestration in the landscape. Due to the different atmospheric lifetime of various GHGs (e.g., methane lasts 12 years in the atmosphere while carbon dioxide can last much longer) the climate change cumulative impact analysis considers both a 20-year and a 100-year timeframe.

Climate change is cumulative by nature. Over time, GHGs accumulate in the atmosphere and contribute to an overall greenhouse gas effect which is a primary driver of cumulative global climate change that can be attributed to human-related activity. Past, present, and reasonably foreseeable actions that contribute to the cumulative impacts on climate change include mineral exploration and development such as fluid minerals (oil, gas and geothermal), locatable minerals, leasable minerals, and mineral materials; urban and industrial development including major and minor ROWs (e.g., for roads, pipelines, electrical transmission lines, infrastructure, and large renewable energy projects, such as solar and wind development projects); vegetation treatments; fire and fuels management; livestock grazing; and recreation and travel management. However, restrictions to development on BLM lands might push development onto state, tribal or private land, which could result in indirect impacts as described under *Nature and Types of Effects.*

The cumulative impacts from all sources within the cumulative impact analysis area include direct emissions from burning fossil fuel and wildland fire as well as methane emissions from livestock grazing. The total amount of carbon dioxide removed from the atmosphere though carbon sequestration and storage in soils and vegetation would contribute to the cumulative climate change impacts through a reduction in the total

GHG concentrations in the atmosphere. These impacts would be similar to those described under *Nature and Type of Effects.*

Climate change trends, particularly the increasing trend in occurrence and severity of drought conditions affecting carbon sequestration, and the increasing trend in uncontrolled large wildfires affecting GHG emissions can further exacerbate impacts to climate change.

Impacts to climate change from solar development include increased emissions near solar project development sites and reduced carbon sequestration and storage in land at the project location. An increase in solar development is expected to reduce the dependence on fossil-fuel-based energy productions and indirectly reduce associated emissions, which continue to be a primary source of emissions.

Comparison of Alternatives

Alternative I, which is based on management actions from the 2015 plan amendments, would continue to contribute to the cumulative impacts from past, present, and reasonably foreseeable actions. This would result in conditions that resemble current local and regional conditions and follows known climate change trends.

Alternative 2, would result in an increase in cumulative impacts, due to fewer restrictions (e.g., fluid mineral development) which would result in an increase in emission of GHGs and fewer countervailing impacts to climate change from carbon storage, compared with Alternative I.

Alternative 3, which has the most restrictions and resource protection measures among the alternatives, would offset the climate change impacts from past, present, and reasonably foreseeable actions to the greatest degree compared with cumulative impacts under Alternative 1. Therefore, Alternative 3 would result in the lowest cumulative climate change impacts among the alternatives. However, potential increases of acres burned by wildfire and increased fine fuels may result in increased GHG emissions from the burning of vegetation, reducing or negating offsets from other actions.

Under Alternative 4, since mineral and renewable energy development can occur in HMAs, there may be an increase in impacts to climate change from development-related GHG emissions and changes to carbon storage levels of the land, compared with Alternative 1. However, these impacts would depend on site- and/or state-specific adjustments.

Similar to Alternative 4, development can occur in HMAs under Alternatives 5 and 6. This would increase the potential for added contribution to the cumulative climate change impacts in the form of increased GHGs and changes to carbon sequestration, which when added to impacts from past, present, and reasonably foreseeable actions would result in increased cumulative climate change impacts compared with Alternative 1. However, compared with Alternative 4, fewer restrictions on development under Alternatives 5 and 6 would result in a greater contribution to cumulative climate change impacts compared with Alternative 4. Alternative 6 would result in a slightly lower contribution to cumulative effects due to management of ACECs in which some development (e.g., major ROWs, renewable energy development) would be restricted.

The Proposed RMP Amendment introduces more focused management strategies aimed at reducing greenhouse gas emissions and mitigating climate change impacts compared with Alternative 1. By designating PHMA as avoidance areas for major ROWs, exclusion for utility-scale solar and wind projects, and exclusion with no exceptions in areas designated as PHMA with limited exceptions, and by implementing state-specific minimization measures in GHMA, the plan would limit activities that contribute to greenhouse gas emissions.

Specific restrictions on saleable and nonenergy minerals, such as closing new saleable permits in PHMA and applying disturbance thresholds in Idaho's IHMA, enhanced guidelines for fluid mineral leasing, including NSO for fluid mineral leasing, with no waivers, exceptions, or modifications in PHMA with limited exceptions areas, and comprehensive evaluations of surface-disturbing activities would have a lower contribution to cumulative impacts on climate change compared with under Alternative 1. Overall, the Proposed RMP Amendment's detailed protections and targeted management actions would produce fewer greenhouse gas emissions and mitigate contribution to climate change impacts more effectively than Alternative 1.

4.14 SOIL RESOURCES

4.14.1 Nature and Type of Effects

Activities that disturb, compact, contaminate, or remove vegetation from soils are generally considered to degrade soil productivity. In some cases, soil compaction aids in plant establishment and growth. However, too much compaction decreases water infiltration rates and gas exchange rates. Decreased gas exchange rates can cause aeration problems, induce nitrogen and potassium deficiency, and negatively impact root development, which is a key component of soil stabilization. As soil compaction increases, the soil's ability to support vegetation diminishes because the resulting increase in soil strength and change in soil structure (loss of porosity) inhibit root system growth and reduce water infiltration. Vegetation diminishment could lead to a shift of soil resources more dominated by trees to one more dominated by grasses and shrubs. As vegetative cover, water infiltration, and soil stabilizing crusts are diminished or disrupted, the surface water runoff rates increase, further accelerating rates of soil erosion (Weltz et al. 2017).

Impacts on soil productivity and erosion can result from a number of causes, including improper livestock grazing, wild horses and burros, surface-disturbing activities, vegetation treatment projects, prescribed burns, and wildfires. The intensity and extent of impacts on soil productivity and erosion are determined in part by the type and location of the activities. Impacts on soil productivity and erosion can also be affected by any applicable stipulations and plans of operations that address site-specific environmental concerns and require mitigation to stabilize soil, to prevent unnecessary erosion, and to revegetate disturbed surfaces.

Impacts on soil productivity and erosion can be mitigated by avoiding or minimizing the impact. This can be done by managing certain lands as closed or unavailable for surface-disturbing activities, or by restricting the activity by managing certain lands as ROW avoidance areas or attaching such stipulations as NSO or CSU to fluid mineral leases. As described in **Appendix 21**, livestock grazing is managed to meet or make progress toward land health standards, thus reducing the likelihood of adverse effects. Impacts that cannot be avoided can be minimized through project design and the application of COAs and BMPs. In addition, to protect GRSG, disturbance cap requirements and the application of lek buffers can locally eliminate impacts from disturbance. However, there could be impacts elsewhere if the disturbance is pushed to another location to minimize habitat impacts on GRSG.

4.14.2 Proposed RMP Amendment

Livestock Grazing Management

Under the Proposed RMP Amendment, livestock grazing would generally remain available in PHMA, IHMA, and GHMA. However, specific areas, such as portions of 13 key RNAs in Oregon, may be fully or partially unavailable for grazing in order to study them without the interruption of grazing This differs from Alternative 1, where grazing restrictions are less specifically targeted to critical habitat areas, focusing instead on broader management approaches. The BLM would maintain its focus on monitoring and renewing grazing activities in PHMA areas. Site-specific management actions would continue to play a crucial role in determining the impacts on soil productivity and erosion resulting from changes in livestock grazing. These

actions would strive to minimize concentrated compaction and aim to maintain or improve soil productivity and erosion conditions, compared with Alternative 1, thereby mitigating effects as described under the *Nature and Type of Effects*. To align with land health standards and GRSG habitat objectives, the BLM Authorized Officer would retain the authority to include or adjust permit terms and conditions within the areas available for livestock grazing. The flexibility emphasized under the Proposed RMP Amendment, compared with Alternative 1, would help ensure that grazing practices remain in compliance with established guidelines and contribute to minimizing local impacts on soil productivity and erosion. The Proposed RMP Amendment includes targeted adjustments to active AUMs, timing, intensity, duration, and frequency of grazing at the allotment scale based on site-specific conditions to meet or make progress toward meeting Land Health Standards for special status species. Temporary adjustments could also be made annually within the range of the terms and conditions and in accordance with applicable regulations.

Wild Horse and Burro Management

Under the Proposed RMP Amendment impacts to soil resources for wild horses and burros would be similar to Alternative 1. Wild horses and burros would be managed within their established AML levels with priority management actions occurring within PHMA and where HMAs/HAs overlap GRSG habitat. Soil health would improve under the Proposed RMP Amendment as a result of reduced populations of wild horses and burros within the planning area, which would in turn reduce associated soil impacts from trampling and excessive forage use.

Management of Surface-disturbing Activities

The Proposed RMP Amendment would include enhanced management strategies for surface-disturbing activities compared with Alternative 1, with a focus on balancing resource development with the conservation of GRSG habitat and soil productivity and erosion conditions. Under the Proposed RMP Amendment, the BLM would conduct comprehensive evaluations of parcels identified in EOIs within GRSG habitat management areas. Priority would be given to parcels that avoid impairing habitat suitability and proper function, which would provide a more specific evaluation approach compared with the general management actions under Alternative 1. This approach is designed to ensure that development activities do not compromise the integrity of GRSG habitat and soil productivity and erosion.

In terms of fluid mineral leasing and development, the Proposed RMP Amendment would apply more stringent lease stipulations and minimization measures compared with Alternative 1. For areas designated as PHMA with limited exceptions, the Proposed RMP Amendment would impose stricter conditions, specifically prohibiting surface occupancy for fluid mineral development with no waivers, exceptions, or modifications. The Proposed RMP Amendment integrates project-specific COAs to further mitigate impacts to soil productivity and erosion. These measures would aim to avoid, minimize, reduce, rectify, and compensate for both direct and indirect effects on soil productivity and erosion conditions, aligning with the objectives described under the *Nature and Type of Effects*, offering more detailed measures than those described under Alternative 1.

For wind and solar development, the Proposed RMP Amendment would designate PHMA as exclusion areas to prioritize GRSG habitat conservation. This restriction on utility-scale projects in these areas are similar to Alternative 1, which designates PHMA as exclusion areas for wind and solar development with some exceptions. Under the Proposed RMP Amendment, a new category, PHMA with limited exceptions, would also be established. This area within PHMA would have stricter limitations compared with Alternative 1, prohibiting utility-scale solar and wind development with no exceptions, while maintaining GHMA as open for such developments, provided that specific minimization measures are implemented to address potential

habitat impacts. This approach would provide a greater balance, compared with Alternative 1, regarding the need for renewable energy infrastructure with the protection of GRSG habitat and soil productivity and erosion conditions.

Regarding major transmission ROWs, the Proposed RMP Amendment would designate PHMA as avoidance areas, similarly prioritizing GRSG habitat and soil productivity and erosion protection compared with Alternative 1. PHMA with limited exceptions would be classified as exclusion with exceptions for major ROWs, with specific exceptions. GHMA would continue to be available for ROW development, with specific minimization measures required to mitigate impacts on soil productivity and erosion. Designated corridors for transmission infrastructure would be maintained, ensuring that development does not unduly disrupt GRSG habitat or soil productivity and erosion conditions. This approach aligns with the emphasis under Alternatives 4, 5, and 6 but would offer more stringent measures compared with Alternative 1, which allows new ROWs in PHMA under specific conditions and with limitations on collocation.

4.14.3 Cumulative Effects

The cumulative effects analysis area for soil resources includes the entire rangewide planning area. The time frame for the analysis is 20 years. Soil productivity is the ability of soil to support plant growth, and erosion is the removal of soil from the land surface. Soil productivity and erosion are affected by several factors, including soil type, climate, vegetation, and land use (See **Chapter 4**, Soil Resources, *Nature and Type of Effects* for a more detailed description).

Surface-disturbing activities, improper grazing, wild horses and burros, wildlife use, wildfires, and fuels management activities are examples of past, present, and reasonably foreseeable actions and conditions that have affected and will likely continue to affect soil resources in the cumulative effects analysis area. Impacts from these activities would be as described above in **Section 4.14**. ROW MLB Plans can help assure surface disturbance activities are managed appropriately within or outside of the planning area. Additionally, wildfires can have impacts on soil productivity and erosion, such as vegetation removal which can lead to erosion. Fuels management projects can also help to reduce the risk of wildfires by preventing the large-scale removal of vegetation which can lead to soil erosion. Vegetation and habitat management projects can help to improve the condition of soil productivity and erosion. For example, restoring sagebrush can help to stabilize the soil and reduce erosion. However, some of these projects, such as prescribed burning, can also have some impacts on soil productivity and erosion. In addition, recreation can have impacts on soil resources, including soil compaction and erosion. For example, OHVs can compact the soil, making it less able to absorb water and support plant growth. This can lead to erosion, as water and wind can more easily remove the compacted soil. OHVs can also damage vegetation, which can further increase the risk of erosion.

Federal resource management and land use plans can have impacts on soil productivity and erosion, as they can determine how land is used and how vegetation is managed. For example, a plan that allows for more development could lead to increased soil erosion.

Climate change is expected to have impacts on soil productivity and erosion in the GRSG range. Increased temperatures and decreased precipitation could lead to increased soil evaporation, decreased water availability, and more intense rainfall events. These changes could all contribute to increased soil erosion, which could lead to decreased soil productivity and the loss of important habitat for the GRSG. The impacts of climate change on soil productivity and erosion are cumulative, meaning that they will likely increase over time.

Comparison of Alternatives

Alternative 1 would continue the current trend of impacts on soil productivity and erosion. This is because the alternative does not make any significant changes to the management of activities that can impact soil, such as changes in livestock grazing, changes in surface-disturbing activities (including minerals development, renewable energy development, travel, and ROW development), and changes in vegetation treatments, prescribed burns, and potential for wildfire.

Cumulative effects on soil productivity and erosion would be greater under Alternative 2 compared with Alternative 1 because development activities are anticipated to be greater under this alternative. This is because it would provide more flexibility in the management of activities that can impact soil resources conditions. This could lead to increased soil compaction and erosion, which could reduce soil productivity. For example, if more development is allowed, this could lead to more roads, pipelines, and other infrastructure being built. This could, in turn, reduce soil productivity and make it more difficult for plants to grow.

Cumulative effects would be less intensive under Alternative 3, compared with Alternative 1. This is because it would prohibit or limit the number of surface-disturbing activities. This would help to protect soil productivity and prevent erosion. For example, this alternative would prohibit the construction of new roads or pipelines in sensitive areas. It would also require that development activities be carefully managed to minimize soil disturbance. This would help to protect soil productivity and prevent erosion. However, the lack of vegetation management practices and livestock grazing can effectively reduce fuels thereby diminishing the potential for increased wildfires. Consequently, Alternative 3 could contribute to decreased soil productivity and increased erosion.

Alternative 4 would depend on the specific adjustments that are made. This is because it would be based on Alternatives 1 and 2, with adjustments based on HMA review, or other state-specific considerations. The potential impacts of this alternative on soil productivity and erosion will depend on the specific adjustments that are made. For example, if HMA review identifies areas that are particularly sensitive to soil erosion, then these areas could be protected from development.

Alternatives 5 and 6 would involve an increase in areas designated as PHMA compared with Alternatives 1 and 2. The potential impacts on soil productivity and erosion in this alternative will depend on the specific adjustments made. For instance, if HMA review identifies areas particularly sensitive to soil erosion, protective measures could be implemented to limit development. Similarly, under Alternative 6, stricter ACEC management actions might safeguard soil resources within those areas. However, the reduced protection of Alternative 5 and 6 could result in noteworthy cumulative effects on soil productivity and erosion, lacking the additional safeguards present in Alternative 1.

The Proposed RMP Amendment would introduce targeted strategies to reduce cumulative impacts on soil productivity and erosion compared with Alternative 1. PHMA areas are designated as avoidance for major ROWs and utility-scale solar and wind projects, with stricter restrictions for PHMA with limited exceptions, where no waivers, exceptions, or modifications for fluid mineral development are allowed, and major ROWs are excluded with exceptions. Additional restrictions include closing new saleable permits in PHMA and applying disturbance thresholds in Idaho's IHMA. Enhanced guidelines for fluid mineral leasing and surface-disturbing activities aim to further minimize soil compaction and erosion, making the Proposed RMP Amendment more protective of soil resources than Alternative 1.

4.15 WATER RESOURCES

4.15.1 Nature and Type of Effects

Surface water quality is influenced by both natural and human factors. Natural factors include weather-related erosion, sediment delivery into waterways as the result of wildfire removal of vegetation, and heavy use from overpopulated herds of wild horses and burros. Human-related factors that can temporarily affect surface water quality includes additional transport of eroded soils into streams due to improper recreational activities or improper livestock grazing. Presence of livestock could decrease the quality of water sources, via erosion of banks and increased water turbidity. Any level of horse presence affects waterways (Scanes et al. 2021). Water quality can also be affected by the introduction of soil from low-water crossing points of roads, routes, and ways used by motorized vehicles. Activities that introduce chemicals into the natural environment also have the potential to degrade surface and water quality through chemical leaks, accidents, or broken well casings. All of these activities have appropriate regulation and mitigation measures in place to reduce and, in most cases, eliminate these risks. The specific regulation and mitigation measures may include strict guidelines for chemical handling, spill response protocols, and well casing integrity requirements. Continuous monitoring of water quality in areas where such activities occur allows for the prompt identification of any deviations from regulatory standards. Additionally, the observed reduction in incidents and the successful implementation of mitigation measures in response to past events contribute to the confidence that risks to water quality can be minimized and, in many cases, eliminated.

Surface-disturbing activities, particularly under specific soil types or weather conditions, can also lead to soil compaction, which decreases infiltration rates and elevates the potential for overland flow. Overland flow can increase erosion and sediment delivery potential to area surface water bodies, leading to surface water quality degradation (Belnap et al. 2001). This degradation occurs through mechanisms such as the introduction of excess sediments, which may carry pollutants, nutrients, and contaminants into the water, adversely impacting its quality.

Surface-disturbing activities within stream channels, floodplains, and riparian habitats are more likely to alter natural morphologic stability and floodplain function. Morphologic destabilization and loss of floodplain function accelerate stream channel and bank erosion, increase sediment supply, dewater near-stream alluvium, cause the loss of riparian and fish habitat, and deteriorate water quality (Rosgen 1996). The deterioration of water quality refers to the introduction of excessive sediments and pollutants into the water, disrupting its chemical composition and overall health. Altering or removing riparian habitats can diminish the hydraulic roughness of the bank, which refers to the resistance that natural features provide to water flow. This reduction in hydraulic roughness, in turn, amplifies flow velocities near the bank. The term hydraulic roughness encompasses the natural irregularities, such as vegetation, rocks, and other features, that impede the smooth flow of water. Thus, when riparian habitats are altered or removed, the resulting decrease in hydraulic roughness allows for swifter flow velocities near the bank. This acceleration in flow can lead to accelerated erosion and potentially contribute to a decline in water quality (National Research Council 2002).

Removing riparian vegetation and the shade it provides contributes to elevated stream temperatures (Rishel et al. 1982; Beschta 1997). Increased solar radiation, resulting from the absence of riparian vegetation, can raise water temperatures. This is significant because elevated water temperatures impact the water's ability to hold dissolved oxygen. The relationship between increased water temperature and lower dissolved oxygen concentrations is crucial for understanding water quality issues affecting aquatic life, particularly in the context of GRSG habitat. Warmer water with lower oxygen levels can pose challenges for aquatic ecosystems, potentially influencing GRSG habitat conditions and overall ecosystem health. Channel widening

or lowering overall flow can increase solar loading in stream channels through specific mechanisms. For instance, when a channel widens, it enlarges the surface area exposed to solar radiation, intensifying the heating of the channel. Additionally, a decrease in overall flow results in a reduction in water volume within the stream channel. With less water present, there is a greater concentration of solar energy absorbed per unit volume of water, as the lower flow means that the available solar radiation is distributed over a smaller volume. This contributes to an increase in solar loading and, consequently, elevated water temperatures. The principal source of heat energy delivered to the water column remains solar energy striking the stream surface directly (Brown 1969). The ability of riparian vegetation to shade the stream throughout the day depends on aspect and vegetation height, width, density, and positions relative to the stream, as well as the aspect in which the stream flows (streamside vegetation provides less shade on a north- or south-flowing stream than on an east- or west-flowing stream). In this context, aspect refers to the compass direction of the slope or landform where the vegetation is located, influencing the angle and duration of sunlight exposure.

The land uses most commonly associated with stream degradation in the planning area include improper livestock grazing and excessive use by wild horses and burros, as these are the most prevalent disturbances as they often congregate in riparian and wetland areas for water and shade (Weltz et al. 2017). Significant contributors to stream degradation include agricultural expansion, urbanization, and the use of fertilizers, pesticides, and other contaminants, which impacts almost all streams and rivers. The conversion of lands for intensive agriculture has led to stream channel straightening and the removal of riparian vegetation to create fields suitable for irrigation, which may have had a greater impact on stream degradation than grazing alone. Additional land uses linked to degraded streams include poorly located roads, which disrupt drainage and increase sediment runoff, construction activities like bridges and culverts that affect water flow, unmanaged trails that contribute to soil erosion, excessive water withdrawal for agriculture or industry, mineral developments that introduce pollutants, and reservoir operations that alter streamflow and aquatic habitats. These activities collectively contribute to degraded streams and compromised water quality.

Management to protect GRSG generally involves reducing or otherwise restricting land uses and activities that disturb the surface. Therefore, the greater the amount of acreage restricted from a land disturbing use, the greater the protection of impacts from surface disturbing activities afforded to water resources. However, water flows across jurisdictional boundaries and such restrictions could merely shift such surface disturbing activities and associated impacts on water resources from BLM lands to state, Tribal, or private lands. Lands and realty management decisions affect where surface-disturbing activities can and cannot occur. The use of ROW exclusion and NSO stipulations limit the opportunities for surface disturbances and runoff of soils and chemicals into waterways within those areas and are generally considered to be protective of water quality. ROW exclusion and NSO stipulations also reduce the likelihood of chemical spills onto the ground which may contaminate surface or groundwater. In areas managed as ROW avoidance, water quality would receive some protection since ground disturbance would often be limited. ROW avoidance areas would generally result in lower impacts on water quality, compared with areas not managed as ROW avoidance. Areas where ROWs are authorized are permitted with conditions of approval (COAs) which assure that the holder of the rights comply with the Water Quality Act and other federal and state laws, which would protect water resources from degradation.

The intention of BLM management is to ensure that water quality adheres to the Standards and Guidelines for Livestock Grazing Administration (BLM and U.S. Department of Energy 1997 (43 CFR Part 4180.2 (b)). Improper livestock grazing and wild horses and burros above appropriate management levels (AMLs) can lead to loss of vegetation cover, reduced water infiltration rates and nutrient cycling, decreased plant litter,

lower water quality, and increased bare ground and soil erosion (Manier et al. 2013). See **Section 4.2**, Greater Sage-Grouse, and **Section 4.3**, Vegetation, for a more detailed analysis regarding these effects. Livestock grazing can be a compatible use in riparian areas when managed consistent with land health standards and land management objectives.

Activities beneficial to water resources are primarily defined as improving conditions by enhancing or restoring degraded water quality or by reducing ongoing groundwater depletion. Changing grazing patterns and maintaining wild horses and burros at AMLs in riparian areas can mitigate negative impacts and further benefit the water quality by promoting vegetation health, stabilizing streambanks, and enhancing nutrient cycling, along with the geomorphic function of streams (Burdick et al. 2021; Kaweck et al. 2018).

Water supply structures throughout the landscape that have been established for multi-purpose use may also provide drinking water sources for GRSG. GRSG will use available water although they do not require it because they obtain their water needs from the food they eat. Information on the extent of habitat influenced by developed water and the net effects on GRSG populations is unknown. Natural water bodies and reservoirs can provide mesic areas for succulent forb and insect production, thereby attracting GRSG hens with broods (Connelly et al. 2004). It is unknown whether wildlife guzzlers built to supply available water in normally arid habitats provide a net benefit to GRSG or if potential benefits are countered by potential negative consequences. These negative consequences may include increased competition from other species that benefit from guzzlers, such as domestic and wild ungulates, or predators and the associated increase in predation risk (Braun 1998). In addition, new water sources may become additional habitat for mosquitoes carrying West Nile virus (Naugle et al. 2004).

Diverting the water sources has the secondary effect of changing the habitat at the water source before diversion. This could result in the loss of either riparian or wet meadow habitat that is important to GRSG as sources of forbs or insects. Further study is needed to determine the effects of water management on the sagebrush biome.

Potential impacts from locatable mineral, mineral material disposal, nonenergy leasable, and fluid leasable mineral activity may result from accidents. The accidents can include the release of pollutants capable of contaminating surface water or aquifers during groundwater recharge as a result of use, storage, and transportation of hazardous fluids and compounds. Mineral resource development activities could alter drainage patterns which would affect stream flow and water supplies, and unintended discharge of mine water could alter water chemistry and impair natural stream morphologic conditions. Effects or impacts from mineral activity is regulated and mitigated through federal and state laws, as well as handbooks, stipulations, and conditions of approval which have effectively reduced the potential of surface or groundwater contamination. However, areas managed as withdrawn from locatable mineral entry would eliminate any potential for impacts on water resources, and therefore be more protective of water resources than areas open to locatable mineral entry.

Effects of wildfire on water resource conditions are determined largely by the severity of the wildfire, suppression tactics used for wildfire management, and post-fire precipitation regimes (Neary et al. 2005). Higher-severity wildfires often result in near complete consumption of vegetation and litter cover and can cause changes to soil chemistry resulting in hydrophobic soil conditions. Wildfire can create hydrophobic soil conditions through a process known as fire-induced soil water repellency. During a wildfire, the intense heat can cause the combustion of organic matter in the soil, releasing hydrophobic substances. These substances then coat soil particles, forming a water-repellent layer. This layer disrupts the natural wettability of the soil, causing water to bead up on the surface rather than penetrating the soil profile. As a result,

stream flow responses in severely burned watersheds are typically higher, in some cases orders of magnitude, than in unburned or lower severity burned watersheds. Additionally, increased flooding and debris flow risks can occur up to 5 years after a severe wildfire. (Neary et al. 2005).

Changes in vegetation communities due to wildfire can also affect water resources. Most wildfires in the planning area result in an increase to invasive vegetation communities, particularly cheatgrass. Cheatgrass communities often have shorter wildfire return intervals, altering the 32- to 70-year return interval (a range representing the typical frequency at which wildfire events naturally occurred in these ecosystems) for sagebrush communities to a 5-year wildfire return interval (Pellant 1996).

4.15.2 Proposed RMP Amendment

Livestock Grazing Management

Under the Proposed RMP Amendment, similar to Alternatives 4, 5, and 6, livestock grazing would generally remain available in PHMA, IHMA, and GHMA. However, specific areas, such as portions of 13 key RNAs in Oregon, may be fully or partially unavailable for grazing to allow for comparison of ungrazed to grazed areas. This differs from Alternative 1, where grazing restrictions are less specifically targeted to critical habitat areas, focusing instead on broader management approaches. The BLM would maintain its focus on monitoring and renewing grazing activities in PHMA areas. Site-specific management actions would continue to play a crucial role in determining the impacts on water resource conditions resulting from changes in livestock grazing. These actions would minimize concentrated compaction and aim to maintain or improve water resource conditions, compared with Alternative 1, thereby mitigating effects as described under the *Nature and Type of Effects*.

To align with land health standards and GRSG habitat objectives, the BLM Authorized Officer would retain the authority to include or adjust permit terms and conditions within the areas available for livestock grazing. The flexibility emphasized under the Proposed RMP Amendment would help ensure that grazing practices remain in compliance with established guidelines and contribute to minimizing local impacts on water resource conditions, compared with Alternative 1. The Proposed RMP Amendment includes targeted adjustments to active AUMs, timing, intensity, duration, and frequency of grazing at the allotment scale based on site-specific conditions to meet or make progress toward meeting Land Health Standards for special status species. Temporary adjustments could also be made annually within the range of the terms and conditions and in accordance with applicable regulations.

Wild Horse and Burro Management

Under the Proposed RMP Amendment, impacts from wild horses and burros would be similar to what is described in Alternative 1. Wild horses and burros would be managed within their established AML levels with priority of wild horse and burro management actions occurring within PHMA and where HMAs/HAs overlap GRSG habitat. Water resources would improve under the Proposed RMP Amendment as that a reduction in the current population of wild horses and burros within the planning area would reduce direct impacts wild horses and burros have on water resources.

Management of Surface-disturbing Activities

The Proposed RMP Amendment would include enhanced management strategies for surface-disturbing activities compared with Alternative 1, with a focus on balancing resource development with the conservation of GRSG habitat and water resource conditions. Under the Proposed RMP Amendment, the BLM would conduct comprehensive evaluations of parcels identified in EOIs within GRSG habitat management areas. Priority would be given to parcels that avoid impairing habitat suitability and proper

function, which would provide a more specific evaluation approach compared to the general management actions under Alternative 1. This approach is designed to ensure that development activities do not compromise the integrity of GRSG habitat and water resource conditions.

In terms of fluid mineral leasing and development, the Proposed RMP Amendment would apply more stringent lease stipulations and minimization measures compared with Alternative 1. The Proposed RMP Amendment would emphasize the importance of compliance with NEPA requirements and integrate project-specific COAs to further mitigate habitat impacts. These measures aim to avoid, minimize, reduce, rectify, and compensate for both direct and indirect effects on water resource conditions, aligning with the objectives described under the *Nature and Type of Effects*, offering more detailed measures than those described under Alternative 1. Under the Proposed RMP Amendment, fluid mineral leasing and development within PHMA with limited exceptions would be subject to NSO with no waivers, exceptions, or modifications. These limited exceptions provide stricter protections compared to the broader PHMA category, ensuring that areas with the highest conservation value are fully protected from potential habitat impacts associated with fluid mineral activities.

For wind and solar development, the Proposed RMP Amendment would designate PHMA as exclusion areas to prioritize GRSG habitat conservation. PHMA with limited exceptions would also be designated as exclusion areas with no exceptions, ensuring stricter protection in these high-priority areas compared with Alternative 1. This restriction on utility-scale projects in these areas would be similar to Alternative 1, which designates PHMA as exclusion areas for wind and solar development with some exceptions. Utility-scale wind and solar projects would be restricted in these areas to prevent adverse impacts on habitat and water resource conditions. However, GHMA would remain open for such developments, provided that specific minimization measures are implemented to address potential habitat impacts. Compared with Alternative 1, this approach seeks to balance the need for renewable energy infrastructure with the protection of GRSG habitat and water resource conditions.

Regarding major transmission ROWs, the Proposed RMP Amendment would designate PHMA as avoidance areas, similarly prioritizing GRSG habitat protection compared with Alternative 1. PHMA with limited exceptions would be designated as exclusion areas with exceptions, ensuring even stricter control over ROW development in these high-priority areas. GHMA would continue to be available for ROW development, with specific minimization measures required to mitigate impacts on water resource conditions. Designated corridors for transmission infrastructure would be maintained, ensuring that development does not unduly disrupt GRSG habitat or water resource conditions compared with Alternative 1. This approach aligns with the emphasis under Alternatives 4, 5, and 6 but may offer more stringent measures compared with Alternative 1, which allows new ROWs in PHMA under specific conditions and with limitations on collocation.

GRSG Management

The Proposed RMP Amendment would introduce specific provisions that differ from Alternative 1 regarding the potential for wildfire and its impacts on water resource conditions for GRSG. Under the Proposed RMP Amendment, different disturbance caps would be applied within the project analysis area of PHMA depending on the state. Specifically, in Wyoming and Montana, a 5% cap on disturbance would be set, while in other states, a 3% cap would be implemented, limited to infrastructure only. Additionally, within the HAF fine scale habitat selection area in PHMA, a 3% cap on infrastructure disturbance would be enforced.

These measures under the Proposed RMP Amendment, compared with Alternative 1, aim to manage and minimize disturbance, preserve vegetation communities, and mitigate the potential for further degradation,

while ensuring the conservation of water resource conditions for GRSG. This approach is designed to improve disturbance management compared with Alternative 1 and addresses the impacts on water resource conditions described under the *Nature and Types of Effects*.

4.15.3 Cumulative Effects

The cumulative impact analysis for water resources conditions will assess the potential impacts of past, present, and reasonably foreseeable actions on water quality and quantity in the entire rangewide planning area over a 20-year time frame. Water quality is the physical, chemical, and biological characteristics of water that determine its suitability for a variety of uses. Water quantity is the amount of water available in a given area. Water resource conditions are affected by several factors, including geology, soil type, climate, vegetation, and land use (See **Chapter 4**, Water Resources, *Nature and Type of Effects* for a more detailed description).

Surface-disturbing activities, improper grazing, wild horses and burros, wildlife use, wildfires, and fuels management activities are examples of past, present, and reasonably foreseeable actions and conditions that have affected and will likely continue to affect water resources conditions in the cumulative impact analysis area. Impacts from these activities would be as described above in **Section 4.12**. Additionally, wildfires can also have impacts on water resources conditions through soil erosion, sedimentation, and water quality degradation. Wildfires can remove vegetation, which can increase the risk of erosion. They can also deposit ash and debris into streams and rivers, which can pollute water supplies. Vegetation and habitat management projects can help to improve the condition of water resources conditions by improving soil productivity and plant growth and decreasing erosion which can lead to sedimentation and contamination. However, some of these projects, such as prescribed burning, can also have some impacts on water resources. For example, prescribed burning can release pollutants, which can then be deposited into water supplies. Furthermore, vegetation management and restoration methods to keep water on the landscape longer within riverscapes will help improve function of these areas. In addition, recreation can have impacts on water resources conditions, including soil compaction, erosion, and water quality degradation. For example, off-highway vehicles can compact the soil, making it less able to absorb water and support plant growth. This can lead to erosion, as water and wind can more easily remove the compacted soil.

Federal resource management and land use plans will continue to be updated to reflect best management decisions for current conditions. These plans determine what activities are allowed on federal lands, like mineral developments, livestock grazing, and recreation. Decisions enabling various projects in land use can cause soil to erode, leading to more sediment in water bodies. Sediment inputs to surface water can lead to increased turbidity and decreased water quality and aquatic habitat. Pollutants such as metals and bacteria can attach to soil particles. Turbidity in streams can also increase the solar energy that is absorbed by the water, thereby increasing the water temperature and impacting aquatic species' habitat. Higher turbidity levels can also reduce the amount of light the water receives and could impact ecological productivity.

Climate change is expected to have impacts on water resource conditions in the rangewide planning area. Increased temperatures and decreased precipitation could lead to changes in the timing and amount of water availability, as well as changes in water quality. These changes could have several downstream impacts, including decreased water supplies, increased risk of flooding and water contamination, growth of harmful algae blooms, and increased salinity among others.

Comparison of Alternatives

Alternative 1 would result in a continuation of current trend of impacts on water resources conditions. This is because the alternative does not make any significant changes to the management of activities that can impact water resources conditions, such as changes in livestock grazing, changes in surface-disturbing activities (including mineral development, renewable energy development, travel, and ROW development), and changes in vegetation treatments, prescribed burns, and potential for wildfire.

Cumulative effects on water resource conditions would be greater under Alternative 2 compared with Alternative 1. This alternative would allow for more development and could lead to greater water degradation. This is because it would provide more flexibility in the management of activities that can impact water resources conditions. This could lead to increased soil compaction, erosion, and sedimentation, which could degrade water quality. For example, if more development is allowed, this could lead to more roads, pipelines, and other infrastructure being built. This could increase the risk of soil compaction and erosion, which could lead to sedimentation in streams and rivers. This could, in turn, degrade water quality and otherwise impact water resources conditions.

Cumulative effects would be less intensive under Alternative 3, compared with Alternative 1, because of increased protections from prohibiting or limiting the number of surface-disturbing activities including changes in livestock grazing, changes in surface-disturbing activities (including mineral development, renewable energy development, travel, and ROW development), and changes in potential for wildfire. This would result in the greatest protections of any alternative for water resources conditions in the planning area. For example, this alternative could prohibit the construction of new roads or pipelines in sensitive areas. It could also require that development activities be carefully managed to minimize soil disturbance. This would help to protect water resources conditions.

Alternative 4 would be based on Alternatives 1 and 2, with adjustments based on HMA review, presence of a potential ACEC, or other state-specific considerations. The potential impacts of this alternative on water resources conditions will depend on the specific adjustments that are made. For example, if HMA review identifies areas that are particularly sensitive to soil erosion, then these areas could be protected from development. Similarly, if an ACEC is identified, then this area could be subject to stricter regulations to protect water resources.

Alternatives 5 and 6 would involve an increase in areas designated as PHMA compared with Alternatives 1 and 2. The potential impacts on water resources conditions in this alternative will depend on the specific adjustments made. For instance, if HMA review identifies areas particularly sensitive to water resources degradation, protective measures could be implemented to limit development. Similarly, for Alternative 6, ACECs with stricter regulations might safeguard water resources within that area. However, the reduced protection of Alternatives 5 and 6 could result in noteworthy cumulative effects on water resources conditions, lacking the additional safeguards present in Alternative 1.

The Proposed RMP Amendment would introduce targeted strategies to reduce cumulative impacts on water resource conditions compared with Alternative 1. PHMA areas are designated as avoidance for major ROWs and utility-scale solar and wind projects, with stricter protections in PHMA with limited exceptions areas. Additional restrictions include closing new saleable permits in PHMA, applying disturbance thresholds in Idaho's IHMA, and enhanced guidelines for fluid mineral leasing and surface-disturbing activities. These measures aim to better protect water resource conditions than under Alternative 1.

4.16 CULTURAL RESOURCES

4.16.1 Nature and Type of Effects

Effects on cultural resources can be direct, indirect, or cumulative. They can also be adverse or beneficial. Effects from management guidance under each alternative will be largely indirect and cumulative, influencing the effects (or lack of thereof) from future undertakings.

On a project-by-project basis, the spatial distribution (or range) of effects would be largely focused on the specific site or location of a development or action. However, over time and as more actions occur throughout the planning area, the extent of these effects on cultural resources would accumulate throughout the planning area.

The nature and type of effects to be expected from different management actions are explained in more detail below:

GRSG Management

GRSG management in the proposed alternatives includes designation of HMAs for the benefit of GRSG. Restrictions on land use and surface-disturbing activities would occur within the HMAs. These restrictions and corresponding management guidance, including required design features and habitat objectives seeking to stabilize or increase GRSG populations in HMAs, would reduce potential for ground disturbance, changes in setting such as visual or auditory disturbance, and access.

A cap for disturbance in GRSG habitat is present in some form under all alternatives, ranging from 3% to 5%. This cap varies by alternative and within alternatives by state and situation, limiting disturbance to some degree for the benefit of GRSG. This would offer protection to cultural resources in these habitat areas from impacts due to disturbance under all alternatives, including ground disturbing activities and alterations of setting. This is discussed in detail by alternative. While this will reduce potential for impacts on cultural resources in certain areas, it is likely at least some of the development related habitat impacts will be displaced to locations outside of these protected areas, exposing cultural resources elsewhere to greater potential for impacts.

While intended to benefit the GRSG, reduced potential for ground disturbance, changes in setting, and increase in access would tend to be protective of cultural resources within these areas. Designations of HMA and management guidance by designation varies under each alternative and between states, and the differences will be discussed in more detail below.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Surface disturbing activities associated with mineral exploration and development would have potential direct and indirect impacts on cultural resources, including damaging, destroying, and/or displacing artifacts and features, and construction of modern features out of character with a historic setting. Many cultural resources that occur on or just below the ground are susceptible to surface disturbance and erosion damage, including modifying spatial relationships of artifacts and destroying features and stratified deposits. The information loss may be relevant to the site function, dates of occupation, subsistence, and past environments; all of these are important to understanding past culture.

Depending on the extent and type of activity, the amount of physical disturbance could be from slight artifact shifts out of context in a small portion of the site to wholesale destruction of the entire site. Should a portion of a site be impacted, it is crucial to recognize that data recovery, while seeking to retrieve valuable

information, inherently constitutes an adverse effect. Despite the intention to contribute to the historical or prehistoric record of the region, the process of data recovery itself can have adverse implications. Furthermore, the historical record could be influenced by physical disturbance, encompassing both prehistoric and historic contexts. Adverse impacts that result in an irreversible and irretrievable loss of cultural resource value are of the highest severity. Mineral exploration and development could result in impacts to cultural resources due to surface disturbing or setting altering activities such as road development and use, facility construction and placement, and creation of well pads and pipelines.

Indirect impacts on cultural resources include changing the character of a property's use or physical features within a property's setting that contribute to its historic significance (e.g., isolating the property from its setting) and introducing visual, atmospheric, or sound elements that diminish the integrity of the property's historic features.

Areas closed to mineral leasing and development, or restrictions placed on these activities would reduce the total acreage of potential surface disturbance and associated impacts to cultural resources in those areas. While this would reduce potential for impacts on cultural resources in protected HMA, it is likely at least some of the development related habitat impacts will be displaced to locations outside of HMA, exposing cultural resources in other areas to greater potential for impacts. Additionally, many cultural resources have been discovered because of field surveys associated with anticipated mineral development activities. Reducing mineral development could have the unintended effect of reducing surveys and discoveries.

Renewable Energy Management

The nature and type of effects on cultural resources from renewable energy development and associated infrastructure (including construction and operation of distribution and transmission lines, substations, and access roads) would largely be similar to the type of effects resulting from minerals management, including damaging, destroying, and/or displacing artifacts and features, and construction of modern features out of character with a historic setting.

Similar to minerals management, closing areas to renewable energy development or restricting surface-disturbing activities during development of renewable energy projects would reduce potential impacts to cultural resources in these areas. While this would reduce potential for impacts on cultural resources in protected HMA, it is likely at least some of the development related habitat impacts will be displaced to locations outside of HMA, exposing cultural resources in other areas to greater potential for impacts.

Lands and Realty Management

The nature and type of effects on cultural resources from ROW development would be similar to the type of effects resulting from minerals management and renewable energy management.

Generally speaking, management actions such as establishing ROW exclusion and avoidance areas offer increased protection to cultural resources in these areas from surface disturbing activities or alterations in setting like construction of highly visible features, and from increased access that often accompanies construction in ROWs. While this would reduce potential for impacts on cultural resources in these areas, it is very likely with ROWs that the development related impacts will simply be displaced to other locations, exposing cultural resources in other areas to greater potential for impacts and potential increasing the potential for impacts by resulting in longer ROWs.

Livestock Grazing and Wild Horse and Burro Management

Cultural resources can be adversely impacted by livestock and grazing through direct trampling of artifacts and features and from such activities as trailing or concentrating around water, under shade, or along natural constraining features such as rock cliffs. Experimental studies have shown that trampling significantly impacts both the physical artifacts and features of a site. It also distorts the most common analytical approaches to measuring sites, such as artifact abundance, raw material proportions, and average artifact dimensions (Osborn et al. 1987; Douglass and Wandsnider 2012). Trampling also causes the vertical displacement of artifacts, especially in wet ground (Eren et al. 2010). Making land unavailable for livestock grazing and removal of wild horses or burros would be protective of cultural resources.

The loss of vegetation, such as grass, forbs, and shrubs over-consumed by improperly managed livestock, wild horses, or burros can result in increased erosion (**Section 4.14.2**, Soil, Nature and Type of Effects), potentially impacting the integrity of cultural resources. Erosion and the loss of vegetation due to improper grazing could also result in impacts to the setting of cultural resources. However, as described in **Appendix 21**, livestock grazing is managed to meet or make progress toward land health standards, thus reducing the likelihood of these effects. Additionally, the BLM manages overpopulations of wild horses and burros through standard population control measures and habitat management to further protect the integrity and setting of cultural resources.

4.16.2 Impacts Common to All Alternatives

Under all alternatives, the BLM would continue to adhere to the existing laws, such as the National Historic Preservation Act, and cultural resource related policy like that found in BLM manuals and handbooks, such as Manual 8100 The Foundations for Managing Cultural Resources (BLM 2004a). This would generally act to protect culturally significant resources from impacts related to ground-disturbing activities, alterations to setting, and vandalism or unauthorized collection. It would also contribute to mitigating unavoidable impacts to cultural resources through various strategies. These might involve the collection of scientific data during cultural resource inventories or excavations, as well as *in situ* preservation to minimize physical disturbance and avoidance measures to guide activities away from sensitive areas. The BLM would continue to identify and manage cultural resources on a programmatic and project specific level. Additionally, continued consultation and cooperation with State Historic Preservation Offices and Native American Tribes would allow information on cultural properties and cultural landscapes to continue to be compiled and concerns regarding sensitive cultural resources such as traditional cultural properties (TCPs) to be addressed. This would enable better future management and protection of the integrity of these resources.

4.16.3 Proposed RMP Amendment

GRSG Management

Under the Proposed RMP Amendment, the impacts on cultural resources from designating HMAs within GRSG habitat would be similar to those described under Alternative 1, although PHMA would cover a larger area and SFAs would not be designated under the Proposed RMP Amendment. Additionally, under the Proposed RMP Amendment, the disturbance cap in PHMA (and IHMA in Idaho) for all states would be 3% for new and pre-existing authorizations within HAF fine scale habitat selection area and would apply only to infrastructure (not to wildfire or agriculture). In Wyoming and Montana, a 5% cap in PHMA at the project scale includes disturbance from wildfire and agriculture. In all other states (Colorado, Montana, Idaho, Nevada, California, Oregon, Utah, North Dakota, and South Dakota), a 3% cap at the project scale would not include wildfire or agriculture-related disturbance. However, in areas designated as PHMA with limited exceptions, additional protections would be in place that may further reduce potential impacts on cultural resources within these specific areas compared with Alternative 1.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Under the Proposed RMP Amendment, fluid mineral leasing management would seek to minimize impacts on GRSG habitat through the reduction of habitat fragmentation and loss, which would be generally protective of cultural resources in GRSG habitat. Under the Proposed RMP Amendment, a greater number of waivers, exceptions, and modifications for fluid minerals leasing applied across a larger portion of the planning area could enable a greater degree of development in HMAs than under Alternative 1, leading to increased potential for impacts on cultural resources related to fluid mineral development, as described under *Nature and Type of Effects*. Additionally, in PHMA with limited exceptions, there would be no waivers, exceptions, or modifications allowed, which could reduce potential disturbances to cultural resources in these areas compared to other PHMA areas.

Renewable Energy Management

Under the Proposed RMP Amendment, impacts on cultural resources related to renewable energy development would be as described in *Nature and Type of Effects*. Exclusion or avoidance of renewable energy development within HMAs under the Proposed RMP Amendment would reduce potential for impacts on cultural resources within these areas and would likely result in a shift of these activities to suitable areas outside of HMAs, negatively impacting cultural resources outside of them. Overall, the restrictions on renewable energy development under the Proposed RMP Amendment could make development more costly and difficult or prevent any uses that could not be relocated to a suitable area, though the overall likelihood of habitat impacts related to renewable energy development within the planning area would likely be similar to that under Alternative 1. In PHMA with limited exceptions, renewable energy development would be excluded without exceptions, which could further limit potential impacts to cultural resources within these areas. Impacts on cultural resources within HMAs would be greater than under Alternative 1 due to the lack of HMAs designated as solar and wind energy exclusion areas. However, the overall likelihood of these habitat impacts within the planning area is likely to be similar to that under Alternative 1, since impacts on cultural resources due to renewable energy development may only be displaced instead of avoided entirely.

Lands and Realty Management

Under the Proposed RMP Amendment, the designation of GHMA as open to major ROWs and the lack of major ROW exclusions could result in shorter ROWs compared with Alternative 1, since Alternative 1 includes greater ROW avoidance or exclusion designations. Shorter ROWs would reduce the overall area where cultural resources could potentially be impacted by ROWs across the planning area compared to all other alternatives. In PHMA with limited exceptions, ROW designations would be excluded with exceptions, potentially reducing the likelihood of cultural resource impacts compared to other areas where avoidance is the standard.

Livestock Grazing Management

Under the Proposed RMP Amendment, impacts on cultural resources from livestock grazing management would be the same as described under Alternative 1.

Wild Horse and Burro Management

Impacts from wild horse and burro management under the Proposed RMP Amendment would be similar to those described under Alternative 1. However, management within established AMLs could reduce impacts from wild horses and burros on cultural resources in some areas.

4.16.4 Cumulative Effects

The effects of past, present, and reasonably foreseeable actions would, when combined with impacts from the decisions made in this planning effort, produce cumulative impacts on cultural resources that differ by alternative. Every impact to cultural resources is cumulative and adverse impacts are permanent; beneficial impacts cannot reverse these impacts. The cumulative effects study area for cultural resources is the planning area and the time frame is 20 years, or the anticipated lifetime of the GRSG RMPA.

Surface-disturbing activities associated with development are the greatest contributor to cumulative impacts to cultural resources. Past and present actions contributing to cumulative impacts on cultural resources in the planning area include mineral exploration, development, and production (including oil and gas); increased recreation and tourism; urban and rural community development; livestock grazing; wild horse and burro management; land use authorizations for ROWs; road construction associated with a variety of uses; renewable energy development, fuels and vegetation treatments, and wildfire. The effects of climate change also present an ongoing threat to cultural resources. Increasing soil erosion, wildfire occurrence and severity, and events such as severe storms that increase weathering and erosion all impact cultural resources and are influenced by a changing climate. Land planning efforts such as this resource management plan tend to offer increased protections to cultural resources, even if incidental to their purposes. Future actions with the potential to affect cultural resources are expected to be very similar to the described past and present actions, influenced by the future social, economic, and regulatory landscape.

Comparison of Alternatives

Under all the alternatives, the over-arching goal or objective of preserving and reducing impacts to GRSG habitat and populations will likely lead to reductions in cumulative impacts on cultural resources by reducing activities like surface disturbance in GRSG habitat. However, the likely contribution to cumulative effects on cultural resources in the planning area varies by alternative.

Alternative 1 would result in a continuation of current impacts on cultural resources from GRSG management decisions regarding activities such as mineral development, renewable energy development, livestock grazing, and ROW location.

Under Alternative 2, potential for impacts on cultural resources is similar in magnitude, but likely greater than under Alternative 1 due to increased potential for fluid mineral and renewable energy development, as well as increased potential for ROW location in PHMA. This alternative would result in the highest level of cumulative impacts on cultural resources in the planning area.

Due to the most robust disturbance cap and highest acreage of designated PHMA, Alternative 3 would offer the greatest restrictions on surface disturbing activities such as minerals development, renewable energy development, and ROW location. This alternative would result in the lowest level of cumulative impacts on cultural resources in the planning area.

Alternatives 4 and 5 would be based on Alternatives 1 and 2, with adjustments based on HMA review and other state-specific considerations. While it is anticipated that impacts under Alternative 4 and 5 will be similar in magnitude to those under Alternatives 1 and 2, the potential impacts on cultural resources from selection of one of these alternatives would depend on the specific adjustments that are made.

Impacts under Alternative 6 would be similar to impacts under Alternatives 4 and 5 except for the designation of ACECs, which may offer additional protection to cultural resources within them.

The Proposed RMP Amendment would have a reduced contribution to cumulative impacts due to the exclusion for solar and wind in PHMA and strengthened protections in PHMA with limited exceptions. In these areas, surface-disturbing activities such as non-energy mineral,, fluid mineral and renewable energy development, and ROW location will be more restricted, potentially reducing cumulative impacts on cultural resources within these specific areas.

4.17 TRIBAL INTERESTS

4.17.1 Nature and Types of Effects

The nature and type of most effects on Tribal interests are general and non-quantifiable in nature. In general, activities that result in ground disturbance to lands currently or historically occupied by GRSG could decrease opportunities for tribes to maintain traditional cultural practices and values if these activities result in decreases in GRSG populations. These include, but are not necessarily limited to, granting ROWs for road and highway construction, wind energy development, vegetation treatments in sagebrush communities, development of leasable, locatable, saleable, and fluid minerals, OHV use, and special recreation permits (SRPs). Additionally, many tribes manage large areas near BLM lands and rely on BLM ROWs for essential infrastructure and resource development on their lands. Thus, Tribal interests extend beyond cultural practices to include resource management and economic needs. Livestock grazing and wild horse and burros may also alter the landscape in ways that decrease Tribal opportunities to maintain specific traditional practices and values. In addition, natural processes that are impossible to control likely add to the human-caused impacts on GRSG and their habitats listed above, including climate change, drought, and lightning-caused wildfires. The general impacts on Tribal interests that would result through the implementation of each alternative analyzed in this EIS are described below.

Types of impacts that could occur from management actions or their implementation under all alternatives including the following:

- Direct disturbance of locations or landscapes associated with trust or treaty assets, traditional beliefs, sacred sites, resource gathering areas, hunting and fishing areas, water sources, ancestral sites, human remains, and trails (similar to those described in **Section 4.16,** Cultural Resources)
- Alterations of visual and aural aspects of the cultural landscape's setting that would create changes to the landscape that make it no long useable by Tribal members
- Increased access and human presence, which could lead to increased vandalism and unauthorized collection of ancestral sites or trespass on treaty areas
- Decreased Tribal member access or interference with the exercise of treaty rights or cultural uses and practices, such as resource gathering or hunting and fishing
- The potential for erosion, pollution, habitat loss, and less-tangible changes to natural features and resources that Tribal members may consider sacred

Any action that would impact the integrity of an Indian Trust Asset or treaty-based right of a tribe or Tribal resource in the planning area would be considered an adverse effect on that resource, asset, or interest. Impacts can be caused by development (e.g., road construction) or conservation (e.g., habitat improvement or landscape reclamation) actions or future implementation actions. The BLM would continue to maintain government-to-government consultation with federally recognized Native American tribes and would consult with tribes during future implementation actions to assess case-by-case or project-by-project impacts.

Depending on the extent and type of activity the amount of physical disturbance could be from slight visual or other intrusions on a landscape to wholesale destruction of an entire location or site. Whether impacts would affect a small portion of an area or affect a larger stretch of landscape would need to be evaluated by Tribal representatives before making a determination on said impact's severity. However, it is usual to assume that impacts resulting in an irreversible and irretrievable loss of Tribal value are of the highest severity. On a project-by-project basis, the spatial distribution (or range) of the disturbance would be largely focused on a site-specific basis. However, over time and as more actions occur throughout the planning area, the extent would be throughout sagebrush habitat.

4.17.2 Impacts Common to All Alternatives

Under all alternatives the BLM would continue to manage BLM-administered lands in a manner that accommodates Native American religious traditions, practices, and beliefs as guided by directives contained in BLM Manual 1780, BLM Handbook 1780-1, American Indian Religious Freedom Act (42 U.S.C. 1996), Native American Graves Protection and Repatriation Act (25 U.S.C. 3001), Executive Order 13007 (Indian Sacred Sites), and Executive Order 13084 (Tribal Consultation), Secretarial Order 3317, DOI Policy on Consultation with Indian Tribes (December 1, 2011), and Joint Secretarial Order 3403, on Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters (November 21, 2022). All alternatives allow for the appropriate Tribal governments to consult on a case-by-case basis on undertakings on BLM-administered land that could affect Native American concerns. The BLM would continue to identify, protect, and preserve Tribal assets, treaty rights, sacred/religious sites, or special use areas through site- and project-specific modification or mitigation on a case-by-case or project-by-project consultation basis that could affect Native American concerns.

Under all alternatives, actions that provide protections for GRSG or its habitat by limiting access into areas or excluding surface-disturbing activities, such as NSO and restrictions on surface and vehicle use would protect cultural resources from effects due to surface disturbance, erosion, effects on setting and access leading to vandalism, inadvertent damage, and unauthorized collection of cultural resources. These actions could also increase Tribal opportunities to maintain specific traditional practices and values such as traditional plant gathering, hunting animals including GRSG, and the role played by GRSG in oral traditions and cultural practices such as observing lekking behavior as described in the Nevada and Northeastern California Greater Sage-Grouse Proposed Land Use Plan Amendment and Final Environmental Impact Statement (BLM 2020b) if the current leasing of nonenergy minerals has led to decreases in GRSG populations.

4.17.3 Proposed RMP Amendment

GRSG Management

Under the Proposed RMP Amendment, the BLM would be more restrictive than Alternative which includes additional consideration of adjustments to HMAs to balance multi-use opportunities. In PHMA, there would be solar and wind exclusions and major rights of way avoidance which would provide greater protections than under Alternatives 4 and 5. In and PHMA with limited exceptions, stricter protections would be applied, eliminating waivers, exceptions, and modifications allowed under standard PHMA, which may further prevent impacts to Tribal interests.

Lands and Realty Management

Under the Proposed RMP Amendment, the potential impacts on areas of Tribal interest in PHMA would be similar to those described under Alternative 1. However, in PHMA with limited exceptions, ROW designations would follow an exclusion with exceptions approach, potentially leading to greater protection of Tribal interests within these areas. Impacts in GHMA would be similar to those under Alternatives 1 and

2, but additional state-specific requirements as described for GRSG in **Section 4.2.1** above would provide additional protections to Tribal interests.

Managing PHMA as exclusion for renewable energy would have impacts similar to those described for Alternative 1. Managing associated ROWs as exclusion would offer greater protections than Alternative 1. Managing PHMA with limited exceptions would further reduce impacts by not allowing exceptions to these exclusions. GHMA would be open, but the requirement for minimization measures and mitigation in the Proposed RMP Amendment would provide more protections for Tribal interests.

Impacts from applying a disturbance cap under the Proposed RMP Amendment would be the same as described for Alternative 5, meaning impacts from applying a 3% disturbance cap would be the same as described for Alternative 4, except in Wyoming and Montana, which would have a 5% disturbance cap at the project scale. Impacts from exceeding the 3% disturbance cap under certain conditions would be similar to those described for Alternative 4, but more exceptions would be allowed, which may result in increased development and potential disturbance to resources of Tribal interest.

Minerals Management (including Fluid minerals, Saleable Minerals/Mineral Materials, Non-energy Leasable Minerals, and Locatable Minerals)

Under the Proposed RMP Amendment, limitations on fluid mineral leasing would seek to minimize impacts on GRSG and their habitats through the reduction of habitat fragmentation and loss, compared with Alternative 1, generally protecting cultural resources and other Tribal interests in GRSG habitat. However, a greater number of waivers, exceptions, and modifications for fluid minerals leasing applied across a larger portion of the planning area could enable a greater degree of development in HMAs than under Alternative 1. In PHMA with limited exceptions, fluid minerals would be subject to NSO without waivers, exceptions, or modifications, which could lead to reduced fluid mineral extraction activities in these areas and potentially leading to greater protection of Tribal interests within these areas.

Livestock Grazing Management

Impacts under the Proposed RMP Amendment would be the same as those described under Alternative 1.

Wild Horse and Burro Management

Impacts from wild horse and burro management under the Proposed RMP Amendment would be similar to those described under Alternative 1. However, management within established AMLs could increase GRSG habitat quality, which could enhance opportunities for tribes to maintain traditional practices in some areas.

4.17.4 Cumulative Effects

The effects of past, present, and reasonably foreseeable actions would, when combined with impacts from the decisions made in this planning effort, produce cumulative impacts on resources and areas of Tribal interest that differ by alternative. The cumulative effects study area for cultural resources is the planning area and the time frame is 20 years, or the anticipated lifetime of the GRSG RMPA.

Increasing development pressure including increased oil and gas and renewable energy development; recreation uses; construction of pipelines, transmission lines, and roads; urban expansion within the planning area; and livestock grazing would likely continue on a regional scale. Resource management activities within the planning area and surrounding areas would likely result in a trend toward increased adverse impacts and ultimately the destruction of many cultural resources and other areas of Tribal interest through time and across political boundaries. If this trend continues as expected, the preservation of cultural resources, research, public education, and consultation with Native American Tribes will become even more critical.

Surface-disturbing activities are the greatest contributor to cumulative impacts to resources and areas of Tribal interest. Residential development and associated recreation opportunities and access on adjacent lands, both within and near the planning area, will continue to be a likely avenue for adverse effects on resources and areas of Tribal interest. Other past and present actions that have affected and would continue to adversely affect resources and areas of Tribal interest include energy and mineral exploration and development; range improvements; lands and realty ROWs; OHV travel and recreation use; wildland fires, and vegetation treatments for fire management and forest health. These actions have cumulative impacts on resources through surface disturbance that contributes to erosion and subsequent sedimentation; exposure of contributing cultural features and artifacts from removal of vegetative cover; and better vehicular access to resources and areas that could lead to relic hunting, and/or disturbance to contributing features and artifacts by vandals.

Comparison of Alternatives

Under all the alternatives, the over-arching goal or objective of preserving and reducing impacts to GRSG habitat and populations will likely lead to reductions in cumulative impacts on cultural resources by reducing activities like surface-disturbance in GRSG habitat. However, the likely contribution to cumulative effects on cultural resources in the planning area varies by alternative.

Alternative 1 would result in a continuation of current impacts on resources and areas of Tribal interest from GRSG management decisions regarding activities such as mineral development, renewable energy development, livestock grazing, and ROW location. However, cumulative adverse impacts to resources and areas of Tribal importance under Alternative 1 are anticipated to be minor to moderate based on Section 106 compliance procedures, in addition to authorities mentioned in **Section 3.16**, which include appropriate Tribal consultation on a case-by-case basis on undertakings on BLM-administered land that could affect Native American concerns.

Under Alternative 2, potential for impacts on resources and areas of Tribal interest is similar in magnitude, but likely greater than under Alternative 1 due to increased potential for mineral and renewable energy development, as well as increased potential for ROW location in PHMA. This alternative would result in the highest level of cumulative impacts on resources and areas of Tribal interest in the planning area.

Under Alternative 3, the level of surface-disturbing activities on BLM-administered public lands would greatly reduce impacts and improve protection to resources and areas of Tribal interest over the other alternatives. Alternative 3 would provide the best protection and would result in the least cumulative impacts when compared to the other alternatives. Cumulative adverse impacts to resources and areas of Tribal importance under Alternative 3 are anticipated to be minor based on Section 106 compliance procedures which include appropriate Tribal consultation on a case-by-case basis on undertakings on BLM-administered land that could affect Native American concerns.

Cumulative impacts to resources and areas of Tribal interest under Alternatives 4 and 5 would be similar to those of Alternatives 1 and 2, with state-specific considerations and adjustments to HMA allocations based on data review. While impacts under Alternatives 4 and 5 would be similar in type to those under Alternatives 1 and 2, the degree of the potential impacts on resources and areas of Tribal interests from selection of one of these alternatives would vary based on the specific adjustments that are made.

Impacts on Tribal interests under Alternative 6 would be similar to impacts under Alternatives 4 and 5 except for the designation of ACECs, which may offer additional protection to cultural resources within them.

The Proposed RMP Amendment would have reduced contribution to cumulative effects due to management of PHMA with limited exceptions. In those areas, stricter protections would be enforced, particularly through the exclusion of waivers, exceptions, and modifications for surface-disturbing activities. This could lead to reduced adverse impacts on resources and areas of Tribal interest in these specific locations, offering greater protection compared to the broader PHMA areas.

4.18 LANDS WITH WILDERNESS CHARACTERISTICS

4.18.1 Nature and Type of Effects

Wilderness characteristics are primarily influenced by actions that impact the undeveloped nature of the area or by activities that increase the sights and sounds of other visitors. Linear developments also impact the sizes of lands with wilderness characteristics units, which can also impact a unit's eligible acreage. These actions and activities could change the wilderness qualities listed in BLM Manual 6310 that make up the criteria for lands with wilderness characteristics. Generally, actions that create surface disturbance degrade the naturalness of wilderness characteristics, as well as the setting for experiences of solitude and primitive recreation.

Allowing any type of energy or mineral development, such as fluid, nonenergy leasable, and saleable minerals, as well as renewable energy (e.g., wind and solar), would result in surface disturbance that would diminish the area's natural characteristics. Any new roads authorized for access to the development area could eliminate wilderness characteristics of the entire unit. This would be the case if the road were to bisect the unit so that it would no longer be considered a roadless area of adequate size. In addition, allowing developers regular access to the lease area or mine site would reduce opportunities for solitude. ROW exclusion areas provide direct and indirect protection of wilderness characteristics by preserving naturalness and opportunities for solitude and primitive recreation by prohibiting disturbance and fragmentation from transmission lines, roads, and other utility developments. ROW avoidance areas also provide protection of wilderness characteristics by encouraging ROW development outside of the avoidance area when feasible.

Impacts on wilderness characteristics are possible from changes in livestock grazing and wild horse and burro management, particularly from new developments (e.g., water developments and range facilities) in lands with wilderness characteristics. This could lessen the naturalness of appearance or could limit unconfined recreation. Existing range facilities used for livestock grazing and wild horse and burro management, such as stock trails and spring developments, would result in no changes to current wilderness characteristics. Installing and maintaining range improvements could result in short-term impacts on solitude and naturalness due to human presence, noise, and disturbance. In addition, range improvements reduce the overall appearance of naturalness over the long-term and could result in short-term impacts on solitude and naturalness due to human presence, noise, and disturbance during installation. Where areas are unavailable for livestock grazing, lands with wilderness characteristics that overlap with these areas would experience a reduction of these impacts. However, removing livestock grazing exposes lands with wilderness characteristics to fuel buildup and increased risk of wildland fire. Gathering operations to manage wild horse and burro populations would temporarily reduce opportunities for solitude due to the increase in human presence and noise during these efforts.

4.18.2 Proposed RMP Amendment

Management of PHMA with limited exceptions under the Proposed RMP Amendment, the direction would be NSO with no waivers, exceptions, or modifications, providing stronger protections to wilderness characteristics in these areas. That is, no changes to mineral resource use allocations would be made, but fluid mineral leasing would be managed to minimize the potential for conflict and associated impacts from

subsequent development in important habitats or connectivity areas. The evaluation of parcels and the consideration of development proximity, habitat significance, and potential would contribute to the preservation of naturalness in lands with wilderness characteristics.

The Proposed RMP Amendment would designate PHMA as exclusion areas to prioritize GRSG habitat conservation. This restriction on utility-scale projects in these areas are similar to Alternative 1, which designates PHMA as exclusion areas for wind and solar development with some exceptions. PHMA with limited exceptions would be subject to an absolute exclusion for utility-scale solar and wind projects, with no exceptions. Utility-scale wind and solar projects would be restricted in these areas to prevent adverse impacts on habitat and soil productivity and erosion. However, GHMA would remain open for such developments, provided that specific minimization measures are implemented to address potential impacts.

Under the Proposed RMP Amendment, impacts on lands with wilderness characteristics from ROW avoidance designations would be similar to those as described under Alternative 4 but greater in magnitude due to GHMA being managed as open to major ROW development. This approach aligns with the emphasis in Alternatives 4, 5, and 6 but may offer more stringent measures compared with Alternative 1, which allows new ROWs in PHMA only under specific conditions. PHMA with limited exceptions would be managed under an exclusion with exceptions approach, which would further reduce impacts on lands with wilderness characteristics in those areas.

Under the Proposed RMP Amendment, impacts on lands with wilderness characteristics from livestock grazing management would be the similar as those described under Alternative 4, 5, and 6. All GRSG HMAs would be available for livestock grazing, except in Oregon, where some, all, or none of 15 key RNAs would be unavailable. Livestock grazing would be managed toward meeting land health standards to meet or make progress toward meeting the GRSG habitat objectives in HMAs. The Proposed RMP Amendment would provide additional protections to lands with wilderness characteristics, compared with Alternative 1, because the BLM would design new range improvement projects to enhance livestock distribution and new structural range improvements would be placed along existing disturbance corridors where possible to not increase impacts on GRSG and their habitat. This would limit the impacts on lands with wilderness characteristics from new range improvement projects as described under *Nature and Type of Effects*.

4.18.3 Cumulative Effects

The cumulative effects study area for lands with wilderness characteristics includes BLM-administered lands in the planning area where completed inventories have identified wilderness characteristics to be present. The period of potential cumulative impacts is the approximately 20-year timeline of the plan.

Past and present actions in the cumulative effects study area that affected lands with wilderness characteristics include resource uses, such as, mineral extraction, utility and infrastructure development, recreation and travel management, and livestock grazing and range improvements as these activities affect the naturalness and outstanding opportunities for solitude and primitive recreation. Reasonably foreseeable actions would have similar effects to the extent that they occurred within lands with wilderness characteristics units.

Alternative 1 would result in a continuation of existing trends of current impacts on lands with wilderness characteristics because there would be no changes to the existing management of GRSG habitats where they occur within lands with wilderness characteristics units.

Mineral leasing, exploration, and development have and continue to occur throughout the planning area. Areas under this alternative that are managed as open to fluid, saleable, and locatable mineral entry would impact lands with wilderness characteristics through surface disturbances associated with these types of projects which reduce the opportunities for solitude and primitive and unconfined recreation in lands with wilderness characteristics.

Large-scale planning projects for major ROWs, such as the Solar Programmatic EIS and the westwide energy corridors would reduce the size of lands with wilderness characteristics units and impair the apparent naturalness of the area and the experience of solitude. There could be additional impacts to lands with wilderness characteristics within PHMAs that are managed as avoidance areas which would encourage ROW development outside of PHMAs, but not prevent ROW developments from these areas.

Recreation has increased on public lands in general and if this continues, it would affect lands with wilderness characteristics. Recreational use would create alterations to the landscape over time through an increase in human presence, vehicle use, and road use in certain areas. Although the effects from these uses may be substantially unnoticeable, they may cumulatively affect the area's solitude with increased use. PHMAs and GHMAs would be limited to existing roads and trails with cross-country use allowed where suitable which would preserve the size of lands with wilderness characteristics in these areas.

Existing livestock grazing management would not directly impact lands with wilderness characteristics, but the addition of any reasonably foreseeable developments that increase the number of rangeland improvements (such as fencing and stock ponds) could lessen the apparent naturalness and limit unconfined recreation found within lands with wilderness characteristics.

Comparison of Alternatives

Compared to Alternative 1, Alternative 2 would include more areas that would be open to fluid mineral leasing. Additionally, fewer restrictions on mineral development under this alternative would create more opportunities for wilderness characteristics to be impacted by increasing surface disturbing activities. For example, if more development is allowed, this could lead to more mines, roads, pipelines, and other infrastructure being built which would directly impact the size of lands with wilderness characteristics units and opportunities for solitude and primitive recreation. Cumulative impacts from ROWs, recreation, and livestock grazing under Alternative 2 would be the same as those described under Alternative 1, with no additional additive effects due to similar management actions being proposed for these resource uses in the range of alternatives.

Management actions under Alternative 3 would provide the overall greatest potential to maintain wilderness characteristics on lands with wilderness characteristics units within PHMAs when compared to all other alternatives due to the closure of fluid, saleable, and nonenergy mineral leasing, ROWs being managed as exclusion, and PHMAs being unavailable for livestock grazing. However, these management actions could lead to a buildup of fuels and increase the risk of wildfire. Wildfire would make affected areas less desirable for primitive recreation.

Management actions under Alternatives 4, 5, and 6 would not offer as many protections to wilderness characteristics as those under Alternative 3, but would reduce impacts when compared to Alternatives 1 and 2. For example, under Alternatives 4, 5, and 6 fluid mineral leasing would be managed to minimize the potential for conflict and associated impacts from subsequent development in important GRSG habitats or connectivity areas which would indirectly protect overlapping lands with wilderness characteristics units.

The Proposed RMP Amendment would have the potential for reduced cumulative impacts compared to those under Alternatives 4 and 5 due to strengthened protections within avoidance areas and the promotion of use within designated corridors. PHMA with limited exceptions areas would provide enhanced protections by including an absolute exclusion for utility-scale solar and wind projects, with no exceptions allowed, which would further reduce impacts to lands with wilderness characteristics compared to the general PHMA management direction. Additionally, PHMA with limited exceptions would be subject to stricter controls for mineral resource use, minimizing surface disturbances and potentially preserving the naturalness and solitude of these areas more effectively than in areas with less stringent protections.

4.19 Recreation and Visitor Services

4.19.1 Nature and Type of Effects

Impacts on recreation can be direct and indirect. Management actions that alter or prohibit users' opportunities to access recreation areas or participate in recreation activities would result in a direct impact. Management actions that change the physical, social, or administrative setting within which recreation activities take place would result in indirect impacts. Impacts on recreation settings can be the achievement of or movement toward a desired setting or an unwanted shift in setting, such as to either a more or less developed environment. Management actions which change when or where SRPs are issued would affect recreation users by changing the types of organized recreation activities permitted via SRPs in the planning area over the long term. This would potentially add costs to recreational users of BLM-administered lands having to circumvent some areas or adopting less preferred options in certain activities. Dispersed recreational activity does not require a permit and would not be affected. There may also be areas temporarily closed for restoration, changing the experiences of or opportunities for users. Physical, social, and administrative settings are not specifically managed for in areas not designated as Recreation Management Areas, although these areas do still provide intrinsic recreation values and opportunities.

4.19.2 Impacts Common to All Alternatives

Under all alternatives, the BLM would continue to review and approve SRPs on a case-by-case basis within the planning area, and the overall number of large group and commercial SRPs would remain consistent. There would be no direct impacts on recreation through changes to the number and types of SRPs issued annually within the decision area. Any indirect impacts on SRPs would be related to the impacts on the change in the types of recreation activities, experiences, and benefits in the decision area.

Under all alternatives, disturbance caps which restrict the construction of recreation infrastructure would decrease access for recreation experiences that depend on road and trail development and could inhibit management objectives where developments are part of the desired conditions. If future recreation projects would exceed the disturbance cap in a particular area, the disturbance cap would prohibit construction of new recreation facilities such as campground, day-use areas, and trailheads in PHMA and GHMA. However, these disturbance caps would also limit development in some areas, thereby increasing remoteness and naturalness in areas managed for those objectives and enhancing the recreational user experience of primitive backcountry recreation activities and experiences over the long-term (BLM 2014).

4.19.3 Proposed RMP Amendment

Under the Proposed RMP Amendment, existing restrictions on other resource uses such as fluid mineral leasing would have an indirect effect on recreation by reducing resource conflicts in PHMA or GHMA. Additionally, under the Proposed RMP Amendment, all states would be exclusion for utility scale wind and solar energy development, which is similarly restrictive as Alternative 1. This could indirectly affect

recreation by potentially reducing resource conflicts with energy development, thus enhancing recreational experiences in those areas (BLM 2014).

Furthermore, PHMA would cover a larger area under the Proposed RMP Amendment compared with Alternative 1 (**Table 2-14**). This expansion would result in more acres of land being restricted to disturbance caps, potentially affecting future recreation projects that exceed these caps in specific areas. This would have the effect of restricting more acres against the construction of new recreation facilities compared with Alternative 1.

Moreover, the management of PHMA with limited exceptions under the Proposed RMP Amendments, would provide additional restrictions on fluid mineral leasing, major ROWs, and renewable energy. Compared with Alternative 1, these provisions would reduce potential conflicts with recreational uses and ensure that PHMA areas maintain their naturalness and remoteness for enhanced recreational experiences.

4.19.4 Cumulative Effects

The cumulative effects study area for recreation and visitor services is the BLM-administered lands in the planning area over a 20-year time frame.

Dispersed, organized, and concentrated recreation would continue throughout the planning area and overall visitation would be expected to continue to increase but vary by season, year, location, and type of activity. Present, past, and reasonably foreseeable actions, such as mineral development and livestock grazing and agriculture, would continue to affect recreation throughout the cumulative effects analysis area. These actions as well as management actions related to Big Game RMPA (Colorado) and Gunnison Sage-Grouse RMPA (Colorado and Utah) that alter the landscape and affect naturalness or remoteness would lead to conflict with these other resources, while reducing or affecting recreation opportunities and experiences. All alternatives would lead to a continuation of reviewing and approving SRPs on a case-by-case basis within the planning area.

Comparison of Alternatives

Alternative 1 would result in a continuation of existing trend of current impacts on recreation because there would be no changes to the existing management.

Compared with Alternative 1, Alternative 2 would have greater cumulative impacts on recreation since there would be more exceptions to restrictions on other resources uses than under Alternative 1. This would reduce impacts on recreation that would otherwise continue to occur and maintain the naturalness and remoteness for recreation in those locations. Compared with Alternative 1, Alternative 2 would also have fewer acres of PHMA and IHMA. This would restrict fewer acres of land to disturbance caps when compared to Alternative 1. Therefore, if future recreation projects would exceed the disturbance cap in a particular area, this would have the potential to restrict fewer acres against the construction of new recreation facilities when compared with Alternative 1.

Alternative 3 would reduce the cumulative impacts in the planning area on recreation since Alternative 3 has the greatest restrictions on other resource uses, such as season restrictions on fluid mineral development. This would reduce the resource conflicts with recreation in PHMA, IHMA, and GHMA that occur, as resource uses that could lead to resource conflict with recreation would otherwise continue in the project area. These restrictions would reduce the degradation of physical setting characteristics in the planning area, which would enhance the recreational user experience compared with Alternative 1. Compared with Alternative 1, Alternative 3 would also have the greatest acres PHMA. Which would subject

the greatest acreage to disturbance caps. Therefore, if future recreation were to have the potential exceed the disturbance cap in a particular area, the disturbance cap would have the potential to prohibit the construction of new recreation facilities over the largest area when compared with the other alternatives. Alternative 3 would have the most adverse impacts on motorized recreation of the alternatives analyzed.

Compared with Alternative 1, Alternative 4 would have additional criteria for avoidance of GRSG, which would limit developments over a greater area, which would maintain naturalness and remoteness for recreation experiences where activities, such as mineral exploration, would have been pursued. Compared with Alternative 1, Alternative 4 would also have fewer acres of PHMA and IHMA. This would restrict fewer acres of land to disturbance caps when compared with Alternative 1. Therefore, if future recreation projects would exceed the disturbance cap in a particular area, this would have the potential to restrict fewer acres against the construction of new recreation facilities when compared with Alternative 1.

Compared with Alternative 1, Alternatives 5 and 6, would have less restrictive avoidance of GRSG which would decrease the naturalness and remoteness for recreation experiences where activities such as mineral exploration, would have been pursued. Compared with Alternative 1, Alternatives 5 and 6 would also have fewer acres of PHMA and IHMA. This would restrict fewer acres of land to disturbance caps when compared with Alternative 1. Therefore, if future recreation projects would exceed the disturbance cap in a particular area, this would have the potential to restrict fewer acres against the construction of new recreation facilities when compared with Alternative 1.

Management of PHMA with limited exceptions under the Proposed RMP Amendment would reduce the contribution to cumulative impacts similar to Alternatives 4 and 5, with additional protections in PHMA with limited exceptions. These areas would see stricter limitations on activities, such as utility scale solar, utility scale wind, and fluid mineral development, that may conflict with recreational uses.

4.20 Transportation and Travel Management

Through Resource Management Plans (RMPs) BLM designates lands in one of three Off Highway Vehicle (OHV) designation categories: open to cross country vehicle use, limited to existing routes, or closed to OHV use. None of the action alternatives, including the Proposed RMP Amendment, propose changes to the existing 2015 GRSG travel and transportation allocations or management direction. Therefore, under all alternatives, in PHMA and GHMA, OHV travel is limited to existing routes and no cross-country travel is allowed. The changing HMA allocations occurring across the alternatives could, however, result in changes to areas moving from open to cross country travel to limited to existing routes due to areas moving from non-habitat to either PHMA or GHMA and, conversely, areas could move from limited to open if previously identified habitat (GHMA or PHMA) is no longer identified as habitat and the areas are not otherwise limited or closed under an existing RMP decision.

The HMA allocations in Colorado, Idaho, Montana, and Wyoming would not change the OHV allocations currently in place under any of the alternatives, and, therefore, there are no anticipated effects by alternative and thus no effects are expected in those states (**Table 4-4** in **Appendix 9** shows the existing OHV allocations in those States).

In Nevada/California there is an increase in open areas when compared with the existing condition under Alternative 1 in all alternatives except Alternative 3, where there is a decrease in open areas (refer to **Table 4-5** in **Appendix 9**). The increase in open areas is greatest under Alternative 4. Alternatives 5, 6, and the Proposed RMP Amendment all increase open areas by approximately two million acres (refer to **Table 4-5** in **Appendix 9**). From a travel and transportation perspective, this increase in open areas could allow for

more recreation associated with off-highway vehicle use. These increases could also increase resource impacts associated with off-highway vehicle travel. The increases are occurring in areas that are not considered habitat (they moved from being either PHMA or GHMA to non-habitat based on the updates to the HMA boundaries) and, therefore, these open areas should not impact GRSG directly. There could, however, be indirect effects from noise or vegetation disturbance should these areas and any off-highway vehicle use be proximate to habitat areas.

In Oregon, there is decrease in open areas and corresponding increase in limited areas from the existing acres in Alternative 1 in all of the alternatives except Alternative 2 (refer to **Table 4-6** in **Appendix 9**). The largest decrease in open areas occurs under Alternatives 5, 6, and the Proposed RMP Amendment with approximately 600,000 fewer acres identified as open. Under Alternatives 3 and 4, there are approximately 450,000 fewer acres allocated as open. From a travel and transportation perspective, these changes could reduce recreation opportunities associated with off-highway vehicle use. These decreases would also reduce resource impacts associated with off-highway vehicle travel. Limiting travel to existing routes in these areas that have been identified as habitat will benefit GRSG by reducing potential noise and disturbance impacts.

In Utah, like Oregon, there is a decrease in the amount of OHV areas that are open and a corresponding increase in areas that are limited as a result of changes in HMA allocations. The decrease in open areas is greatest under Alternative 3 followed by Alternative 4, and the Proposed RMP Amendment (refer to **Table 4-7** in **Appendix 9**). Under Alternatives 5 and 6 the decrease is approximately 88,000 acres; under the Proposed RMP Amendment the decrease is approximately 295,000 acres; under Alternative 4 the decrease is approximately 376,000 acres; and under Alternative 3 the decrease is approximately 464,000 acres. From a travel and transportation perspective, these changes could reduce recreation opportunities associated with off-highway vehicle use. These decreases would also reduce resource impacts associated with off-highway vehicle travel. Limiting travel to existing routes in these areas that have been identified as habitat will benefit GRSG by reducing potential noise and disturbance impacts.

Under the Proposed RMP Amendment, acres open to OHV use would increase by 2,187,000 acres (8%) in Nevada/California compared to Alternative 1. Conversely, acres limited to OHV use would decrease by 2,314,000 acres (11%). In Oregon, there would be 604,000 fewer acres (50% fewer) open to OHV use under the Proposed RMP Amendment compared to Alternative 1, with 665,000 more acres (6% more) limited to OHV use. Utah has a similar trend, with 295,000 fewer acres (5%) open under the Proposed RMP Amendment and 308,000 more acres (2%) limited.

4.20.1 Cumulative Effects

The cumulative impact analysis area includes all BLM-administered lands within the range of GRSG as well as other federally managed lands, and adjacent state, Tribal, county, and privately owned lands within the planning area. The larger analysis area is necessary because transportation and travel management has consequential effects on ecosystems that extend over larger areas. Ongoing and planned actions in and near the cumulative impact analysis area would influence conditions for transportation and travel management to be effective across the planning area. The time frame for cumulative environmental consequences for future actions is 20 years.

Cumulative impacts on travel and transportation management would occur primarily from actions that facilitate, restrict, or preclude motorized and mechanized access. Past, present, and reasonably foreseeable actions (see **Appendix 14**) that restrict motorized and mechanized use would limit the degree of travel opportunities and the ability to access certain portions of the planning area for the public. Such past, present, and reasonably foreseeable actions and conditions within the cumulative impact analysis area that have

affected and will likely continue to affect transportation and travel include restrictions in GRSG HMAs on mineral exploration and development, other planning efforts, such as those for Gunnison sage-grouse and big game in Colorado, and continued maintenance of federal and state highways and county roads which provide arterial connections to BLM system roads.

The management actions considered in the alternatives, including land use restrictions, such as management of ROW avoidance or exclusion areas and NSO stipulations on fluid mineral development, would not result in the inability of the BLM to provide public access. Changes to OHV area designations from changes in HMAs in Nevada/California could increase opportunities for off-highway vehicle use with the increased level of open areas and the impacts associated with such use. In Oregon and Utah changes to OHV area designations from changes in HMAs could decrease opportunities for off-highway vehicle use by decreasing the amount of open areas in both states. Limiting off-highway vehicle use in these areas would reduce the negative environmental effects associated with off-highway vehicle use but would reduce the potential for off-highway vehicle recreation.

Chapter 5. Consultation and Coordination

5.1 Introduction

This chapter describes the efforts undertaken by the BLM in developing the Proposed RMPA/Final EIS to ensure the process remained open and inclusive. Efforts to comply with legal requirements to consult and coordinate with various government agencies are also described. These include public scoping; identifying, designating, and coordinating with cooperating agencies; formally consulting with applicable federal, state, and tribal governments; providing a 90-day comment period on the Draft RMPA/EIS, and identifying "any known inconsistencies with state or local plans, policies or programs" (43 CFR 1610.3-2(e)).

The BLM land use planning activities are conducted in accordance with NEPA requirements, CEQ regulations, and DOI policies and procedures implementing NEPA, as well as specific BLM planning and NEPA policies. The NEPA and associated laws, regulations, and policies require the BLM to seek public involvement early in and throughout the planning process to develop a range of reasonable alternatives and to prepare environmental documents disclosing the potential impacts of proposed alternatives.

Public involvement and agency consultation and coordination have been a critical component of the planning process leading to this Proposed RMPA/Final EIS. These efforts were achieved through Federal Register notices, public meetings, individual contacts, media releases, and the GRSG project website. This chapter documents the outreach efforts that have occurred to date. Additional efforts will continue as the planning process continues and the Approved RMPA and Records of Decision are prepared.

5.2 Formal Consultation Efforts

5.2.1 Federally Recognized Tribes

Federally recognized Tribes are sovereign nations and retain inherent powers of self-government. They interact with the United States on a government-to-government level. In accordance with the National Historic Preservation Act and several other legal authorities (see BLM Manual 8120), and in recognition of the government-to-government relationship between individual Tribes and the federal government, the BLM sought to initiate Tribal consultation efforts in the preparation of this RMPA. The BLM contacted Tribes in a variety of methods, twice mailing letters to 53 federally recognized Tribes within or with cultural interest in the planning area notifying them of the effort. These letters provided a summary of the project and invited them to participate in government-to-government consultation and be cooperating agencies in the planning effort. Subsequent outreach continued through emails, phone calls, and meetings with Tribal personnel, as they have expressed interest. On September 4, 2024, the BLM held an online information session for Tribal governments to provide an update on the development of the Proposed RMPA/Final EIS.

In Colorado, the Ute Indian Tribe of the Uintah and Ouray Reservation expressed an interest in formal, government-to-government consultation and it was held during biannual consultation meetings in April 2023, August 2023, and April 2024. The Ute Mountain Ute Tribe was also present at these consultation meetings. In Nevada, formal, government-to-government consultation occurred with the following Tribes: Battle Mountain Band of the Te-Moak Tribe, Duckwater Shoshone Tribe, Lovelock Paiute Tribe, Modoc Nation, Reno-Sparks Indian Colony, Summit Lake Paiute Tribe, Timbisha Shoshone Tribe, Walker River Paiute Tribe, Yerington Paiute Tribe, and the Yomba Shoshone Tribe. In the other participating states, no formal, government-to-government consultation was requested.

5.2.2 U.S. Fish and Wildlife Consultation

Under Section 7(a)(2) of the ESA, federal agencies must consult with FWS when an action the agency carries out, funds, or authorizes may affect any federally listed or endangered species or its critical habitat. The Proposed RMP Amendment/Final EIS describes potential impacts on threatened and endangered species because of management actions proposed in the alternatives. The USFWS is a cooperating agency in this planning process. The BLM has met with the USFWS and provided them with drafts of proposed management direction for discussion and input. The BLM has initiated development of a biological assessment and will coordinate with the USFWS to complete that analysis and initiate Section 7 consultation. The USFWS will evaluate the biological assessment and either concur with the determination via memorandum or prepare a biological opinion. The USFWS response to this consultation process (either the memorandum or the biological opinion) will be included in the ROD.

5.3 COORDINATION EFFORTS

5.3.1 State Historic Preservation Officer Coordination

Section 106 of the National Historic Preservation Act and regulations at 36 CFR Part 800 govern the BLM's cultural resource management programs. These regulations provide specific procedures for consultation between the BLM and State Historic Preservation Offices. Proposed changes to RMPs can comprise a federal undertaking subject to compliance with Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations. However, the RMP-level allocations and management direction proposed by this Proposed RMP Amendment/Final EIS do not constitute an undertaking requiring formal consultation. The Proposed RMP Amendment will not approve any site-specific undertakings on BLM-administered lands within the planning area, and all future proposed, agency actions/undertakings related to this RMP Amendment will be subject to National Environmental Policy Act (NEPA) compliance and National Historic Preservation Act (NHPA) Section 106 compliance and consultation with the SHPO. Given the RMP-level allocations and management direction being proposed, the BLM anticipates that the Proposed RMP Amendment may reduce the overall number of subsequent undertakings that have the potential to affect cultural resources. The likely reduction of undertakings is a result of establishing additional limitations on where and how future development could be approved on public lands in greater sage-grouse Habitat Management Areas (HMAs). These limitations would result from protections the BLM is proposing in Priority HMAs, Priority HMAs with limited exceptions, and in General HMAs. The Proposed RMP Amendment/Final EIS will be provided to the State Historic Preservation Officers (SHPO) of each participating state for their awareness.

5.4 COOPERATING AGENCIES

Federal regulation directs the BLM to invite eligible federal agencies, state and local governments, and federally recognized Native American Tribes to participate as cooperating agencies when amending RMPs (43 CFR 1610.3-1(b)). A cooperating agency is any such agency or Tribe that enters into an agreement with the lead federal agency to "work with the BLM, sharing knowledge and resources, to achieve desired outcomes for public lands and communities within statutory and regulatory frameworks" (BLM Land Use Planning Handbook H-1601-1). These agencies are invited to participate because they have jurisdiction by law or can offer special expertise. Cooperating agency status provides a formal framework to engage in active collaboration with a lead federal agency in the planning process. Invitations were sent to potential cooperating agencies in December 2021 and January 2022. **Table 5-1** lists the agencies that accepted BLM's invitation and served as cooperating agencies throughout preparation of the RMPA/EIS. The BLM invited many other cooperators to engage in this effort who either did not reply or chose not to participate. In addition, the BLM engaged the U.S. Forest Service, U.S. Fish and Wildlife Service and Environmental

Protection Agency at the national level to identify and receive feedback on specific issues under the jurisdiction of those agencies.

Table 5-1. List of Cooperating Agencies

Cooperating Agency Name
Rangewide Level
United States Forest Service
U.S. Fish and Wildlife Service
U.S. Environmental Protection Agency
Colorado
City of Steamboat Springs
Colorado Department of Agriculture
Colorado Department of Natural Resources (includes the Colorado Oil and Gas Commission and Colorado Division of Reclamation Mining and Safety)
Colorado Department of Transportation—Region 3 (includes the Colorado Department of Transportation State Office)
Colorado First Conservation District
Colorado Parks and Wildlife
Douglas Creek Conservation District
Eagle County Board of Commissioners
Garfield County Board of Commissioners
Grand County Board of Commissioners
Jackson County Board of Commissioners
Mesa County Board of Commissioners
Moffat County Board of Commissioners
Rio Blanco County Board of Commissioners
Routt County Board of Commissioners
White River Conservation District
Idaho
State of Idaho, including Idaho Governor's Office of Species Conservation, Idaho Governor's Office of Energy and Mineral Resources Idaho Department of Fish and Game, Idaho Department of Lands, Idaho State Department of Agriculture, and Idaho Department of Parks and Recreation
Idaho Army National Guard
Blaine County
Clark County
Custer County
Montana and the Dakotas
Blaine County Commission
Bowman-Slope Conservation District
Fergus County Commission
McCone County Commissioners
Montana Department of Agriculture
Montana Department of Environmental Quality
Montana Department of Livestock
Montana Fish, Wildlife and Parks
Montana Grass Conservation Commission
Montana Sage-Grouse Habitat Conservation Program
North Dakota Game and Fish Department
Phillips County Commission
Prairie County Commissioners
Rosebud County Commissioners

Cooperating Agency Name
Slope County Commissioners
Sweet Grass County Commissioners
Valley County Commission
Nevada/California
Nevada Department of Wildlife
Nevada Department of Agriculture
Nevada Department of Conservation and Natural Resources
Nevada Division of Minerals
Churchill County
Elko County
Eureka County
Humboldt County
Lincoln County
Mineral County
Nye County
Pershing County
White Pine County
Oregon
Deschutes County
Harney County
Harney Soil and Water Conservation District
Lake County
Malheur County
Oregon Department of Fish and Wildlife
Oregon Department of Geology and Mineral Industries
Oregon State University - Institute of Natural Resources
Umatilla County
Utah
State of Utah
Utah County
Department of Defense (including Utah Test and Training Range and Hill Air Force Base)
Daggett County
Beaver County
Emery County Public Lands
Wyoming
Big Horn County Commissioners
Campbell County Commissioners
Campbell County Conservation District
Carbon County Commissioners
Converse County Commissioners
Converse County Conservation District
Crook County Commissioners
Fremont County Commissioners
Hot Springs County Commissioners
Johnson County Commissioners
Laramie Rivers Conservation District
Lincoln County Commissioners
Lincoln Conservation District
Lingle-Fort Laramie Conservation District
Lower Wind River Conservation District
Medicine Bow Conservation District
Meeteetse Conservation District

Cooperating Agency Name
Natrona County Commissioners
Niobrara County Commissioners
Park County Commissioners
Popo Agie Conservation District
Saratoga-Encampment-Rawlins Conservation District
Sheridan County Commissioners
South Big Horn Conservation District
Shoshone Conservation District
State of Wyoming
Wyoming Department of Agriculture
Wyoming Oil and Gas Conservation Commission
Wyoming State Historic Preservation Office
Wyoming State Parks and Cultural Resources
Wyoming State Forestry
Wyoming Game and Fish Department
Wyoming Department of Environmental Quality
Wyoming Office of State Lands and Investment
Sublette County Conservation District
Sublette County
Sweetwater County Conservation District
Sweetwater County
Teton County Commissioners
Uinta County Conservation District
Uinta County
Washakie County Commissioners
Washakie County Conservation District
Weston County Commissioners

The BLM also actively engaged the Western Governors' Association Conservation Task Force (Task Force) to share and collect information relevant to this planning effort, conservation of GRSG, and impacts of BLM authorizations on state and local economies and livelihoods. Members of the Task Force are also members of cooperating agencies within their home states. Meetings were initiated in 2022 and occurred monthly (both virtual and in person) through September 2023. In the lead up to the issuance of the Draft RMP Amendment/EIS, weekly meetings were conducted to get feedback on the draft range of alternatives and the associated language. Since the issuance of the Draft RMP Amendment/EIS, the BLM has met with the Task Force four times.

Each BLM State Office coordinated with cooperating agencies in their states to establish information sharing processes and meeting schedules. The frequency of meetings varied by state needs and cooperator requests. BLM Headquarters staff virtually attended most individual state coordination meetings when invited to share rangewide planning information and consider individual state concerns and suggestions in drafting the range of alternatives.

A GRSG Planning update newsletter was released to cooperating agencies on March 29, 2023, which presented information refining the list of management topics to be addressed in this current effort, and high-level conceptual summary of preliminary draft range of alternatives. The list of management topics included were the result of scoping comments received and a review of management decisions from previous GRSG planning efforts. Some management topics were not carried forward to this Amendment as they were

extensively addressed in the previous planning efforts and new scientific information did not support changing associated management.

In June 2023, draft text was provided to cooperating agencies for review, including a draft range of alternatives and associated management. Comments from the cooperating agencies were reviewed and incorporated as appropriate. In December 2023, a pre-draft version of the entire Draft RMPA/EIS was provided to the cooperating agencies for review and input. Coordination with the cooperating agencies has included project presentations and working meetings discussing the purpose and need, new science, alternative strategies, range of alternatives, review of alternative text, meetings to review subsequent changes and further refine the alternatives, and a review of the administrative Draft RMPA/EIS. Since the release of the Draft RMPA/EIS, the BLM has met with cooperating agencies to discuss their feedback on the Draft RMPA/EIS and get their input on the development of the Proposed RMP Amendment/Final EIS and state-specific management direction. Cooperating agencies were provided an administrative draft of the Proposed RMP Amendment management direction in August for review. As a result of these reviews and the many state-level meetings with cooperating agencies, the BLM has made many changes to the Proposed RMP Amendment/Final EIS that have improved the clarity of the document and have addressed cooperating agency concerns.

5.5 PUBLIC INVOLVEMENT

Public involvement is a vital and legal component of both the land use planning and NEPA processes. Public involvement provides public opportunities to raise issues to be addressed in the planning process, disclosure of the alternatives and effects anticipated, and, in general, invests the public in the decision-making process. Guidance for implementing public involvement under NEPA is codified in 40 CFR 1506.6, thereby ensuring that federal agencies make a diligent effort to involve the public in the NEPA process. Section 202 of the FLPMA directs the Secretary of the Interior to establish procedures for public involvement during land use planning actions on public lands. These procedures can be found in the BLM's Land Use Planning Handbook (H-1601-1). Public involvement for this Proposed RMPA/Final EIS included the following four phases:

- Public scoping before NEPA analysis began to determine the scope of issues and identify potential alternatives to be addressed in the RMPA/EIS
- Public outreach via news releases
- Collaboration with federal, state, local, and Tribal governments and cooperating agencies
- 90-day public review of and comment on the Draft RMPA/EIS, which analyzed likely environmental effects and identified the preferred alternative.
- Final EIS availability period and 30-day protest period on Proposed RMP Amendment.

Information about the plan amendment process can be obtained by the public at any time on the National NEPA Register project website (https://eplanning.blm.gov/eplanning-ui/project/2016719/510). This website contains background information about the project, a public involvement timeline, and copies of public information documents released throughout the RMPA/EIS process.

5.5.1 Scoping Process

The formal public scoping process for the RMPA/EIS began on November 22, 2021, with the publication of the Notice of Intent to Amend an RMP and Prepare an EIS (NOI) in the *Federal Register* (Vol. 86 No. 222). The NOI notified the public of the BLM's intent to develop RMPAs for the management of GRSG and initiated the public scoping period, which closed on February 8, 2022. During the comment period, the BLM received 258 total submissions containing 1,865 unique comments. A summary of comments received can

be found on the project's website under "documents." The issues identified during public scoping and outreach helped refine the list of planning issues, summarized in Section 3 of the Scoping Report.

Virtual Public Scoping Meetings

The BLM hosted two virtual public meetings to gather input on issues to consider while amending BLM RMPs regarding GRSG and sagebrush management, and specifically language from the 2015 and 2019 RMPAs. The virtual public forums were held on January 11, 2022, from 1:00 to 2:30 p.m. mountain standard time, and January 24, 2022, from 6:30 to 8:00 p.m. mountain standard time. The meeting recordings can be found on the project's National NEPA Register website within the "Documents" tab. The meetings' purpose was to provide the public with opportunities to become involved, learn about the project and the planning process, and participate in a question-and-answer session where participants were able to ask BLM specialists questions and receive live responses.

5.5.2 Project Website

The BLM maintains a national GRSG conservation website (https://www.blm.gov/programs/fish-and-wildlife/sage-grouse) as part of its efforts to maintain and restore GRSG habitat on public lands. The site is intended to help the public learn how the BLM is working on maintaining and restoring GRSG habitat. It includes background information related to government and BLM roles in GRSG conservation. In addition to the national GRSG conservation website, the BLM has a National NEPA Register website with information related to this planning effort. It includes background documents, information on public meetings, and contact information (https://eplanning.blm.gov/eplanning-ui/project/2016719/510).

5.5.3 Draft RMP Amendment/EIS Comment Period

A substantial contribution to this effort is the opportunity for members of the public to review and comment on the Draft RMPA/EIS during a 90-day comment period which included a 60-day comment period on the Areas of Critical Environmental Concern (ACECs) being considered as per 43 CFR 1610.7-2[1]. The BLM held a 90-day public comment period on the Draft RMPA/EIS from March 15th, 2024, through June 13th, 2024. Thirteen public meetings were held, including two virtual meetings and eleven in-person meetings throughout the planning area. Over 38,000 submissions were received, including approximately 6,000 individual comments. Additionally, the BLM has also initiated and/or participated in over 80 meetings with Tribes; federal, state, and county cooperating agencies; and interest groups since the issuance of the Draft RMPA/EIS. The BLM has considered all public comments and responded to all substantive comments received on the Draft RMPA/EIS (refer to **Appendix 22**, Responses to Substantive Public Comments on the Draft EIS). The high level of public comments and high level of stakeholder coordination has significantly shaped the development of the Proposed RMPA/Final EIS.

5.5.4 Proposed RMP Amendment/Final EIS Availability and Protest Period

Release of the Proposed RMP/Final EIS initiates a 30-day protest period for any person who previously participated in the planning process and has an interest that is (or may be) adversely affected by the Proposed RMPA. The protest regulations specify the required elements for filing a valid protest. To help guide you through this process, there is a critical item checklist available at https://www.blm.gov/programs/planning-and-nepa/public-participation/filing-a-plan-protest. As much as possible, cite specific planning documents or available planning records (such as summaries, correspondence, etc.) in your protest. All protests must be

[1] The 43 CFR 1610.7-2 regulations have been revised since the Draft RMPA/Draft EIS was issued. Under the revised regulations, the public comment and review period for ACECs is not specified in the regulation and would follow the same public comment and review period as specified and required for the associated RMP, RMP revision, or applicable RMP amendment.

in writing and filed with the BLM Director, either as a hard copy or electronically via the BLM's National NEPA Register website, by the close of the protest period.

The only electronic protests the BLM will accept are those filed through the National NEPA Register website at https://eplanning.blm.gov/eplanning-ui/project/2016719/510. All protest letters sent to the BLM via fax or email will be considered invalid unless a properly filed protest is also submitted. If you do not have the ability to file your protest electronically, hard-copy protests must be mailed to the following addresses (regular and overnight mail), postmarked by the close of the protest period:

USPS Mail:
BLM Director
Attention: Protest Coordinator (HQ210)
PO Box 151029
Lakewood, CO 80215

Overnight Mail:
BLM Director
Attention: Protest Coordinator (HQ210)
Denver Federal Center, Bldg. 40
Lakewood, CO 80215

Before including your address, phone number, email address, or other personal, identifying information in your protest, be advised that your entire protest—including your personal, identifying information—may be made publicly available at any time. While you can ask the BLM in your protest to withhold from public review your personal, identifying information, the BLM cannot guarantee that it will be able to do so.

5.5.5 Governor's Consistency Review

The BLM planning regulations in 43 CFR 1610.3-2(e) provide each Governor with a review opportunity for RMPs and RMP amendments. The Governors of each state in the planning area will be provided with 60 days to identify inconsistencies between the Proposed RMPA/Final EIS with approved state or local plans, policies, or programs and to provide written recommendations to the BLM State Director. If the BLM does not accept the Governor's recommendations on plan consistency, the Governor may appeal to the BLM Director. If no response to this Governor's consistency review request is received, the BLM assumes the Proposed RMPA is consistent with state approved plans, policies, and programs.

5.6 Next Steps

The BLM intends to issue an Approved RMP Amendment and Record of Decision for each BLM state in the planning area once the protest and Governor's consistency review processes are complete.

5.7 List of Preparers

This Proposed RMPA/Final EIS was prepared by an interdisciplinary team of staff from the BLM and AECOM (see **Table 5-2**, Rangewide Preparers). In addition to the staff on this list, additional staff from numerous BLM field, district and state offices, as well as other federal, state, and local agencies reviewed and provided comments on various iterations of internal drafts of the Draft RMPA/EIS.

Table 5-2. Rangewide Preparers

Name	Role/Responsibility	Qualifications
BLM Headquarters/National Operations Center		
Quincy Bahr	Project Manager	Quincy has a B.S. in Parks, Recreation Tourism-Natural Resource Planning and Management. He has over 25 years natural resources planning and management experience with federal land management agencies (NPS, USFS, and BLM), including over 18 years working on BLM NEPA and land use planning projects.
Pat Deibert	BLM National Sage-grouse Conservation Coordinator	Pat has a B.A. in biology from Earlham College, a M.S. in ecology from the University of Dayton and a PhD from the University of Wyoming in wildlife management. She has worked for two state wildlife agencies, USFWS and BLM, totaling nearly 35 years of experience with sagebrush ecosystems and greater sage-grouse.
Brenda Lincoln-Wojtanik	Project Manager	Brenda has a B.A. in political science from the State University of New York at Albany and a M.S. in Environmental Science from the State University of New York, College of Environmental Science and Forestry. She has worked for the BLM for over 25 years and has over 20 years of NEPA and land use planning experience.
Bonnie Million	Greater Sage-grouse Core Team	Bonnie has a B.S. in biology from the George Washington University. She has worked over 22 years with the NPS and BLM across the western U.S., including over 18 years of NEPA and land use planning experience.
Katie Flahive	Greater Sage-grouse Core Team	Katie has a B.A. in Sustainable Development and Geography from McGill University and M.P.A. in Environmental Science & Policy from Columbia University. She has 8 years of NEPA and land use planning experience.
Jennifer Schein Dobb	Socioeconomics	Jenn has a B.A. in Economics and a Master of Science degree in Agricultural and Resource Economics. She has over 10 years of experience providing federal land management agencies (USFS and BLM) with socioeconomic support, including 6 years working on BLM NEPA and land use planning projects.
Zach Miller	Socioeconomics	Zach has a BA in Natural Resources, and MS in Park and Conservation Area Management, and a PhD in Forest and Conservation Sciences. He has over 10 years of experience in using social science to support land managers and planning.
Kimberly Hackett	Livestock Grazing/Range	Kimberly has a B.S. in wildlife management with a rangeland management emphasis from New Mexico State University. She has more than 35 years of experience with the BLM, including over 20 years as a rangeland management specialist in several western states and 14 years working in the range program for headquarters.

Name	Role/Responsibility	Qualifications
	AECOM	
Meredith Linhoff	Project Manager and Greater Sage-Grouse and Wildland Fire Management	Meredith has B.S. degrees in biology and environmental science from SUNY Binghamton and a M.A. in biology from Boston University. She has 17 years of consulting experience as a biologist and NEPA planner.
Andrew Wilkins	Assistant Project Manager and Cultural Resources and Tribal Interests	Dr. Wilkins has a B.A. in Historic Preservation from the University of Mary Washington, a M.A. in Historical Archaeology from the University of Massachusetts Boston, and a PhD in Anthropology from the University of Tennessee. He has 18 years of cultural resource management and NEPA experience.
Lily Benson	Air and Climate, Lands with Wilderness Characteristics, Travel and Transportation	Lily has a Bachelor of Arts degree in Environmental Studies from the University of California, Santa Cruz. She has two years of NEPA experience.
Lindsay Chipman	Greater Sage-Grouse	Dr. Chipman has a B.S. in Physics from the College of William and Mary, a M.S. and PhD degree in Oceanography from Florida State University. She has four years of experience as an environmental professional.
Amy Cordle	Air and Climate	Amy has a B.S. in Civil Engineering from Virginia Polytechnic Institute and State University. She has 26 years of experience in management, public involvement, planning, environmental analysis, and air quality analyses.
Francis Craig	Mineral Resources	Francis has B.S. degrees in Geoscience, Psychology and a Minor in Environmental Studies from Hobart College, and a M.A. in Environmental Remote Sensing and GIS from Boston University. He has 10 years of Energy and Minerals experience.
Noelle Crowley	Lands and Realty and Renewable Energy	Noelle has a B.S. in Environmental Studies from the University of Southern California and a Master of the Environment degree in Sustainability Planning and Management from the University of Colorado Boulder. She has 3 years of NEPA experience.
Sean Cottle	Lands with Wilderness Characteristics	Sean has a B.S. in Ecohydrology from the University of Nevada, Reno. He has 10 years of experience as an environmental professional.
Emma Davis	Lands with Wilderness Characteristics	Emma has a B.S. in Geography, with a minor in Renewable Energy from the University of Nevada, Reno. She has over 2 years of experience as an environmental professional.
Kayla Ferron	Fish and Wildlife, Special Status Species	Kayla has a M.S. in Environmental Science from the University of Illinois and a B.S. in Fish, Wildlife, and Conservation Biology from Colorado State University. She has over 5 years of experience in the biological resource field.

Name	Role/Responsibility	Qualifications
Zoe Ghali	Socioeconomics and Environmental Justice	Zoe has a B.S. in biology from the University of California Santa Barbara and a M.S. in environmental physiology and a certificate in environmental policy from the University of Colorado Boulder. She has 15 years of experience as a NEPA specialist.
Derek Holmgren	Soil and Water	Derek has a B.A. in International Studies and a B.S. degree in Environmental Studies from Oregon State University. Additionally, he has a M.S. in Environmental Science and a M.P.A. in Environmental Policy and Natural Resources Management from Indiana University, He has 20 years of NEPA experience.
Erin Hudson	Cultural Resources	Dr. Hudson has a B.A. in Anthropology from the University of Colorado, Boulder; a M.A. in Anthropology from Georgia State University and the University of New Mexico; and a PhD in Anthropology from the University of New Mexico. She has over 15 years of experience as an environmental professional.
Perry Lown	Cultural Resources	Perry has a B.A. in Anthropology from the University of New Mexico. He has seven years of experience in cultural resource management.
Courtney Luxford	Mineral Resources	Courtney has a B.S. in Geology from Humboldt State University. He has 15 years of experience as a geologist and environmental professional.
Michael McIntire	Livestock and Grazing, Wild Horses and Burros	Michael has a B.S. in Natural Resources: Rangeland Management and Ecology from the University of Arizona. HE has over 7 years of combined experience working as a rangeland management specialist.
Mike Meany	Lands and Realty and Renewable Energy	Mike has B.S. degrees in Geography and Environmental Planning and Policy from the University of Maine at Farmington. He has 10 years of experience as an environmental professional.
Bronson Pace	Soil, Water, and Special Designations	Dr. Pace has a B.S. in History with a minor in Zoology from Weber State University, a J.D. in Natural Resources and Environmental Law from the University of Idaho, and a PhD in Water Resources: Law, Management, and Policy from the University of Idaho. He has over 5 years of NEPA experience.
Allison Piazzoni	Lands and Realty, Recreation	Allison has a MENV in Sustainability in the Outdoor Industry from the University of Colorado, Boulder and a B.A. in Environmental Studies from Sonoma State University. She has 2 years of experience in outdoor recreation planning and biology

Name	Role/Responsibility	Qualifications
Sara Piccolomini	Greater Sage-Grouse	Sara has a M.S. in Biological Sciences from Auburn University and a B.A. in Environmental Sciences from Hiram College. She has over 5 years of experience in project management, section writing, NEPA related tasks, and biological assessments.
Rachel Redding	Fish and Wildlife and Special Status Species and Wildland Fire Management	Rachel has a B.S. in Wildlife Ecology and Conservation from the University of Nevada, Reno. She has five years of wildlife and natural resource experience.
Shannon Regan	Vegetation	Shannon has a B.S. degree in Marine Science, from Coastal Carolina University and a M.S. in Fisheries, Wildlife, & Conservation Biology, with a GIS minor from North Carolina State University. She has 10 years of wildlife biology experience.
Camila Reiswig	Socioeconomics, Environmental Justice	Camila has a B.A. in Economics from Portland State University and a Master of Science in Agriculture and Applied Economics from the University of Illinois, Urbana-Champaign. She has over 6 years of experience as an environmental professional
Shine Roshan	Mineral Resources	Shine has a B.S. in Physics with a concentration in Astrophysics and a M.S. in Physics from San Francisco State University. She has 5 years of experience as an environmental professional.
Eduardo Sanchez	Transportation, Vegetation, Fire	Eduardo has a B.S. in Natural Resources and Wildlife Management from the University of Texas at San Antonio and a Master of Natural Resources Stewardship degree in Ecological Restoration from Colorado State University. He has three years of experience as an environmental professional.
Andy Spellmeyer	Livestock and Wild Horses and Burros, 508 Compliance	Andy has a B.S. and a M.S. degree in Biology from Wichita State University. He has 10 years of Biology experience.
Val Stanson	Recreation	Val has a B.S. in Biology from the State University of New York at New Paltz and a Master of Public Health degree in Environmental Health from the State University of New York at Albany. She has five years of experience as an environmental professional.
Morgan Trieger	Fish and Wildlife and Special Status Species	Morgan has a B.S. in Conservation and Resource Studies with a minor in Forestry from the University of California, Berkeley. He has over 17 years of experience as an environmental professional.

Name	Role/Responsibility	Qualifications
Kim Murdoch	Technical Editing	Kim has a B.S. degree in marketing and entrepreneurship from the University of Colorado and a Master of Business Administration in marketing and management information systems from the University of Denver. She has 15 years of writing and editing experience.
Cindy Schad	Formatting	Cindy has a B.F.A. degree in Creative Writing from Emerson College. Cindy has 30 years of formatting experience.

Table 5-3. California Preparers

Name	Role/Responsibility	Qualifications
	BLM	
Amy McGowan	Planning Coordinator	Amy has a B.A. in biology from Colorado College and a Post-Degree certificate in Technical Writing and Communication from Pima Community College. She has over 10 years of experience in NEPA and Planning.
Arlene Kosic	Greater Sage-Grouse	Arlene has a B.S. from the State University of NY, College of Environmental Science and Forestry and over 20 years of experience as a wildlife biologist with the BLM.
Brian A. Novosak	State Wildlife Program Lead	Brian has a M.S. in Zoology from Southern Illinois University and almost 20 years experience in wildlife conservation.

Table 5-4. Colorado Preparers

Name	Role/Responsibility	Qualifications
	BLM	
Diane Mastin Dixon	Planning Coordinator, GRSG, and ACECs	Diane has a bachelor's degree in environmental science and GIS certificate from Colorado Mesa University and a master's degree in natural resources stewardship with an emphasis on rangeland ecology and management from Colorado State University. She has 10 years of interdisciplinary experience with the BLM and has spent the last 6 years implementing sage-grouse management.
Forrest Cook	Air	Forrest holds a bachelor's degree in atmospheric science from the University of Georgia and has over 20 years of experience analyzing atmospheric phenomena. He joined the BLM in early 2013 as an air resource specialist for the Colorado State Office.

Name	Role/Responsibility	Qualifications
James Miller	Climate	James has a bachelor's degree in meteorology from the University of Utah and a Ph.D. in geography with an emphasis on regional climatology from Arizona State University. He has over 20 years of experience in climate and atmospheric science as a research scientist, university professor, and land management professional.
Ed Rumbold	Soil and Water	Ed has a B.S. in watershed management from SUNY College of Environmental Science and Forestry with over 30 years of aquatic resources experience with USFS as well as BLM Field, District and State Office levels. His experience includes design and implementation of stream restoration and stream crossing replacements, NEPA, aquatic resources monitoring, fluvial geomorphology, riparian resources, sediment transport, water resources, water quality and modeling.
Carol Dawson	Vegetation	Carol has a MS degree in Botany from Arizona State University and a PhD in Biology from the University of Denver. Carol has over 30 years' experience in developing and implementing conservation strategies for rare plants, demographic trend monitoring for rare plants, plant identification, and teaching.
Tom Fresques	Fish and Wildlife	Tom has a B.S. in fish biology from Colorado State University. He has 24 years of interdisciplinary experience with the BLM, and six years with the Arizona Game and Fish Department prior to that. For the past 2 years, he has served as the CO State Lead for Fisheries and Riparian resources under the Aquatic Resources Program.
Natalie Clark	Cultural Resources	Natalie has a B.A. in Anthropology from Colorado College and a Master of Arts degree in Anthropology from Washington State University, both with an emphasis in archaeology. She has over 15 years of experience in cultural resource management, Tribal consultation, and collections management. She is currently the BLM Colorado State Archaeologist/ Deputy Preservation Officer.
Ian Barrett	Wildland Fire Management	Ian has a bachelor's degree in forestry from Colorado State University. He has 18 years of experience with fire/fuels management and has spent the last 8 years implementing treatments and managing wildfires within sage-grouse landscapes.

Name	Role/Responsibility	Qualifications
Dan Ben-Horin	Lands with Wilderness Characteristics	Dan has a master's degree in Urban and Regional Planning concentrating in Land Use and Environmental Planning from the University of Colorado Denver. He has over a decade of experience in public lands management with a focus on wilderness and special designations.
Laria Lovec	Livestock Grazing	Laria has an Associate of Science degree in AgBusiness from Dawson Community College and a Bachelor of Science degree in Rangeland Ecology and Management from University of Idaho. She has over 20 years of experience working for the BLM and USFS in Montana, Nevada, Nebraska, and Colorado.
Tim Finger	Recreation	Tim has dual Bachelor of Science degrees in Wildlife Management and Zoology from Washington State University. Tim has over 40 years of experience in the federal land management agencies managing recreation, visual, tourism, wilderness, Travel and Transportation Management, wild and scenic rivers and other related programs in an interdisciplinary team setting. Tim has been the BLM Colorado Recreation Program Manager since 2015.
Jeff Christenson	Travel and Travel and National Trails	Jeff has a Bachelor of Science degree from Oregon State University in Forestry Recreation with a minor in Planning. He has 7 years of seasonal and volunteer experience with the BLM and USFS as a Recreation Technician and 23 years as an Outdoor Recreation Planner at the Field and State Office levels.
Kemba Anderson	Mineral Resources	Kemba has a Bachelor of Science degree in Business Administration from Wesleyan College and MBA in Finance from Capella University. She has over 18 years of experience working in the minerals arena.
Carmia Wooley	Mineral Resources	Carmia has a bachelor's degree in watershed science from Colorado State University. She has 20 years of experience in environmental science and has spent the last 9 years in the BLM's fluid minerals program.
Kristin Elowe	Mineral Resources and NEPA	Kristin has a bachelor's degree in geoscience from the University of Texas at Austin and a master's degree in petroleum geoscience from the University of London. She has 25 years of experience, 12 years in federal service with the last 2 years in planning and environmental coordination within the BLM's fluid minerals program.

Name	Role/Responsibility	Qualifications
Shay Romine	Mineral Resources	Shay has a BS in Geology from the University of Wyoming and completed graduate work in geophysics and mineral economics. She has spent the last 3 years as the Colorado State office Fluid Minerals Program lead and over 7 years in the Office of the Secretary, Appraisal Valuation Services, Division of Minerals Evaluation. Earlier experiences include work in the mining and environmental sectors, forestry, fire, trails and wilderness experience.
Amy Stillings	Socioeconomics and Environmental Justice	Amy has Master of Science in Agriculture and Resource Economics from Oregon State University. She has over 26 years of experience as an environmental professional.
Erin Leifeld	Tribal Interests	Erin has a bachelor's and master's degree in Anthropology with an emphasis in Archaeology from Colorado State University. She worked for the BLM in Colorado for 14 years as an archaeologist. She recently moved into the role of Tribal Liaison Officer for the BLM Colorado State Office in 2023.

Table 5-5. Idaho Preparers

Name	Role/Responsibility	Qualifications
	BLM	
Sylvia Copeland	Planning Coordinator, GRSG	Sylvia has a Bachelor of Science in Biology from University of Massachusetts at Amherst and a Master of Science in Wildlife Science from Viriginia Polytechnic Institute and State University. She has worked for industry and consulting, and several state and federal agencies. She has nearly 25 years of experience in wildlife studies and management and environmental planning, with most experience on sagebrush ecosystems. She has been with BLM Idaho for 7 years and is the Sage-grouse Lead at the Idaho State Office.

Name	Role/Responsibility	Qualifications
Ethan Ellsworth	Water and Fish and Wildlife	Ethan has a Bachelor of Science degree in Zoology and Botany from Wisconsin-Oshkosh University, a MS in raptor Biology from Boise State University, and a PhD in Wildlife Resources from University of Idaho. He has 12 years of experience with the BLM in wildlife, threatened and endangered species, and aquatic habitat. Ethan's is the BLM Idaho Aquatic Resource State Lead.
Anne Halford	Vegetation and ACECs	Anne has a Bachelor of Science Degree from the University of Colorado-Boulder in Environmental Science and a Master of Science Degree in Plant Physiology from the University of Nevada Reno. She has 32 years of experience with the BLM in botany, plant ecology, native plant restoration and rare plant management and her current position is as the BLM Idaho State Botanist.
Paul Makela	GRSG, ACEC, Special Status Species, and Fish and Wildlife	Paul has a Bachelor of Science in Natural Resources (Wildlife Management Option) from the University of Michigan and a Master of Science degree in Wildlife Biology from the University of Montana. He has over 35 years of experience with the BLM and USFS. Most of his career has involved wildlife and habitat conservation in sagebrush ecosystems. He currently serves as lead for the BLM Idaho Wildlife Habitat Management program.
Christa Braun	Geospatial Analyst	Christa has a Bachelor of Science in Wildlife Biology from Washington State University and Master of Public Administration from Boise State University. Christa has 22 years of experience working with the Bureau of Land Management as a GIS Specialist supporting multiple disciplines including botany, wildlife, planning, lands & realty, fire & fuels and recreation.
Donald Major	ACEC	Don has a Master's Degree in Wildlife Biology from Wahington State University and a PhD in Wildlife Ecology from Utah State University. He has 20 years of professional experience (USGS and BLM) working in wildlife/fire/landscape ecology in sagebrush ecosystems.

Name	Role/Responsibility	Qualifications
Robin Fehlau	Lands with Wilderness Characteristics and Recreation	Robin has a Bachelor of Science in Physical Geography from the University of California at Davis and a Master's Degree in Outdoor Recreation from the University of Utah. Robin 31 years of experience working for the BLM, including the last 25 years as the Recreation and National Conservation Lands Lead at the BLM Idaho State Office.
Melissa Davis	Lands and Realty and Renewable Energy	Melissa has a Bachelor of Science in Business Information Systems from the University of Phoenix. She has 23 years of experience with federal agencies in lands adjudication, lands and realty, project management, and as a Field Manager. She currently serves the BLM Idaho State office as Supervisory Realty Specialist.
Devin McLemore	Locatable Minerals	Devin has a Bachelor of Science in Geology from Southern Utah University and a Professional Master's Degree in Geosciences from the University of Northern Colorado. She has over 6 years with the BLM. She detailed as the Idaho State Office Locatable Minerals Program lead. Her permanent position is in the Utah Richfield Field Office as a geologist.

Table 5-6. Montana/Dakotas Preparers

Name	Role/Responsibility	Qualifications
	BLM	
David Wood	Planning Coordinator, GRSG, ACECs	David has Bachelor of Science and Masters Degrees from University in Arizona in Fish and Wildlife Management and a PhD in Ecology and Environmental Sciences from Montana State University. He has 16 years of professional experience working in landscape ecology, natural resource management, and sagebrush systems for the BLM and USGS.
Dan Brunkhorst	Planning and NEPA Coordination, ACECs	Dan has a Bachelor of Science in Resource Conservation from the University of Montana. He has over 25 Years professional experience working in wildlife, vegetation, fisheries, recreation, range and planning with Montana/Dakotas BLM, US Forest Service and the State of Montana.
Jess McDermott	Geospatial Analyst and Fish and Wildlife	Jess has a Bachelor of Arts and a Master of Science degree in Environmental Science from Clark University. She has six years of experience with the BLM working in GIS and natural resource management.

With Review and Program Support from the Following:

Name	Role/Responsibility	Qualifications
Mark Peterson	Air	Montana/Dakotas Program Leads, Blue Sky Zone and/or Senior Specialists for assigned areas of responsibility
Josh Buckmaster	Soil	
James Johnson	Water	
Wendy Velmen	Vegetation	
Chris Boone	Special Status Species and Fish and Wildlife	
Amy Waring	Wild Horses and Burros, Planning and Coordination	
Zane Fulbright	Cultural Resources	
Karly DeMars	Wildland Fire Management	
Jamie Tompkins	Lands with Wilderness Characteristics and National Trails	
Reyer Rens	Livestock Grazing	
Whitney Patterson	Recreation	
Brad Colin	Travel	
Cindy Eide	Lands and Realty and Renewable Energy	
John Zeise	Mineral Resources	
Tessa Wallace	Mineral Resources	
Joel Hartmann	Mineral Resources	
Dorothy VanOss	Mineral Resources	
Amy Stillings	Socioeconomics and Environmental Justice	
Marcia Pablo	Tribal Interests	

Table 5-7. Nevada Preparers

Name	Role/Responsibility	Qualifications
	BLM	
Carolyn Sherve	Planning & Environmental Specialist, ACECs	Carolyn has a Bachelor of Arts degree in German from the University of Montana and a Master of Arts degree from the University of Nevada, Reno in Anthropology with an emphasis in Archaeology. She has fifteen years of experience in cultural resource management and sixteen years of experience working on BLM NEPA and land use planning projects.
Tim Bowden	Greater Sage-Grouse Program Lead, Wildlife Biologist	Tim has a Bachelor of Science degree from Cal Poly Humboldt and a Master of Biological Science from Montana State University, with an emphasis in Quantitative Ecology. He has 20 years of experience as a wildlife biologist within the Department of Interior (NPS, USFWS, and BLM). He is the BLM Nevada State Office sage-grouse biologist.

Name	Role/Responsibility	Qualifications
Jamie Lange	Geospatial Analyst	Jamie has a Bachelor of Science degree in Animal Ecology from Iowa State University and a Master of Science in Environmental Science from the University of Illinois, with a GIS certificate. She has 7 years of experience as a GIS Specialist with the BLM Nevada State Office.
Alan Shepherd	Deputy State Director, Resources, Lands, and Planning	Alan has Bachelor of Science degrees in Range Management and Wildlife Management from the University of Idaho. He has over 34 years of professional experience working in wildlife, vegetation, range, wild horses and burros, restoration, and planning with Nevada and Wyoming BLM as well as BLM Headquarters.
Brock Uhlig	Wildland Fire Management	Brock has 27 years of experience in fire and fuels management in Nevada. He has an A.S. from Great Basin College in Elko and years of practical rangeland management experience being raised on a small ranch in northeastern Nevada.
Tyson Gripp	Wildland Fire Management	Tyson has a Bachelor of Science degree in Rangeland Management from Oregon State University. He has 22 years of experience in range, post fire rehabilitation, and fuels management in Nevada.
Dylan Rader	Wildland Fire Management	Dylan has a Bachelor of Science degree in Education and Fire Ecology from the University of Nevada. He has 28 years of experience in fire and fuels management in Nevada.

Table 5-8. Oregon Preparers

Name	Role/Responsibility	Qualifications
	BLM	
Jim Regan-Vienop	Planning Coordinator, Wildland Fire Management, Research Natural Areas	Jim has a Bachelor of Art's degrees in biology from Humboldt State University, California and a Master of Science degree in Regional and Community Planning from the University of Texas, Austin. He has more than 30 years of planning and project management experience in many different locations and levels of government, including eight years as a Planning & Environmental Coordinator at the Oregon/Washington BLM State Office in the Branch of Planning, Monitoring, Social Sciences.

Name	Role/Responsibility	Qualifications
Angel Dawson	Planning and Environmental Coordinator	Angel has a bachelor's degree from Reed College and a master's degree from the University of Oregon both in anthropology. She has 35 years of federal land management experience (BLM and USFS) including 20 years as a natural resource advisor and seven years as a cultural and Tribal program specialist.
Mike Brown	Air, Soil, and Water	Mike has Master of Science degree in Geology, a graduate degree Geography, a Bachelor of Science in Geology and a Bachelor of Science in Natural Resources and Environmental Sciences from Kansas State University. Mike has 20 years of federal land management experience (BLM, USFS, and NPS) which includes experience in land management planning and implementation for water resources and soils related actions, and fire, fuels and emergency management.
Stacy Johnson	Vegetation	Stacy has a Bachelor of Science degree in Botany from Northern Arizona University. She has 19 years of experience as a Botanist spanning several western states and ecoregions. She is a coauthor of the Service First publication "Rare Plants of Southwestern Oregon" (2018). She is the Invasive Species Program lead for Oregon Washington BLM State Office Branch of Biological Resources.
Sarah Canham	Vegetation and ACECs	Sarah has a Bachelor of Science degree in Ethnobotany from the University of Massachusetts, Amherst and a Master of Forest Science degree from the School of Forestry & Environmental Studies at Yale University. She has over 17 years of Federal employment in botanical resources, across four states, with the NPS, USFWS, USFS, and 13 years with the BLM Oregon. Sarah is the Plant Conservation & Restoration Program Lead for Oregon/Washington BLM.
Glenn Frederick	GRSG and Fish and Wildlife	Glenn has a Master of Science degree in wildlife management from Humboldt State University. He has 30 years of experience as a wildlife biologist, including 11 years as the BLM ORWA Wildlife Program Lead and greater sage-grouse Biologist.

Name	Role/Responsibility	Qualifications
Rob Huff	Special Status Species	Rob has a bachelor's degree in Ecology and Evolutionary Biology from Northwestern University in Evanston IL. Rob has 36 years of federal experience with USFS and the BLM as a wildlife biologist and general biologist, and currently serves as the Conservation Planning Coordinator in the Interagency Sensitive and Special Status Species Program for BLM Oregon/Washington and Region 6 of the Forest Service.
Kelli Van Norman	Planning Coordinator and Sage-Grouse Coordinator	Kelli has a Bachelor of Science degree in Geography with a minor in Biology from University of Oregon and a Master of Science degree in Forest Science from Oregon State University with an emphasis on landscape ecology disturbance. She has 25 years federal land management experience (BLM and USFS) including 18 years working on PNW Sensitive Species.
Emily Lent	Wild Horses and Burros	Emily has a Bachelor of Science in Rangeland Management & Natural Resources from the University of Arizona. 17 years of experience in BLM Rangeland & Natural Resource Management. She currently works as a Rangeland Management Specialist in the Oregon/Washington State Office Branch of Biological Resources.
Heather Ulrich	Cultural Resources	Heather received her bachelors degree in Anthropology in 2001 from the University of Oregon and then her Masters in Anthropology with a focus on Archaeology in 2009. She has worked permanently for the BLM in Oregon since 2009 first as a District Archaeology, then as the OR/WA Cultural and Paleontological Program Lead. She is currently the OR/WA Tribal Liaison.
David Lachapelle	Wildland Fire Management	David is the Deputy Fire Management Officer (Fuels) for Vale BLM. He has 34 years in fire and fuels management with the Payette National Forest and Vale BLM. He was educated at Oregon State University, University of Idaho, Colorado State University, and Treasure Valley Community College.
Lauren Pidot	Lands with Wilderness Characteristics	Lauren has 15 years of experience with the BLM, primarily focused on NEPA and planning and national conservation lands. She has a BA in Government from Wesleyan University and an MS in Environmental Policy and Planning from the University of Michigan.

Name	Role/Responsibility	Qualifications
Rebecca Carter	Livestock Grazing	Rebecca has a Bachelor of Science degree in Earth Sciences with emphasis in range management and ecology from Montana State University. She has 20 years' experience with the government and has worked in the fields of cartography, forestry and rangeland management. She is the OR/WA Rangeland Management program lead and OR/WA Emergency Stabilization and Burned Area Rehab (ES&R) program lead.
Dan Davis	Recreation	Dan has a Bachelor of Science degree in sociology from Linfield University, and a Master of Business Administration, with a concentration in Environmental Compliance and Sustainability from Southern New Hampshire University. He has eight years as an Outdoor Recreation Planner.
Chris Knauf	Travel and National Trails	Chris has a Bachelor of Science degree in biology and environmental science from Evergreen State College in Olympia. Chris has worked for the BLM as a Biologist, Natural Resource Specialist, and Project Manager for 6 years, and an Outdoor Recreation Planner for 18 years.
Trisha Skerjanec	Lands and Realty and Renewable Energy	Trisha has an Associates Degree in Paralegal Studies. She has spent 27 years working from the Vale District Office. She is a Realty Specialist for the Oregon State Office.
Greta Krost	Mineral Resources	Greta has a Bachelor of Science in geology from Portland State University. Greta has 18 years of experience in managing and administering the federal mineral estate. Greta worked for the USFS for 7 years and has currently worked for the BLM for 11 years. Greta is a State Registered Geologist with the State of Oregon.

Name	Role/Responsibility	Qualifications
Stewart Allen	Socioeconomics and Environmental Justice	Stewart has been the Zoned Socioeconomic Specialist (California, Oregon/Washington and Alaska), in the Oregon State Office, Branch of Planning, Monitoring, and Social Science, since 2013. He has dual B.A.s in Psychology and Mass Communications from the University of Utah, an M.A. in Psychology from Claremont Graduate School, and a Ph.D. in Forestry from the University of Montana. He has 43 years of experience in social science aspects of natural resource management, including 29 years as a federal employee with the Tennessee Valley Authority, USFS, USFWS, NOAA Fisheries, and the BLM.
Paul Whitman	Planning and Environmental Coordinator, Lakeview District	Paul has a BA in Biology, Illinois Wesleyan University; MS in Zoology, Southern Illinois University - Carbondale
Jerome (Ted) Benson	Natural Resource Specialist (weeds)- Baker City Field Office	Ted Benson has a Masters of Science in forestry from Stephen F. Austin State University. He has served on Forestry, Weeds, Recreation, and Water Quality Interdisciplinary Teams over a 25 year career with the BLM.
Jonah Blustain	Field Manager - Malheur Field Office	Jonah has a Bachelor of Arts degree from Boston University in Anthropology and Archaeology and a Master of Arts in Anthropology from the University of Nevada, Reno. He has 16 years of natural and cultural resource management experience in the consulting industry and the BLM.
Caryn L. Burri	Planning and Environmental Specialist	Caryn has a Bachelor of Science in Natural Resource Management with 16 years in government service and 3 years as a Planning & Environmental Coordinator/Project Manager with the BLM.
Annie Franks	Forestry Technician- Baker City Field Office	Annie has a Bachelor of Science in Exercise Science and a Masters of Science in Exercise Science from Central Washington University and a non-degree seeking credits in Forestry through Oregon State University. She has worked for the BLM for 16 years, all in the Forestry discipline and is a Certified Cruiser/Appraiser and Certified Check Scaler, through the BLM.
Susan Fritts	Natural Resource Specialist- Malheur Field Office	Susan has a Bachelor of Science degree in biology with a botany emphasis and a minor in ecology from Washington State University. She has 25 years of experience as a botanist working for both the USFS and the BLM.

Name	Role/Responsibility	Qualifications
Michele McDaniel	Supervisory Rangeland Management Specialist- Malheur Field Office	Michele has a Bachelors of Science Degree in Natural Resource Management from the University of Nevada Reno, College of Agriculture, Biotechnology, & Natural Resources. She has over 20 years of experience with the BLM in natural resource management and planning.
Megan McGuire	Wildlife Biologist- Malheur Field Office	Megan McGuire has a Bachelor of Science in Biology from Colorado Mesa University and 20 years experience in wildlife biology.
Shelli Pence	Land Law Examiner- Baker Field Office	Shelli Pence is the Land Law Examiner for the Baker Field Office and is currently working as the Realty Specialist for the Malheur Field and Baker Field Office, and the Vale District. Shelli has worked for the Vale District of the BLM since 2010 and for the federal government since 1998. She is a fully qualified Land Law Examiner with extensive administrative experience.
Amber M. Pike	Geologist	Amber has a Bachelor of Science in Geology from University of South Alabama and Master of Science in Geology/Geochemistry from Northern Illinois University. She has eight years as a Geologist with two years in private industry and six years with the federal government. with the federal government.
Kari A. Points	Outdoor Recreation Planner-Jordan Field Office	Kari has Bachelor of Science degree in Environmental Science from University of Kansas and a Master of Arts degree in Environmental Science from University of Idaho. She is an American Institute of Certified Planners (AICP #018426, July 2003). She has 29 years of experience as NEPA project manager and 14 years at the Vale BLM as an Outdoor Recreation Planner.
John G. Quintela	Fishery Biologist- Baker City Field Office	John has a Bachelor of Science degree in Environmental Science from Lubbock Christian University and a Master of Science degree in Fishery Resources from the University of Idaho. He has 23 years of experience as a fisheries biologist; seven years with the Forest Service in Idaho, Montana, and Oregon; and has served as the Fisheries Biologist for the BLM Vale District Baker Field Office for the last 16 years.

Name	Role/Responsibility	Qualifications
John A. Rademacher	Supervisory Natural Resource Specialist- Baker City Field Office	John has a Bachelor of Science from the University of Idaho in Range Management and Ecology and a Master of Science in Ecology from the University of Toledo. He has co-authored three peer reviewed manuscripts and a master's thesis on subjects related to carbon storage/allocation and habitat fragmentation. He has worked in range management for 22 years and has been a supervisor for 18 years.
Sarah Sherman	Acting Field Manager- Baker Field Office	Sarah has a Bachelor of Science in environmental science and a Bachelor of Arts in English from the University of Virginia. She has two years of experience as a NEPA planner and five years in BLM Resources and Planning.
Lynne F. Silva	Range Technician-Malheur Field Office	Lynne has worked for the BLM for 32 years, including 30 years in the Weed Program/Invasive Species. She holds DOI/BLM Pesticide Applicator's Certification in 5 categories (Ag Plant Pests, Aquatic Pests, Forest Pests, Rights of Way Pests and Research and Development), and an Oregon Department of Agriculture Public Applicator's License in Agriculture Plant Pests.
Daniel J. Thomas	Range Technician-Malheur Field Office	Daniel has 20 years at the Vale District BLM working in the Range and National Conservation Lands System programs.
Brian T. Woolf	Outdoor Recreation Planner- Baker City Field Office	Brian has a Bachelor of Science Degree in Recreation Resource Management from Oregon State University with an emphasis in Adventure Tourism. Brian spent six years as a primary firefighter before pursuing more experience in Recreation Management. He has worked for the BLM since 2007 as Lead Interpretive Specialist at Garnet Ghost Town, Work Leader for the Upper Missouri River Breaks, Interpretive Center Director at the Upper Missouri River Breaks, and two detailed assignments as Supervisory Recreation Planner and Interpretive Center Manager with cumulatively, 17 years in BLM Recreation Resource Management.
Melissa N. Yzquierdo Primus	Natural Resource Specialist- Baker City Field Office	Melissa has a Bachelor of Science in Wildlife Resources from the University of Idaho with 23 years with the BLM in resources for wildlife and botany.

Table 5-9. Utah Preparers

Name	Role/Responsibility	Qualifications
	BLM	
Tia Arbogast	Planning Coordinator, GRSG, and ACECs	Tia has a Bachelor of Arts degree in Environmental Studies from University of North Carolina at Greensboro and a Master in Natural Resources – Policy and Administration from North Carolina State University. She has 8 years of experience as a NEPA practitioner.
Christine Fletcher	Planning Coordinator and GRSG	Christine has a Bachelor of Science from the University of Wyoming in Wildlife Biology & Management with a minor in Botany. She has worked for three federal agencies and has 24 years of experience in wildlife management, GRSG, and NEPA.
Ben Gaddis	Planning Coordinator	Ben has Bachelor of Science degrees in environmental science from Willamette University and a Master of Environmental Management in watershed management from Duke University. He has 17 years of experience as a NEPA practitioner.
Erik Vernon	Air	Erik has a Bachelor of Science and a Master of Science from the University of Utah in Meteorology. He has over 21 years of experience in the fields of boundary layer meteorology, atmospheric dispersion, climate, air quality, and noise.
Jared Dalebout	Soil and Water	Jared has a Bachelor of Science degree in Geology at Weber State University 16 years federal experience with the BLM.
Jason Burgess Conforti	Vegetation	Jason has a PhD from the University of Arkansas in Environmental Dynamics with a focus on soil science and hydrology. He has worked for NRCS and the BLM and has experience in assessing management effects on ecological health.
Adrienne Pilmanis	Vegetation	Adrienne has a B.A. in Biology, a M.S. in Botany (Paleoecology) and a PhD (ABD) in Botany (Biogeochemistry) with research projects focused on global change impacts in arid ecosystems. She has 19 years working for BLM Natural Resources in several states and leads the Colorado Plateau Native Plant Program.
Aaron Roe	Vegetation and Special Status Species	Aaron has a Master of Science in Botany from the University of Wyoming. He has worked fourteen years of experience with the BLM in botany; special status species management, including Endangered Species Act implementation; and NEPA.

Name	Role/Responsibility	Qualifications
Cassie Mellon	Vegetation, Special Status Species, and Fish and Wildlife	Cassie has a Master of Science in Fisheries from the University of Alaska Fairbanks. She has fifteen years of experience with state and federal agencies in sensitive aquatic species and aquatic habitat management.
Josh Robbins	Vegetation	Josh has a Bachelor of Science from the University of Nevada, Reno, in Animal Science, with a minor in Rangeland Management. He has work for the BLM for 16 years, participating in many resource management disciplines; including, rangeland management, wildlife, fisheries, fire, and ES&R.
Jared Reese	GRSG	Jared has a Bachelor of Science in Wildlife Science from Utah State University. He has over 15 years of BLM experience ranging from grazing, oil and gas development and wildlife management. He has solely been focused on sage-grouse management for the BLM since 2016.
Dave Cook	Special Status Species and Fish and Wildlife	Dave has a Bachelor of Science in Wildlife Biology from the University of Idaho. He has 35 years of wildlife management experience with 17 years with Utah DNR, 5 years with Texas Parks and Wildlife and 13 Years with the BLM.
Victor (Gus) Warr	Wild Horses and Burros	Gus has a Bachelor of Science degree from Utah State University. He has 35 years of experience in wild horse and burro management with the BLM.
Nate Thomas	Cultural Resources & Tribal Interests	Nate has a Bachelor of Science from Utah State University in Anthropology, and a Master's degree in Archaeology and Ancient History from the University of Leicester. He has worked for federal agencies, including the BLM and USFS in Nevada and Utah since 2000.
Nicole Lohman	Cultural Resources	Nicole has a Masters in Applied Anthropology with a focus in Archaeology. She serves as the Assistant State Archaeologist for BLM Utah, with over 13 years of service as an archaeologist for the federal government with both the National Park Service and the BLM.
Geoffrey Wallin	Wildland Fire Management	Geoff studied Environmental Science at Utah State University. He has worked federally (BLM and USFS) in fire suppression fuels management for the last 28 years in Nevada, Montana, Oregon, and Utah. He is currently BLM Utah's Fuels Program Lead.

Name	Role/Responsibility	Qualifications
Mark Williams	Wildland Fire Management	Mark has a PhD in Fire Ecology and has worked for two federal agencies in multiple states across the western US. He has more than 20 years of experience with NEPA related to Hazardous Fuels and Fire Management.
Ray Kelsey	Lands with Wilderness Characteristics	Ray has a Master of Science in Parks, Recreation, and Tourism with a Natural Resources Management emphasis from the University of Utah. He previously worked in the field for 15 years as a BLM Outdoor Recreation Planner before joining the staff at the Utah State Office as the National Conservation Lands Program Lead in 2019.
Alan Bass	Livestock Grazing	Alan has a Bachelor of Science in Botany from Weber State University and a Bachelor of Science in Rangeland Resources from Utah State University. Alan has over 17 years of experience in the Rangeland Management Program.
Josh Robbins	Livestock Grazing	Josh has a Bachelor of Science in Animals Sciences with a minor in Rangeland Management from the University of Nevada, Reno. He has over 16 years of BLM experience in the Rangeland Management Program.
Michelle Campeau	Lands and Realty and Renewable Energy	Michelle has over 18 years of service with the BLM primarily in Land and Realty processing Land Use Authorizations in Southern Utah. Michelle currently serves as the BLM's Renewable Energy Program Coordinator for Colorado, New Mexico, Utah and Wyoming.
Mary Higgins	Lands and Realty and Renewable Energy	Mary has over 30 years' experience working in BLM, Utah, in the Cadastral Survey and Oil and Gas Programs, including 14 years in the Lands and Realty Program working on all types of rights-of-way projects.
Terry Snyder	Mineral Resources	Terry has a B.A. in Geology and a Professional Geologist license from the State of Utah. She has over 40 years of BLM experience as a field office, district office and a state office geologist and currently serves as the Utah Solid Minerals Branch Chief. In these positions she created with the assistance of contractors a technical guidance entitled "Verification of Risk at Abandoned Mine site on BLM Management Lands in Utah."

Name	Role/Responsibility	Qualifications
Nathan Packer	Mineral Resources	Nate has a Bachelor of Science in Fisheries and Wildlife and a Master of Natural Resources from Utah State University. He has 24 years of experience with the BLM in Wildlife, Hazardous fuels, Fluid Minerals, and NEPA Planning. He currently works on Oil, Gas, and Geothermal leasing.
Rob Sweeten	National Trails	Rob has a Bachelor of Landscape Architecture and Environmental Planning from Utah State University. He has 31 years of experience as an employee of the BLM. He has served as a District and State Landscape Architect and for 13 years and the BLM Administrator for the Old Spanish National Historic Trail.
Matt Fockler	Socioeconomics and Environmental Justice	Matt has two Bachelor of Arts degrees in history and English from the University of Nevada, Reno, a Master of Science in Geography from the University of Nevada, Reno, a M.A. in Education from Sierra Nevada College, and a PhD in Earth Sciences (Geography and Natural Resource Management) from Montana State University. He has two years of experience as the BLM's Great Basin Zone Socioeconomic Specialist (ID, NV, UT).
Amber Koski	Planning & Environmental Specialist	Amber has a Bachelor of Arts in Anthropology (archaeology emphasis) and a M.S in Environmental Policy and Management. She has 20 years of federal service and currently serves as a Utah project manager in the West Desert District Office.

Table 5-10. Wyoming Preparers

Name	Role/Responsibility	Qualifications
	BLM	
James Halperin	Planning Coordinator and Soil	Jamie has a Bachelor of Arts in Political Science, an AAS in Geographic Information Systems, and Master of Science and PhD degrees in forestry. He has 20 years of environmental planning and project implementation experience.
Matt Holloran	Planning Coordinator, GRSG, and ACECs	Matt has a BS in biology from Colorado College, and an MS and PhD in zoology and physiology from the University of Wyoming. He has 24 years of sagebrush-dependent wildlife management and environmental planning experience.

Name	Role/Responsibility	Qualifications
Tia Flippin	Geospatial Analyst	Tia has a Bachelor of Science degree in Environmental Biology from Fort Lewis College and a Masters of Science degree in Geographic Informational Science and Technology from the University of Southern California. She has 10 years experience in geospatial data generation, standardization and management.

With Review and Program Support from the Following:

Name	Role/Responsibility	Qualifications
Ryan McCommon	Air	Wyoming BLM Program Leads and/or Senior Specialists for assigned areas of responsibility
Chad Mickschl	Water	
Kim Wahl	Vegetation	
Mark Goertel	Vegetation and Livestock Grazing	
Chris Keefe	Special Status Species and Wildlife	
June Wendlandt	Wild Horses and Burros	
Georges (Buck) Damone	Cultural Resources and Tribal Interests	
Reed Oldenburg	Wildland Fire Management	
Gwenan Poirier	Wildland Fire Management	
Katy Kuhnel	Lands with Wilderness Characteristics, Travel, and National Trails	
Travis Bargsten	Lands and Realty and Renewable Energy	
Kurt Triscori	Mineral Resources	
George Varhalmi	Mineral Resources	
Allen Stegeman	Mineral Resources	
Karsyn Lamb	Socioeconomics and Environmental Justice	
Susan Hunter Norman	Geospatial Analyst	

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Literature Cited

Abraham, Z. 2018. Substitute Goods: Oil and Natural Gas. Internet website: https://blog.capitalwealthadvisors.com/risk-on-risk-off/substitute-goods.

Adams, B. W., J. Carlson, D. Milner, T. Hood, B. Cairns and P. Herzog. 2004. Beneficial Grazing Management Practices for Sage-Grouse (*Centrocercus urophasianus*) and Ecology of Silver Sagebrush (*Artemisia cana*) In Southeastern Alberta. Technical Report, Public Lands and Forests Division, Alberta Sustainable Resource Development. Pub. No. T /049. 60 pp.

Adler, P. B., K. Renwick, E. Kachergis, M. Manning, T. Remington, E. Thacker, C. Aldridge, B. Bradley, A. Kleinhesselink, C. Curtis, and D. Schlaepfer. 2018. Managing Big Sagebrush in a Changing Climate. Available at: https://digitalcommons.usu.edu/cgi/viewcontent.cgi?article=2900&context=extension_curall.

Aldridge, C. L. and M. S. Boyce. 2007. Linking occurrence and fitness to persistence—A habitat-based approach for greater sage-grouse. Ecological Applications 17(2):508–526.

Aldridge, C. L. and R. M. Brigham. 2003. Distribution, abundance, and status of the greater sage-grouse, Centrocercus urophasianus, in Canada. Canadian Field-Naturalist 117:25-34.

Aldridge, C. L., S. E. Nielsen, H. L. Beyer, M. S. Boyce, J. W. Connelly, S. T. Knick, and M. A. Schroeder. 2008. Range-Wide Patterns of Greater Sage-Grouse Persistence. Diversity and Distributions 14:983-994.

Al-Hamdan, O. Z., F. B. Pierson Jr, M. A. Nearing, C. J. Williams, M. Hernandez, K. E. Spaeth, J. Boll, and M. A. Weltz. 2015. Use of RHEM to assess runoff and erosion following disturbance on rangelands [abstract]. Internet website: https://www.ars.usda.gov/research/publications/publication/?seqNo115=310640.

Allred, B. W., B. T. Bestelmeyer, C. S. Boyd, C. Brown, K. W. Davies, M. C. Duniway, L. M. Ellsworth, T. A. Erickson, S. D. Fuhlendorf, T. V. Griffiths, V. Jansen, M. O. Jones, J. Karl, A. Knight, J. D. Maestas, J. J. Maynard, S. E. McCord, D. E. Naugle, H. D. Starns, D. Twidwell, D. R. Uden. 2021. Improving Landsat predictions of rangeland fractional cover with multitask learning and uncertainty. Methods in Ecology and Evolution 12:841-849. https://doi.org/10.1111/2041-210X.13564.

Ambrose, S. C., J. O Florian, J. MacDonald, and T. Hartman. 2021. Sagebrush Soundscapes and The Effects of Gas-Field Sounds on Greater Sage-Grouse. Western Birds 52:23-46.

American Ornithologists' Union (AOU). 1983. Check-list of North American birds. 6th edition.

Anderson, P. L., R. D. McLellan, J. P. Overton, and G. L. Wolfram. 1997. Price Elasticity of Demand. McKinac Center for Public Policy. Accessed October, 13(2).

Andreasen, A. M., K. M. Stewert, W. S. Longland, and J. P. Beckmann. 2021. Prey Specialization by Cougars on Feral Horses in a Desert Environment. Journal of Wildlife Management: 85:1104-1120.

Angell, R. F. 1997. Crested Wheatgrass and Shrub Response to Continuous or Rotational Grazing. Journal of Range Management 50:160-164.

Applegate, D. H. and N. L. Owens. 2014. Oil and Gas Impacts on Wyoming's Sage-Grouse: Summarizing the Past and Predicting the Foreseeable Future. Human-Wildlife Interactions 8: 284-290.

Arizona Board of Regents. 2023. North American Sagebrush Steppe. Internet website: https://wrangle.org/ecotype/north-american-sagebrush-steppe-and-shrubland.

Audubon. 2023. Sagebrush Sparrow: Audubon Field Guide. Internet website: https://www.audubon.org/field-guide/bird/sagebrush-sparrow.

Avery, M. L., M. A. Pavelka, D. L. Bergman, D. G. Decker, C. E. Knittle, and G. M. Linz. 1995. Aversive Conditioning to Reduce Raven Predation on California Least Tern Eggs. Colonial Waterbirds 18:131–138.

Beard, T. N., D. B. Tait, and J. W. Smith. 1974. Nahcolite and Dawsonite Resources in the Green River Formation. Piceance Creek Basin, Colorado.

Baker, W. L. 2011. Pre-Euro-American and Recent Fire in Sagebrush Ecosystems. *Greater sage-grouse: ecology and conservation of a landscape species and its habitats. Studies in Avian Biology Series*. Volume 38. Pages 185–202 *in* S. T Knick and J. W Connelly editors. University of California Press, Berkeley, California, USA.

Barber, J. R., K. M. Fristrup, C. L. Brown, A. R. Hardy, L. M. Angeloni, and K. R. Crooks. 2009. Conserving the Wildlife Therein: Protecting Park Fauna from Anthropogenic Noise. Park Science 26(3):26-31.

Barbour M. G. and W. D. Billings. 2000. North American terrestrial vegetation. 2nd edition. Cambridge Massachusetts: Cambridge University Press. p 616.

Barnett, J. F. and J. A. Crawford. 1994. Pre-laying Nutrition of Sage-Grouse Hens in Oregon. Journal of Wildlife Management 47:114-118.

Bartmann, R. M., G. C. White, and L. H. Carpenter. 1992. Compensatory Mortality in a Colorado Mule Deer Population. Wildlife Monograph 121:1-39.

Bartholdt, R. 2023. Grouse and Grazing. Researchers Learn Grazing Has No Effect on Sage Grouse Nest Success. Internet website: https://www.uidaho.edu/news/feature-stories/sage-grouse-ten.

Baruch-Mordo, S., J. S. Evans, J. P. Severson, D. E. Naugle, J. D. Maestas J. M. Kiesecker, M. J. Falkowski, C. A. Hagen, and K. P. Reese. 2013. Saving Sage-Grouse from the Trees: A Proactive Solution to Reducing a Key Threat to a Candidate Species. Biological Conservation 167:233-241.

Baumgardt, J. A., K. P. Reese, J. W. Connelly, and E. O. Garton. 2017. Visibility Bias for Sage-Grouse Lek Counts. Wildlife Society Bulletin 41(3):461–470.

Bartis, T. J., T. LaTourrette, L. Dixon, D. J. Peterson, G. Cecchine. 2005. Oil Shale Development in the US Prospects and Policy Issues. RAND Corporation. Internet website: https://www.rand.org/content/dam/rand/pubs/monographs/2005/RAND_MG414.pdf.

Baxter, R. J., J. T. Flinders, and D. L. Mitchell. 2008. Survival, Movements, and Reproduction of Translocated Greater Sage-Grouse in Strawberry Valley. Journal of Wildlife Management 72:179-186.

Beck, J. L., M. C. Milligan, K. T. Smith, P. A. Street, A. C. Pratt, C. P. Kirol, C. P. Wanner, J. D. Hennig, J. B. Dinkins, J. D. Scasta, and P. S. Coates. 2024. Free-roaming Horses Exceeding Appropriate Management Levels Affect Multiple Vital Rates in Greater Sage-Grouse. Journal of Wildlife Management: e22669.

Beck, J. L., and D. L. Mitchell. 1997. Brief Guidelines for Maintaining and Enhancing Sage-Grouse Habitat on Private Lands in Utah. Utah technical notes: UT190-7-3. US Natural Resources Conservation Service, Salt Lake City, Utah.

_____. 2000. Influences of livestock grazing on sage grouse habitat. Wildlife Society Bulletin 28:993-1002.

Becker, J. M., C. A. Duberstein, J. D. Tagestad, and J. L. Downs. 2009. Sage-Grouse and Wind Energy: Biology, Habits, and Potential Effects from Development. Prepared for the US Department of Energy by Pacific Northwest Energy. PNNL-18567.

Beetle, A. A. 1960. A study of Sagebrush. Bulletin 368. Laramie, WY: University of Wyoming Agricultural Experiment Station.

Beetle, A. A. and W. M. Johnson. 1982. Sagebrush in Wyoming. Bulletin 779. University of Wyoming Agricultural Experiment Station. Laramie, WY.

Beever, E. A. 1999. Species-and Community-Level Responses to Disturbance Imposed by Feral Horse Grazing and Other Management Practices. University of Nevada, Reno.

Beever, E. A. 2003. Management Implications of the Ecology of Free-Roaming Horses in Semi-Arid Ecosystems of the Western United States. Wildlife Society Bulletin, 887-895.

Beever, E. A. and C. L. Aldridge. 2011. Influences of Free-Roaming Equids on Sagebrush Ecosystems, with a Focus on Greater Sage-Grouse. In Greater grouse: Ecology and conservation of a landscape species and its habitats (S. T. Knick and J. W. Connelly, editors). Studies in Avian Biology 38:273-290. University of California Press, Berkeley.

Beever E. A. and P. F. Brussard. 2000. Examining Ecological Consequences of Feral Horse Grazing Using Exclosures. Western North American Naturalist 60: 236-254.

Beever E. A., R. J. Tausch, and W. E. Thogmartin. 2008. Multi-Scale Response of Vegetation to Removal of Horse Grazing from Great Basin (USA) Mountain Ranges. Plant Ecology 196:163-184.

Behnke, R. J. 1979. Monograph of the Native Trouts of the Genus Salmo of Western North America. United States Forest Service, Lakewood, Colorado.

Belmecheri, S., F. Babst, E. R. Wahl, D. W. Stahle, and V. Trouet. 2015. Multi-Century Evaluation of Sierra Nevada Snowpack. Nature Climate Change 6:2-3.

Belnap, J., J. H. Kaltnecker, R. Rosentreter, J. Williams, S. Leonard, and D. Eldridge. 2001. Biological Soil Crusts: Ecology and Management. US Department of Interior, BLM Technical Reference 1730-2, 119.

Bennett, D. and J. A. Suhr Pierce. 2021. Chapter B. Human dimensions of sagebrush. In: Remington, T.E., Deibert, P.A., Hanser, S.E., Davis, D.M., Robb, L.A., and Welty, J.L., Sagebrush conservation strategy Challenges to sagebrush conservation: U.S. Geological Survey Open-File Report 20201125, Reston, VA, USA, 1115, https://doi.org/10.3133/ofr20201125.

Bengston, G. 2003. Northern Paiute and Western Shoshone Land Use in Northern Nevada: A Class I Ethnographic/Ethnohistoric Overview. BLM Cultural Resource Series No. 12. Prepared for the BLM, Nevada State Office, Reno, Nevada. Available online: https://www.blm.gov/sites/default/files/documents/files/Library_Nevada_CulturalResourceSeries12.pdf. Accessed January 31, 2023.

Berryhill, Jr. H. B., D. M. Brown, A. Brwon, and D. A. Taylor. 1950. Coal Resources of Wyoming. United States Department of Interior, Geological Survey Circular 81. Washington, DC.

Beschta, R. L. 1997. Riparian Shade and Stream Temperature; An Alternative Perspective. Rangelands 19(2):25-28.

Beschta, R. L., D. L. Donahue, D. A. DellaSala, J. J. Rhodes, J. R. Karr, M. H. O'Brien, T. L. Fleischner, and C. D. Williams. 2014. Reducing Livestock Effects on Public Lands in the Western United States as the Climate Changes: A Reply to Svejcar et al. Environmental Management DOI 10.1007/s00267-014-0263-5.

Blickley, J. L. and G. L. Patricelli. 2012. Potential acoustic masking of greater sage-grouse display components by chronic industrial noise. Ornithological Monographs 74:23-35.

Blickley J. L., D. Blackwood, and G. L. Patricelli. 2012a. Experimental evidence for the effects of chronic anthropogenic noise on abundance of greater sage-grouse at leks. Conservation Biology 26: 461-471.

Blickley, J. L., K. R. Word, A. H. Krakauer, J. L. Phillips, S. N. Sells, C. C. Taff, J. C. Wingfield, G. L Patricelli. 2012b. Experimental chronic Noise is Related to Elevated Fecal Corticosteroid Metabolites in Lekking Male Greater Sage-Grouse (*Centrocercus urophasianus*). PLoS ONE 7(11): e50462.

Blomberg, E. J, J. S. Sedinger, D. V. Nonne, and M. T. Atamian. 2013. Seasonal Reproductive Costs Contribute to Reduced Survival of Female Greater Sage-Grouse. Journal of Avian Biology 44(2):149-158.

Boarman, W. I. 1992. Problems With Management of a Native Predator on a Threatened Species: Raven Predation on Desert Tortoises. Proceedings: Vertebrate Pest Conference 15:48–52. Davis, California.

_____. 2003. Managing a Subsidized Predator Population: Reducing Common Raven Predation on Desert Tortoises. Environmental Management 32:205–217.

Boarman, W. I. and B. Heinrich. 1999. Common Raven (*Corvus corax*). In *The Birds of North America* 476 (Poole, A. and F. Gill Editors). Academy of Natural Sciences, Philadelphia, PA, USA, and American Ornithologists' Union, Washington, DC, USA.

Boarman, W. I., M. A. Patten, R. J. Camp, and S. J. Collis. 2006. Ecology of a Population of Subsidized Predators: Common Ravens in the Central Mojave Desert, California. Journal of Arid Environments 67:248–261.

Boden, T. and B.T. Tripp. 2012. Gilsonite Veins of the Uinta Basing, Utah. Utah Geological Survey. A Division of Utah Department of Natural Resources. Special Study 141. Internet website: https://ugspub.nr.utah.gov/publications/special_studies/ss-141.pdf.

Bondarenko, P. 2024. Unemployment Rate. Britannica Money. Internet website: https://www.britannica.com/money/unemployment-rate.

Boyko, A. R., R. M. Gibson, and J. R. Lucas. 2004. How Predation Risk Affects the Temporal Dynamics of Avian Leks: Greater Sage Grouse versus Golden Eagles. The American Naturalist 163(1):154-165.

Boyd, C. S., D. D. Johnson, J. D. Kerby, T. J. Svejcar, and K. W. Davies. 2014. Of grouse and Golden Eggs: Can Ecosystems Be Managed Within a Species-Based Regulatory Framework? Rangeland Ecology and Management 67(4):358-368.

Bradbury, J. W., R. M. Gibson, C. E. McCarthy, and S. L. Vehrencamp. 1989. Dispersion of Displaying Male Sage Grouse: II. The Role of Female Dispersion. Behavior Ecology and Sociobiology 24:15-24.

Bradley, B. A., Curtis, C. A., Chambers, J. C. 2016. Bromus Response to Climate and Projected Changes with Climate Change. In: Germino, M., Chambers, J., Brown, C. (eds) Exotic Brome-Grasses in Arid and Semiarid Ecosystems of the Western US. Springer Series on Environmental Management. Springer, Cham. https://doi.org/10.1007/978-3-319-24930-8_9.

Braun, C. E. 1998. Sage-grouse Declines in Western North America: What are the problems? Proceedings of Western Association of Fish and Wildlife Agencies (WAFWA). Pp. 139-156.

Braun, C. E., M. F. Baker, R. L. Eng, J. S. Gashwiler, and M. H. Schroeder. 1976. Conservation committee Report on Effects of Alteration of Sagebrush Communities on the Associated Avifauna. The Wilson Bulletin 88(1): 165–171.

British Columbia. 2023. Forest Fires and Air Quality - Province of British Columbia. Internet website: https://www2.gov.bc.ca/gov/content/environment/air-land-water/air/air-pollution/smoke-burning/forest-fires-air-quality.

Briske, D. D., J. D. Derner, J. R. Brown, S. D. Fuhlendorf, W. R. Teague, K. M. Havstad, R. L. Gillen, A. J. Ash, and W. D. Willms. 2008. Rotational Grazing on Rangelands: Reconciliation of Perception and Experimental Evidence. Rangeland Ecology and Management 61:3-17.

Briske, D. D., J. D. Derner, D. G. Milchunas, and K. W. Tate. 2011. An Evidence-Based Assessment of Prescribed Grazing Practices. In: D.D. Briske (ed.). Conservation benefits of rangeland practices: Assessment, recommendations, and Knowledge Gaps. United States Department of Agriculture, Natural Resources Research Service. pp. 21-74.

Briske, D. D., S. D. Fuhlendorf, and F. E. Smeins. 2003. Vegetation Dynamics on Rangelands: A Critique of the Current Paradigms. Journal of Applied Ecology 40:601-614.

Briske, D. D. and J. R. Hedrickson. 1998. Does Selective Defoliation Mediate Competitive Interactions in a Semiarid Savanna? A Demographic Evaluation. Journal of Vegetation Science 9:611-622.

Brooks, M. L. and J. C. Chambers. 2011. Resistance to Invasion and Resilience to Fire in Desert Shrublands of North America. Rangeland Ecology and Management 64:431–438.

Bromley, M. 1985. Wildlife Management Implications of Petroleum Exploration and Development in Wildland Environments. U.S. Department of Agriculture, Forest Service, Intermountain Research Station, General Technical Report INT-191. Ogden, Utah.

Brown, G. W. 1969. Predicting Temperatures of Small Streams. Water Resources Research 5(1):68-75.

Brown, K. G. and K. M. Clayton. 2004. Ecology of the Greater Sage-Grouse (*Centrocercus urophasianus*) in the Cola Mining landscape of Wyoming's Powder River Basin: Thunderbird Wildlife Consulting, Inc, 29 p.

Brownfield, M. E., T. J. Mercier, R. C. Johnson, and J. G. Self. 2010. Nahcolite Resources in the Green River Formation, Piceance Basin, Colorado: U.S. Geological Survey Digital Data Series DDS–69–Y.

Brussee, B. E., Coates, P. S., Ricca, M. A., Chenaille, M. P. 2019. Spatially Explicit Modeling of Annual and Seasonal Habitat for Greater Sage-Grouse (*Centrocercus urophasianus*) in Northeastern California: U.S. Geological Survey data release, https://doi.org/10.5066/P99E64Y4.

Bui, T. D., J. M. Marzluff, and B. Bedrosian. 2010. Common Raven Activity in Relation to Land Use in Western Wyoming: Implications for Greater Sage-Grouse Reproductive Success. Condor 112:65-78.

Baxter, R. J., K. D. Bunnell, J. T. Flinders, and D. L. Mitchell. 2000. Impacts of Predation on Greater Sage-Grouse in Strawberry Valley, Utah. Journal of Wildlife Management, 64(1):182-191.

BLM (Bureau of Land Management). 1984. BLM Manual 8400: Visual Resource Management. Washington, DC: Bureau of Land Management.

_____. 1986a. BLM Manual 8410-1: Visual Resource Inventory. Washington, DC: Bureau of Land Management.

_____. 1986b. BLM Manual 8431-1: Visual Resource Contrast Rating. Washington, DC: Bureau of Land Management.

_____. 2003. Summary of the Management Situation Analysis, Kemmerer Field Office Planning Area. Kemmerer, Wyoming.

_____. 2004a. Mineral Occurrence and Development Potential Report, Casper Field Office Planning Area. Casper, Wyoming.

_____. 2004b. BLM-M-8100, The Foundations for Managing Cultural Resources. December 3, 2004. Washington, DC.

_____. 2005. The BLM Land Use Planning Handbook.

_____. 2007. United States Department of the Interior and United States Department of Agriculture. Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development. BLM/WO/ST-06/021+3071/REV 07. Bureau of Land Management. Denver, Colorado. 84 pp.

_____. 2009. Approved Resource Management Plan Amendments/Record of Decision (ROD) for Designation of Energy Corridors on Bureau of Land Management-Administered Lands in the 11 Western States. Washington, DC. January 2009.

_____. 2012. Summary of Nevada-Northeast California Sub-Region Economic Strategies Workshop: Carson City, Nevada, June 28, 2012.

_____. 2013a. Rapid Ecoregional Assessment Sage-Grouse Package. Northern Great Basin Ecoregion.

_____. 2013b. Bureau of Land Management Socioeconomics Program Guidance: Economic Methods for Estimating Nonmarket Environmental Values. Internet website: https://www.blm.gov/sites/blm.gov/files/uploads/IM2013-131_a1.chg1_.pdf.

_____. 2013c. Approved Land Use Plan Amendments Record of Decision (ROD) for Allocation of Oil Shale and Tar Sands Resources on Lands Administered by the Bureau of Land Management in Colorado, Utah, and Wyoming and Final Programmatic Environmental Impact Statement. Internet website: https://eplanning.blm.gov/public_projects/lup/65266/79042/91307/2013_Oil_Shale_PEIS_ROD.pdf.

_____. 2014. BLM Handbook H-8320-1. BLM, Washington, DC.

_____. 2015a. Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region, Including the Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah. Internet website: https://eplanning.blm.gov/public_projects/lup/21152/63385/68727/Great_Basin_ROD_9.21.15_508.pdf.

_____. 2015b. Record of Decision and Approved Resource Management Plan Amendments for the Rocky Mountain Region, Including the Greater Sage-grouse Sub-Regions of Lewistown, North Dakota, Northwest Colorado, Wyoming, and the Approved Resource Management Plans for Billings, Buffalo, Cody, HiLine, Miles City, Pompeys Pillar National Monument, South Dakota, and Worland. Internet website: https://eplanning.blm.gov/public_projects/lup/105596/143663/176863/2015_Rocky_Mountain_Region_Record_GRSG_ROD_ARMPA_508.pdf.

_____. 2019a. BLM Recreation and Visitor Services Program. Internet website: https://www.blm.gov/sites/blm.gov/files/program_recreation_homepage_ConnectingWithCommunitiestrategy_0.pdf.

_____. 2019b. BLM Travel and Tourism Management Plan https://www.blm.gov/sites/blm.gov/files/documents/BLM-Travel-Tourism-Action-Plan.pdf.

_____. 2019c. Connecting with Communities. BLM Recreation Strategy. Internet website: https://www.blm.gov/sites/default/files/docs/2021-09/Connecting-With-Communities.pdf.

_____. 2019d. Idaho Greater Sage-Grouse Record of Decision and Approved Resource Management Plan Amendment. Boise, Idaho.

_____. 2019e. Nevada and Northeastern California Greater Sage-Grouse Record of Decision and Approved Resource Management Plan Amendment. Reno, Nevada.

_____. 2019f. Northwest Colorado Greater Sage-Grouse Record of Decision and Approved Resource Management Plan Amendment. Lakewood, Colorado.

_____. 2019g. Oregon Greater Sage-Grouse Record of Decision and Approved Resource Management Plan Amendment.

_____. 2019h. Record of Decision and Approved Utah Greater Sage-Grouse Resource Management Plan Amendment. Salt Lake City, Utah.

_____. 2019i. Wyoming Greater Sage-Grouse Record of Decision and Approved Resource Management Plan Amendment.

_____. 2020a. 2020 BLM Specialist Report on Annual Greenhouse Gas Emissions and Climate Trends from Coal, Oil, and Gas Exploration and Development on the Federal Mineral Estate. Internet website: https://www.blm.gov/noc/blm-library/report/2020-blm-specialist-report-annual-greenhouse-gas-emissions-and-climate#:~:text=The%20%222020%20BLM%20Specialist%20Report,BLM)%20authorized%20coal%2C%20oil%2C.

_____. 2020b. Nevada and Northeastern California Greater Sage-Grouse Proposed Land Use Plan Amendment/Final EIS. Internet website: https://eplanning.blm.gov/eplanning-ui/project/103343/570.

_____. 2020c. Oregon Greater Sage-Grouse Proposed RMPA/Final EIS. Internet website: https://eplanning.blm.gov/eplanning-ui/project/103348/570.

_____. 2021a. Conducting Wilderness Characteristics Inventory on BLM Lands. Manual 6310. Release 6-138. Washington, DC: U.S. Department of the Interior, Bureau of Land Management.

_____. 2021b. Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process. Manual 6320. Release 6-139. Washington, DC: U.S. Department of the Interior, Bureau of Land Management.

_____.2021c. Wind Energy Rights-of-Way (ROW) on Public Lands. October 2021. Internet website: https://www.blm.gov/sites/default/files/docs/2021-11/PROJECT%20LIST%20WIND_October%202021.pdf.

_____. 2022b. Interior Department Outlines Roadmap for Continued Renewable Energy Progress on Public Lands. Internet website: https://www.doi.gov/pressreleases/interior-department-outlines-roadmap-continued-renewable-energy-progress-public-lands.

_____. 2022c. Addressing Environmental Justice in NEPA Documents: Frequently Asked Questions. Internet website: https://www.blm.gov/sites/default/files/docs/2022-09/IM2022-059_att1.pdf.

_____. 2022d. Solar Energy Rights-of-Way (ROW) on Public Lands – as of 12/28/2022. Internet website: https://www.blm.gov/sites/default/files/docs/2023-03/PROJECT_LIST_SOLAR_FY2022.pdf.

_____. 2023. The Bureau of Land Management's Blueprint for 21st Century Outdoor Recreation. U.S. Department of the Interior, Bureau of Land Management, Division of Recreation and Visitor Services, Washington, DC. Internet website: https://www.blm.gov/sites/default/files/docs/2023-08/Blueprint%20for%2021st%20Century%20Outdoor%20Recreation508.pdf.

_____. 2024a. Herd Area and Herd Management Area Statistics as of March 1, 2024. Internet website: https://www.blm.gov/sites/default/files/docs/2024-03/2024_HMA-HA_PopStats_2-29-2024_COMBINED_Clean_FINAL_web.pdf.

_____. 2024b. Fluid Mineral Specialist Report on Concurrent Land Use Planning Efforts in Colorado. BLM Colorado State Office. Lakewood, Colorado.

BLM GIS (Bureau of Land Management GIS). 2023. GIS data used in developing the EIS. BLM National Operations Center. Denver, Colorado.

_____. 2024. GIS data used in developing the EIS. BLM National Operations Center. Denver, Colorado.

Bunting, S., C. Kilgore, M. Bruce, and C. L. Bushey. 1987. Guidelines for prescribed burning sagebrush-grass rangelands in the northern Great Basin. Gen. Tech. Rep. INT-231. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Research Station. 33 p.

Bunting, S. C., E. F. Peters, and D. B. Sapsis. 1994. Impact of Fire Management on Rangelands of the Intermountain West. Scientific Contract Report: Science Integration Team, Terrestrial Staff, Range Task Group. Walla Walla, WA. Interior Columbia Basin Ecosystem Management Project.

Bureau of Land Management and US Department of Energy. 1997. Standards and Guidelines for Livestock Grazing Administration (43 CFR, Part 4180.2 (b)).

_____. 2012. Final Programmatic Environmental Impact Statement (PEIS) for Solar Energy Development in Six Southwestern States. Washington, DC. July 2012.

Bureau of Land Management and Forest Service (United States Department of the Interior, Bureau of Land Management and United States Department of Agriculture, Forest Service). 2012. National Greater Sage-Grouse Planning Strategy Land Use Plan Amendments and EISs Scoping Summary Report. Internet Web site: https://eplanning.blm.gov/public_projects/lup/36511/43228/46290/GSG_ScopingReport_508.pdf.

_____. 2015. Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS. Chapter 6.2.1 Native American Tribal Consultation. Internet website: https://eplanning.blm.gov/public_projects/lup/103343/143719/176933/11_Volume_3_Chapter_6_NVCA_GRSG.pdf.

Burdick, J., S. Swanson, S. Sebastian, and S. Mccue. 2021. Lentic meadows and riparian functions impaired after horse and cattle grazing. The Journal of Wildlife Management 85(6):1121-1131.

Burgex Mining Consultants. 2016. What are locatable minerals? Internet website: https://burgex.com/2016/01/21/what-are-locatable-minerals/.

Burkhalter, C., M. J. Holloran, B. C. Fedy, H. E. Copeland, R. L. Crabtree, N. L. Michel, S. C. Jay, B. A. Rutledge, and A. G. Holloran. 2018. Landscape-scale habitat assessment for an imperiled avian species. Animal Conservation 21(3):241-251.

Calfee, R. and E. Little. 2003. Effects of a fire-retardant chemical to fathead minnows in experimental streams. Environmental Science and Pollution Research International 10:296-300.

Cane, J. H. and L. Kervin. 2013. Utah Pests Fact Sheet. Gardening for Native Bees in Utah and Beyond. Utah State University Extension and Utah Plant Pest Diagnostic Laboratory. Logan, Utah.

Carothers, S. W., M. E. Stitt, and R. R. Johnson. 1976. Feral asses on public lands: An analysis of biotic impact, legal considerations and management alternatives. North American Wildlife Conference. 41: 396–405.

Carr, N. B., S. L. Garman, A. Walters, A. Ray, C. P. Melcher, J. S. Wesner, M. S. O'Donnell, K. R. Sherrill, N. C. Babel, and Z. H. Bowen. 2013. Wyoming Basin Rapid Ecoregional Assessment work plan: U.S. Geological Survey Open-File-Report 2013–1223, 58 p. Internet website: https://doi.org/10.3133/ofr20131223.

Carroll J. C. 2005. Colorado Coal Directory with Statistics on Electric Generation and Map of Coal Production and distribution. Colorado Geological Survey. Department of Natural Resources. Denver, Colorado. Information Series 71.

Carter, S. K., R. S. Arkle, H. L. Bencin, B. R. Harms, D. J. Manier, A. N. Johnston, S. L. Phillips, S. E. Hanser, and Z. H. Bowen. 2020. Annotated Bibliography of Scientific Research on Greater Sage-Grouse Published From 2015 to 2019: U.S. Geological Survey Open-File Report 2020–1103, 264 p., accessed September 1, 2022, at https://doi.org/10.3133/ofr20201103.

Casazza, M. L., P. S. Coates, and C. T. Overton. 2011. Linking habitat selection and brood success in Greater Sage-Grouse. Pp. 151-167 in Sandercock, B.K., K. Martin, and G. Segelbacher, editors. Ecology, Conservation, and Management of Grouse. Studies in Avian Biology 39. University of California Press, Berkeley, California, USA, Pp. 151-167.

Casey, N. H. 2023. Livestock adaption to climate. Animal Frontiers 13(5):3-5.

Caudill D., M. R. Guttery, E. Leone, G. Caudill, and T. A. Messmer. 2016. Age-dependence and individual heterogeneity in reproductive success of Greater Sage-Grouse. Journal of Avian Biology 47(5): 719–723.

Clark, L., J. Hall, R. McLean, M. Dunbar, K. Klenk, R. Bowen, and C. A. Smeraski. 2006. Susceptibility of Greater Sage-Grouse to experimental infection with West Nile virus. Journal of Wildlife Diseases 42:14-42.

Chambers, J. C., R. F. Miller, D. I. Board, J. B. Grace, D. A. Pyke, B. A. Roundy, E. W. Schupp, R. J. Tausch. 2014a. Resilience and Resistance of Sagebrush Ecosystems: Implications for State and Transition Models and Management Treatments. Rangeland Ecology and Management 67:440–454.

Chambers, J. C., D. A. Pyke, J. D. Maestas, M. Pellant, C. S. Boyd, S. B. Campbell, S. Espinosa, D. W. Havlina, K. E. Mayer, A. Wuenschel. 2014b. Using resistance and resilience concepts to reduce impacts of invasive annual grasses and altered fire regimes on the sagebrush ecosystem and Greater Sage-Grouse: A Strategic Multi-Scale Approach. Gen. Tech. Rep. RMRS-GTR-326. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 73 p.

Chambers, J. C., J. L Beck, J. B. Bradford, J. Bybee, S. Campbell, J. Carlson, T. J. Christiansen, K. J. Clause, G. Collins, M. R. Crist, J. B. Dinkins, K. E. Doherty, F. Edwards, S. Espinosa, K. A. Griffin, P. Griffin, J. R. Haas, S. E. Hanser, D. W. Havlina, K. F. Henke, J. D. Hennig, L. A. Joyce, F. M. Kilkenny, S. M. Kulpa, L. L. Kurth, J. D. Maestas, M. Manning, K. E. Mayer, B. A. Mealor, C. McCarthy, M. Pellant, M. A. Perea, K. L. Prentice, D. A. Pyke, L. A. Wiechman, A. Wuenschel. 2017. Science framework for conservation and restoration of the sagebrush biome—Linking the Department of the Interior's Integrated Rangeland Fire Management Strategy to long-term strategic conservation actions. Part 1, Science basis and applications: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, General Technical Report RMRS-GTR-360, 213 p., https://www.fs.fed.us/rmrs/publications/science-framework-conservation-and-restoration-sagebrush-biome-linking-department.

Chambers, J. C., J. D. Maestas, D. A. Pyke, C. S. Boyd, M. Pellant, and A. Wuenschel. 2017. Using resilience and resistance concepts to manage persistent threats to sagebrush ecosystems and greater sage-grouse. Rangeland Ecology and Management. 70:149-164.

Chambers J. C., J. L. Brown, J. B. Bradford, D. I. Board, S. B. Campbell, K. J. Clause, B. Hanberry, D. R. Schlaepfer, A. K. Urza. 2023. New indicators of ecological resilience and invasion resistance to support prioritization and management in the sagebrush biome, United States. Frontiers in Ecology and Evolution 10:1009268. doi: 10.3389/fevo.2022.1009268.

Chen, W., D. Huang, N. Liu, Y. Zhang, W. B. Badgery, X. Wang, and Y. Shen. 2015. Improved grazing management may increase soil carbon sequestration in temperate steppe. Scientific Reports 5: 10892.

Cho, H. 2020. The Airborne Toxic Event: The Effects of Socioeconomic Characteristics on Ambient Air Pollution and the Decision to Over Pollute. Honors Thesis.

Clark, L., J. Hall, R. McLean, M. Dunbar, K. Klenk, R. Bowen, and C. A. Smeraski. 2006. Susceptibility of Greater Sage-Grouse to Experimental Infection with West Nile virus. Journal of Wildlife Diseases 42:14-42.

Coates, P. S. 2007. Greater Sage-Grouse (*Centrocercus urophasianus*) Nest Predation and Incubation Behavior. Idaho State University, Boise.

Coates, P. S. and D. J. Delehanty. 2010. Nest predation of greater sage-grouse in relation to microhabitat factors and predators. The Journal of Wildlife Management 74(2):240-248.

Coates, P. S., M. L. Casazza, E. J. Blomberg, S. C. Gardner, S. P. Espinosa, J. L. Yee, L. Wiechman, and B. J. Halstead. 2013. Evaluating greater sage-grouse seasonal space use relative to leks: implications for surface use designations in sagebrush ecosystems. The Journal of Wildlife Management 77(8):1598-1609.

Coates, P. S., M. A. Ricca, B. G. Prochazka, K. E. Doherty, M. L. Brooks, and M. L. Casazza. 2015. Long-Term effects of wildfire on greater sage-grouse—integrating population and ecosystem concepts for management in the great basin: U.S. Geological Survey Open-File Report 2015–1165, 42 p., accessed December 2017 at https://doi.org/10.3133/ofr20151165.

Coates, P. S., B. E. Brussee, K. B. Howe, K. B. Gustafson, M. L. Casazza, and D. J. Delehanty. 2016. Landscape characteristics and livestock presence influence common ravens: relevance to greater sage-grouse conservation. Ecosphere 7(2):e01203. 10.1002/ecs2.1203.

Coates, P. S., B. E. Brussee, M. A. Ricca, J. E. Dudko, B. G. Prochazka, and S. P. Espinosa. 2017. Greater Sage-Grouse (*Centrocercus urophasianus*) Nesting and brood-rearing microhabitat in Nevada and California—spatial variation in selection and survival patterns: U.S. Geological Survey Open-File Report 2017–1087, 79 p., accessed December 2017 at https://doi.org/10.3133/ofr20171087.

Coates, P. S., S. T. O'Neil, B. E. Brussee, M. A. Rica, P. J. Jackson, J. B. Dinkins, K. B. Howe, A. M. Moser, L. J. Foster, and D. J Delehanty. 2020. Broad-scale impacts of an invasive native predator on a sensitive native prey species within the shifting avian community of the North American great basin. Biological Conservation 243:108409.

Coates P. S., S. T. O'Neil, D. A. Munoz, I. A. Dwight, and J. C. Tull. 2021a. Sage-grouse population dynamics are adversely affected by overabundant feral horses. Journal of Wildlife Management 85:132-1149.

Coates, P. S., B. G. Prochazka, M. S. O'Donnell, C. L. Aldridge, D. R. Edmunds, A. P. Monroe, M. A. Ricca, G. T. Wann, S. E. Hanser, L. A. Wiechman, and M. P. Chenaille. 2021b. Range-wide GRSG hierarchical monitoring framework—implications for defining population boundaries, trend estimation, and a targeted annual warning system: U.S. Geological Survey Open-File Report 2020–1154, 243 p., https://doi.org/10.3133/ofr20201154.

Coates, P. S., B. G. Prohazka, S. T. O'Neil, S. C. Webster, S. Espinosa, M. A. Ricca, S. R. Mathews, M. Casazza, and D. J. Delehanty. 2023. Geothermal energy production adversely affects a sensitive indicator species within sagebrush ecosystems in western North America. Biological Conservation 280:109889

Colorado Greater Sage-Grouse Steering Committee. 2008. Colorado Greater Sage-Grouse Conservation Plan: Denver, Colo., Colorado Division of Wildlife, at http://cpw.state.co.us/learn/Pages/GreaterSagegrouseConservationPlan2.aspx.

Connelly, J. W., H. W. Browers, and R. J. Gates. 1988. Seasonal movements of sage grouse in southeastern Idaho. The Journal of Wildlife Management 52(1):1988.

Connelly, J. W. and L. A. Doughty.1989. Sage Grouse use of wildlife water developments in southeastern Idaho. Pages 167–173 in S. Stiver and G. Tsukomoto, editors. Symposium on wildlife water developments. Nevada Department of Fish and Game, Reno, USA.

Connelly, J. W., A. D. Apa, R. B. Smith, and K. P. Reese. 2000a. Effects of predation and hunting on adult Sage-Grouse *Centrocercus urophasianus* in Idaho. Wildlife Biology 6:227-232.

Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000b. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.

Connelly, J. W., K. P. Reese, and M. A. Schroeder. 2003. Monitoring of greater sage-grouse habitats and populations. University of Idaho College of Natural Resources Experiment Station Bulletin, Bulletin 80. University of Idaho, Moscow, Idaho.

Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver. 2004. Conservation assessment of greater sage-grouse and sagebrush habitats. Western Association of Fish and Wildlife Agencies (WAFWA).

Connelly, J. W., C. A. Hagen, and M. A. Schroeder. 2011a. Characteristics and dynamics of greater sage-grouse populations. Studies in Avian Biology 38:53-67.

Connelly, J. W., E. T. Rinkes, and C. E. Braun. 2011b. Characteristics of greater sage-grouse habitats: A landscape species at micro and macro scales. in: greater sage-grouse: ecology and conservation of a landscape species and its habitats (S. T. Knick and J. W. Connelly, editors). Studies in Avian Biology 38:69-83. University of California Press, Berkeley.

Connelly J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000a. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.

Connelly, J. W., A. D. Apa, R. B. Smith, and K. P. Reese. 2000b. Effects of Predation and Hunting on Adult Sage Grouse *Centrocercus urophasianus* in Idaho. Wildlife Biology 6(4):227-232.

Cohn, J. P. 2008. How Ecofriendly Are Wind Farms? BioScience 58(7):576-578.

Congressional Research Service (CRS). 2022. Wild Horse and Burro Management: Overview of Costs. Internet website: https://crsreports.congress.gov/product/pdf/IF/IF11060.

Conover, M. R., J. S. Borgo, R. E. Dritz, J. B. Dinkins, and D. K. Dahlgren. 2010. Greater sage-grouse select nest sites to avoid visual predators but not olfactory predators. The Condor 112(2):331-336.

Conover, M. R. and A. J. Roberts. 2017. Predators, predator removal, and sage-grouse: A review. The Journal of Wildlife Management 81(1):7-15.

Conway, C. J., E. O. Garton, G. H. Dicus, and J. J. Lonneker. 2018. Sage-grouse habitat on Craters of the Moon National Monument and Preserve. Report by University of Idaho and National Park Service.

Cook, A. A., P. A. Deibert, S. P. Espinosa, A. Moser, L. Schreiber, and M. A. Schroeder. 2022. Greater Sage-grouse Range-wide Population Monitoring Guidelines Part A: Standards for Collection and Reporting of Greater Sage-grouse Lek Count Data. WAFWA Sage- and Columbian Sharp-tailed Grouse Technical Team, Boise, Idaho.

CPW (Colorado Department of Natural Resources, Parks and Wildlife, formerly Colorado Division of Wildlife). 2011. Internet Web site: http://wildlife.state.co.us/SiteCollectionDocument/DOW/LandWater/COWildlifeHabitatProtection Program/HabitatDefinitions.pdf.

Crawford, J. A., R. A. Olson, N. E. West, J. C. Mosley, M. A. Schroder, T. D. Whitson, R. F. Miller, M. A. Gregg, and C. S. Boyd. 2004. Ecology and management of sage-grouse and sage-grouse habitat. Journal of Range Management 57:2-19.

Crist, M. R., J. C. Chambers, S. L. Phillips, K. L. Prentice, and L. A. Wiechman, 2019. Science framework for conservation and restoration of the sagebrush biome: linking the Department of the Interior's integrated rangeland fire management strategy to long-term strategic conservation actions. Part 2. Management applications.

Cross, T. B., D. E. Naugle, J. C. Carlson, and M. K. Schwartz, 2016. Hierarchical population structure in greater sage- grouse provides insight into management boundary delineation. Conservation Genetics 17(6):1417–1433.

_____. 2017. Genetic recapture identifies long-distance breeding dispersal in greater sage-grouse (*Centrocercus urophasianus*) The Condor 119(1):155–166.

Cross, T. B., M. K. Schwartz, D. E. Naugle, B. C. Fedy, J. R. Row, and S. J. Oyler-McCance. 2018. The genetic network of GRSG: range-wide identification of keystone hubs of connectivity. Ecology and Evolution 8(11):5394-5412.

Cross, T. B., J. D. Tack, D. E. Naugle, M. K. Schwartz, K. E. Doherty, S. J. Oyler-McCance, R. D. Pritchert, and B. C. Fedy. 2023. The ties that bind the sagebrush biome: integrating genetic connectivity into range-wide conservation of greater sage-grouse. Royal Society Open Science 10:220437. https://doi.org/10.1098/rsos.220437.

Crowell, M. M., L. A. Shipley, M. J. Camp, J. L. Rachlow, J. S. Forbey, and T. R. Johnson. 2016. Selection of Food Patches by Sympatric Herbivores in Response to Concealment and Distance from a Refuge. Ecol Evol, 6: 2865-2876. Internet website: https://doi.org/10.1002/ece3.1940.

Dahlgren, D. K., R. T. Larsen, R. Danvir, G. Wilson, E. T. Thacker, T. A. Black, D. E. Naugle, J. W. Connelly, and T. A. Messmer. 2015. Greater sage-grouse and range management—Insights from a 25-Year Case Study in Utah and Wyoming. Rangeland Ecology and Management 68(5):375–382.

Dahlgren, D. K., T. A. Messmer, B. A. Crabb, R. T. Larsen, T. A. Black, S. N. Frey, E. T. Thacker, R. J. Baxter, and J. D. Robinson. 2016. Seasonal movements of greater sage-grouse populations in Utah—implications for species conservation. Wildlife Society Bulletin 40(2):288–299.

D'Antonio, C. M. and P. M. Vitousek. 1992. Biological invasions by exotic grasses, the grass/fire cycle, and global change. Annual Review of Ecology and Systematics 23:63-87.

Dardis, M., S. Dailey, L. Smith, T. Sue, and A. Shaw. 2016. Greater Sage-grouse Wildfire, Invasive Plant Species, and Conifer Encroachment Assessment. United States Department of Agriculture Forest Service. Internet website: fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd529508.pdf.

Davies, K. W., J. D. Bates, and J. J. James. 2009. Microsite and herbaceous vegetation heterogeneity after burning Artemisia tridentata steppe. Oecologia, 159(3), 597-606.

Davies, K. W., J. D. Bates, T. J. Svejcar, and C. S. Boyd. 2010. Effects of long-term livestock grazing on fuel characteristics in rangelands: an example from the sagebrush steppe. *Rangeland Ecology & Management*, *63*(6), 662-669.

Davies, K. W., J. D. Bates, and C. S. Boyd. 2016. Effects of intermediate-term grazing rest on sagebrush communities with depleted understories: evidence of a threshold. Rangeland Ecology & Management, 69(3), 173-178.

Davies, K. W., A. Gearhart, C. S. Boyd, and J. D. Bates. 2017. Fall and spring grazing influence fire ignitability and initial spread in shrub steppe communities. International Journal of Wildland Fire, 26(6), 485-490.

Davies, I. P., R. D. Haugo, J. C. Robertson, and P. S. Levin. 2018. The Unequal Vulnerability of Communities of Color to Wildfire. Internet website: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6214520/.

Davis, L. G., D. B. Madsen, L. Becerra-Valdivia, T. Higham, D. A. Sisson, S. M. Skinner, D. Stueber, A. J. Nyers, A. Keen-Zebert, C. Neudorf, and M. Cheyney. 2019. Late Upper Paleolithic occupation at Cooper's Ferry, Idaho, USA, ~16,000 years ago. Science 365:891-897.

d'Azevedo, W.L. Handbook of North American Indians (HNAI), Vol. 11: Great Basin. William C. Sturtevant, general editor.

Decker, T. 2018. Targeted-grazing as a fuels reduction treatment: evaluation of vegetation dynamics and utilization levels. Master's thesis, Utah State University.

Decker, K., R. Rondeau, J. Lemly, D. Culver, D. Malone, L. Gilligan, and S. Marshall. 2020. Guide to the Ecological Systems of Colorado. Colorado Natural Heritage Program, Colorado State University, Fort Collins, Colorado.

Defenders of Wildlife. 2022. Petition to List the Pinyon Jay (*Gymnorhinus cyanocephalus*) as Endangered or Threatened Under the Endangered Species Act. Internet website: https://defenders.org/sites/default/files/inline-files/2022.4.25_FWS_Listing%20petition_Pinyon%20Jay.pdf.

Delaney, M. L. 1998. Phosphorus Accumulation in Marine Sediments and the Oceanic Phosphorus Cycle. Global Biogeochemical Cycles 12(4):563-572.

Dennison, P. E., S. C. Brewer, J. D. Arnold, and M. A. Moritz. 2014. Large wildfire trends in the western United States,1984–2011, Geophys. Res. Lett., 41,2928–2933, doi:10.1002/2014GL059576.

Dettenmaier, S. J., T. A. Messmer, T. J. Hovick, and D. K. Dahlgren. 2017. Effects of livestock grazing on rangeland biodiversity-A meta-analysis of grouse populations. Ecology and Evolution 7(19):7620-7627.

Diamond, J. M., C. A. Call, and N. Devoe. 2009. Effects of targeted cattle grazing on fire behavior of cheatgrass-dominated rangeland in the northern Great Basin, USA. International Journal of Wildland Fire 18:944–950.

Dinkins, J. B., M. R. Conover, C. P. Kirol, and J. L. Beck. 2012. Greater sage-grouse (*Centrocercus urophasianus*) select nest sites and brood sites away from avian predators. The Auk 129(4):600-610.

Dinkins, J. B., M. R. Conover, C. P. Kirol, and J. L. Beck, and S. N. Frey. 2016. Effects of common raven and coyote removal and temporal variation in climate on greater sage-grouse nesting success. Biological Conservation 202:50-58.

DOE (United States Department of Energy). 2021. Solar Impacts on Wildlife and Ecosystems: Request for Information Response Summary. Internet website: https://www.energy.gov/sites/default/files/2021-11/Solar%20Impacts%20on%20Wildlife%20and%20Ecosystems%20Request%20for%20Information%20Summary.pdf.

Doherty, K. E., D. E. Naugle, B. L. Walker, and J. M. Graham. 2008. Greater sage-grouse winter habitat selection and energy development. Journal of Wildlife Management 72:187-195.

Doherty, K. E., J. S. Evans, P. S. Coates, L. M. Juliusson, and B. C. Fedy. 2016. Importance of regional variation in conservation planning: A Rangewide Example of the GRSG. Ecosphere 7(10):e01462. 10.1002/ecs2.1462.

Doherty, K. E., J. D. Tack, J. S. Evans, and D. E. Naugle. 2010. Mapping breeding densities of GRSG: A tool for range-wide conservation planning. Bureau of Land Management.

Doherty, K. E., D. M. Theobald, J. B. Bradford, L. A. Wiechman, G. Bedrosian, C. S. Boyd, M. Cahill, P. S. Coates, M. K. Creutzburg, M. R. Crist, S. P. Finn, A. V. Kumar, C. E. Littlefield, J. D. Maestas, K. L. Prentice, B. G. Prochazka, T. E. Remington, W. D. Sparklin, J. C. Tull, Z. Wurtzebach, K. A. Zeller. 2022a. A sagebrush conservation design to proactively restore America's sagebrush biome U.S. Geological Survey Open-File Report 2022–1081, 38 p., https://doi.org10.3133ofr20221081.

Doherty, K., D. M. Theobald, D. M., M. C. Holdrege, L. A. Wiechman, and J. B. Bradford. 2022b. Biome-wide sagebrush core habitat and growth areas estimated from a threat-based conservation design: U.S. Geological Survey data release, https://doi.org/10.5066/P94Y5CDV.

DOI (United States Department of the Interior). 2021. Report on the Federal Oil and Gas Leasing Program. Internet website: https://www.doi.gov/sites/default/files/report-on-the-federal-oil-and-gas-leasing-program-doi-eo-14008.pdf.

DOI and USDA (United States Department of the Interior and United States Department of Agriculture). 2007. Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development. BLM/WO/ST-06/021+3071/REV 07. Bureau of Land Management. Denver, Colorado. 84 pp.

Donnelly, J. P., B. W. Allred, D. Perret, N. L Silverman, J. D. Tack, V. J. Dreitz, J. D. Maestas, and D. E. Naugle. 2018. Seasonal drought in North America's sagebrush biome structures dynamic mesic resources for sage-grouse. Ecology and Evolution 8:12492– 12505.

Donnelly, J. P., D. E. Naugle, C. A. Hagen, and J. D. Maestas. 2016. Public lands and private waters—Scarce mesic resources structure land tenure and sage-grouse distributions. Ecosphere 7(1): e01208. 10.1002/ecs2.1208.

Douglas, C. L. and T. L. Hurst. 1993. Review and Annotated Bibliography of Feral Burro Literature (No. 044/02, pp. 0-132). National Park Service.

Douglass, M. and L. Wandsnider. 2012. Fragmentation Resistant Measures of Chipped Stone Abundance and Size: Results of an Experimental Investigation of the Impact of Cattle Trampling on Surface Chipped Stone Scatters. Plains Anthropologist 244(57):353–365.

Downey, M. C., F. Hernandez, K. D. Bristow, C. J. Cardinal, M. L. Cline, W. P. Kuvlesky Jr., K. S. Miller, and A. B. Montalvo. 2023. Quails. In: McNew, L.B., Dahlgren, D.K., Beck, J.L. (eds) Rangeland Wildlife Ecology and Conservation. Springer, Cham. https://doi.org/10.1007/978-3-031-34037-6_11.

Drut, M. S., W. H. Pyle, and J. A. Crawford. 1994. Diets and food selection of sage grouse chicks in Oregon. Journal of Range Management 47:90-93.

Dumroese, R. K., T. Luna, B. A. Richardson, F. F. Kilkenny, and J. B. Runyon. 2015. Conserving and restoring habitat for Greater Sage-Grouse and other sagebrush-obligate wildlife: the crucial link of forbs and sagebrush diversity. Native Plants Journal 16(3):277–299.

Dusek, G. L., C. D. Eustace, and J. G. Peterson. 2002. Ecology and status of sage grouse in Montana. Intermountain Journal of Sciences 8(2):15-15.

Dyni, R. J. 1974. Stratigraphy and Nahcolite Resources of the Saline Facies of the Green River Formation, Rio Blanco County, Colorado. United States Department of the Interior. Geological Survey.

Eberhardt, L. L., A. K. Majorowicz, and J. A. Wilcox. 1982. Apparent rates of increase for two feral horse herds. Journal of Wildlife Management 46 (2):367-374.

Edgel, R. J., R. T. Larsen, J. C. Whiting, and B. R. McMillan. 2018. Space use, movements, and survival of pygmy rabbits in response to construction of a large pipeline. Wildlife Society Bulletin 42: 488–497.

EIA (United States Energy Information Administration). 2021. Annual Energy Outlook 2021. Internet website: https://www.eia.gov/outlooks/aeo/pdf/AEO_Narrative_2021.pdf.

_____. 2023a. Wind Explained-Where Wind Power is Harnessed. April 2020.

_____. 2023b. Tight oil and shale gas plays. US Energy Atlas Interactive map. Internet website: https://atlas.eia.gov/apps/tight-oil-and-shale-gas-plays-1/explore.

Ellis, K. L. 1984. Behavior of lekking sage grouse in response to a perched golden eagle. Western Birds 15(1):37-38.

Encyclopedia Britannica. 2008. Culture areas of North American Indians. Retrieved February 10, 2023, from https://www.britannica.com/topic/culture-area#/media/1/146313/122117.

EPA (United States Environmental Protection Agency). 1987. Nonpoint Source Controls and Water Quality Standards. August 19, 1987. Washington, DC.

_____. 2023a. Nonattainment Areas for Criteria Pollutants (Green Book). Internet website: https://www.epa.gov/green-book.

_____. 2023b. Outdoor Air Quality Data: Air Quality Statistics Report. Internet website: https://www.epa.gov/outdoor-air-quality-data/air-quality-statistics-report.

_____. 2023c. 2020 National Emissions Inventory Data. Internet website: https://www.epa.gov/air-emissions-inventories/2020-national-emissions-inventory-nei-data.

_____. 2024. Methodology Report: Inventory of U.S. Greenhouse Gas Emissions and Sinks by State: 1990-2022. Internet website: Methodology Report: Inventory of U.S. Greenhouse Gas Emissions and Sinks by State: 1990-2022 | US EPA

Eren, M. I., A. Durant, C. Neudorf, M. Haslam, C. Shipton, J. Bora, R. Korisettar, and M. Petraglia. 2010. Experimental examination of animal trampling effects on artifact movement in dry and water saturated substrates: A test case of South India. Journal of Archaeological Science (37):3010–3021.

Fattet, M., Y. Fu, M. Ghestem, W. Ma, M. Foulonneau, J. Nespoulous, Y. Le Bissonnais, and A. Stokes. 2011.Effects of vegetation type on soil resistance to erosion: Relationship between aggregate stability and shear strength. Catena 87(1): 60-69.

Fedy, B. C. and C. L. Aldridge. 2011. The importance of within-year repeated counts and the influence of scale on long-term monitoring of sage-grouse. The Journal of Wildlife Management 75(5):1022-1033.

Fedy, B. C. and K. E. Doherty. 2011. Population cycles are highly correlated over long time series and large spatial scales in two unrelated species: greater sage-grouse and cottontail rabbits. Oecologia 165:915-924.

Fedy, B. C., C. L. Aldridge, K. E. Doherty, M. O'Donnell, J. L. Beck, B. Bedrosian, M. J. Holloran, G. D. Johnson, N. W. Kaczor, C. P. Kirol, C. A. Mandich, D. Marshall, G. McKee, C. Olson, C. C. Swanson, and B. L. Walker. 2012. Interseasonal Movements of Greater Sage-Grouse, Migratory Behavior, and an Assessment of the Core Regions Concept in Wyoming. Journal of Wildlife Management, v. 76, p. 1062–1071.

Fischer, R. A. 1994. The effects of prescribed fire on the ecology of migratory sage-grouse in southeastern Idaho. Doctoral dissertation, University of Idaho, Moscow.

Flerchinger, G. N., A. W. Fellows, M. S. Seyfried, P. E. Clark, and K. A. Lohse. 2019. Water and carbon fluxes along an elevational gradient in a sagebrush ecosystem. Ecosystems 23:246–263.

Fletcher, T. 2021. Evaluating GPS-derived estimates of livestock use and their value in addressing impacts of spring cattle grazing on Greater Sage-Grouse demographics. Doctoral dissertation. University of Idaho, Moscow, Idaho.

Forest Service (United States Department of Agriculture, Forest Service). 1997. Forest Service National Resource Guide to American Indian and Alaska Native Relations. Prepared by Joseph Mitchell. Available online: https://www.fs.usda.gov/spf/tribalrelations/documents/publications/national-resource-guide-ver2.pdf. Accessed January 31, 2023.

_____. 2015. Greater sage-grouse Record of Decision for Idaho and Southwest Montana, Nevada and Utah and Land Management Plan Amendments. Internet website: https://www.fs.usda.gov/sites/default/files/sage-grouse-great-basin-rod.pdf.

Forman, R. T. and L. E. Alexander 1998. Roads and Their Major Ecological Effects. Annual Review of Ecology and Systematics 29:207-31.

Fremgen, A. L., C. P. Hansen, M. A. Rumble, R. S. Gamo, and J. J. Millspaugh. 2016. Male greater sage-grouse detectability on leks. Journal of Wildlife Management 80(2):266–274.

Fremgen, M. R., D. Gibson, R. L. Ehrlich, A. H. Krakauer, J. S. Forbey, E. J. Blomberg, J. S. Sedinger, and G. L Patricelli. 2017. Necklace-style radio-transmitters are associated with changes in display vocalizations of male greater sage-grouse. Wildlife Biology:wlb.00236.

Frick, W. F., S. J. Puechmaille, J. R. Hoyt, B. A. Nickel, K. E. Langwig, J. T. Foster, K. E. Barlow, T. Bartonička, D. Feller, A. J. Haarsma, C. Herzog, I. Horáček, J. van der Kooij, B. Mulkens, B. Petrov, R. Reynolds, L. Rodrigues, C. W. Stihler, G. G. Turner, A. M. Kilpatrick. 2015. Disease Alters Macroecological Patterns of North American Bats. Global Ecology and Biogeography 24(7): 741–9. https://doi.org/10.1111/geb.12290.

Frick, W. F., E. F. Baerwald, J. F. Pollock, R. M. R. Barclay, J. A. Szymanski, T. J. Weller, A. L. Russell, S. C. Loeb, R. A. Medellin, and L. P. McGuire. 2017. Fatalities at wind turbines may threaten population viability of a migratory bat. Biological Conservation 209:172-177.

Gamperl, A. K., K. J. Rodnick, H. A. Faust, E. C. Venn, M. T. Bennett, L. I Crawshaw, E. R. Keeley, M. S. Powell, and H. W. Li. 2002. Metabolism, Swimming Performance, and Tissue Biochemistry of High Desert Redband Trout (Oncorhynchus mykiss ssp.): Evidence for Phenotypic Differences in Physiological Function. Physiological and Biochemical Zoology 75(5):413-431.

Garrott, R. A. and L. Taylor. 1990. Dynamics of a feral horse population in Montana. Journal of Wildlife Management 54(4):603-612.

Garrott, R. A., D. B. Siniff, and L. L. Eberhardt. 1991. Growth rates of feral horse populations. Journal of Wildlife Management 55(4):641-648.

Gaylord, M. L., T. E. Kolb, W. T. Pockman, J. A. Plaut, E. A. Yepez, A. K. Macalady, R. E. Pangle, and N. G. McDowell. 2013. Drought predisposes piñon-juniper woodlands to insect attacks and mortality. New Phytologist 198:567-578.

GBBO (Great Basin Bird Observatory). 2010. Nevada Comprehensive Bird Conservation Plan, ver. 1.0. Great Basin Bird Observatory, Reno, Nevada.

_____. 2012. Bird Population Responses to Projected Effects of Climate Change in Nevada: An Analysis for the 2012 Revision of the Nevada Wildlife Action Plan. Prepared for Nevada Department of Wildlife, Reno, Nevada. Final Report. February 27, 2012.

_____. 2023. Pinyon Jay Research. Internet website: https://www.gbbo.org/pinyon-jay-research.

Geist, V. 1978. Behavior. pp. 283-296 in Big Game of North America: Ecology and Management. J. L. Schmidt and D. L. Gilbert, eds. Harrisburg, Pennsylvania: Stackpole Books.

Geothermal Energy Association. 2015. Brief Economic Values. Internet website: https://geothermal.org/sites/default/files/2021-02/Issue_Brief_Economic_Values_2015.pdf#:~:text=GEA%20estimates%20that%20geothermal%20provides%20approximately%20%24117%20million,fossil%20fuel%20emissions%20based%20on%20current%20geothermal%20generation.

Gerber, P. J., A. N. Hristov, B. Henderson, H. Makkar, J. Oh, C. Lee, R. Meinen, F. Montes, T. Ott, J. Firkins, A. Rotz, C. Dell, A. T. Adesogan, W. Z. Yang, J. M. Tricarico, E. Kebreab, G. Waghorn, J. Dijkstra, S. Oosting. 2013. Technical options for the mitigation of direct methane and nitrous oxide emissions from livestock: a review. Animal 7(s2):220-234.

Germaine, S. S., S. K. Carter, D. A. Ignizio, and A. T. Freeman. 2017. Relationships between gas field development and the presence and abundance of pygmy rabbits in southwestern Wyoming. Ecosphere 8(5):e01817.

Germino, M. J. and B. E. Lazarus. 2020. Synthesis of Weed-Suppressive Bacteria Studies in Rangelands of the Western United States: Special Section of Articles in *Rangeland Ecology & Management* Provides Little Evidence of Effectiveness. Rangeland Ecology and Management 73(6):737-740.

Gerringer, M. B., K. T. Smith, and K. L Kosciuch. 2022. Observations of Greater Sage-Grouse at a solar energy facility in Wyoming. Western North American Naturalist 82(1):96-200.

Gibson, D., E. J. Blomberg, and J. S. Sedinger. 2016. Evaluating vegetation effects on animal demographics: the role of plant phenology and sampling bias. Ecology and Evolution 6(11):3621–3631.

Gibson, D., E. J. Blomberg, M. T. Atamian, S. P. Espinos, and J. S. Sedinger. 2018. Effects of Power Lines on Habitat Use and Demography of Greater Sage-Grouse (*Centrocercus urophasianus*). Wildlife Monographs 200(1):1–41.

Gibson, R. M., and J. W. Bradbury. 1987. Male and female mating strategies on Sage-Grouse leks. In: Ecological Aspects of Social Evolution: Birds and Mammals (D. I. Rubenstein and R. W. Wrangham, editors). Princeton University Press, New Jersey. Pp. 379-398.

Gigliotti L. C., M. P. Atwood, E. K. Cole, A. Courtemanch, S. Dewey, J. A. Gude, M. Hurley, M. Kauffman, K. Kroetz, B. Leonard, D. R. MacNulty, E. Maichak, D. McWhirter, T. W. Mong, K. Proffitt, B. Scurlock, D. R. Stahler, and A. D. Middleton. 2023. Multi-level thresholds of residential and agricultural land use for elk avoidance across the Greater Yellowstone Ecosystem. Journal of Applied Ecology 60(6):1089-1099.

Gillan, J. K., E. K. Strand, J. W. Karl, K. P. Reese, and T. Laninga. 2013. Using spatial statistics and point-pattern simulations to assess the spatial dependency between greater sage-grouse and anthropogenic features. Wildlife Society Bulletin 37:301-310.

Gosnell, H., and W. R. Travis. 2005. Ranchland ownership dynamics in the Rocky Mountain West. Rangeland ecology and management, 58(2), 191-198.

Gotsch, D. 2014. Reducing Raven Predation on Greater Sage-grouse Nests. Internet website: https://appliedbehavior.wordpress.com/behavior-projects/ravens/.

Gottfried, G. J., T. W. Swetnam, C. D. Allen, J. L. Betancourt, and A. L. Chung-MacCoubrey. 1995. Pinyon-juniper woodlands. Chapter 6. In: Ecology, Diversity, and Sustainability of the Middle Rio Grande Basin. Pp. 95–132. General Technical Report RM-GTR-268. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station. Fort Collins, Colorado.

Gratson, M. W. 1993. Sexual selection for increased male courtship and acoustic signals and against large male size at sharp-tailed grouse leks. Evolution 47(2):691-696.

Grayson, D. K. 1993. The Desert's Past: A Natural History of the Great Basin. Smithsonian Institution, Washington, DC.

Green, A. W., C. L. Aldridge, and M. S. O'Donnell. 2017. Investigating impacts of oil and gas development on greater sage-grouse. Journal of Wildlife Management 81(1):46–57.

Green J. S, F. R. Henderson, and M. D. Collinge. 1994. Coyotes. Internet website: https://www.dfw.state.or.us/wildlife/living_with/docs/Coyotes.pdf.

Green, J. S. and J. T. Flinders. 1980. Habitat and dietary relationships of the pygmy rabbit. Rangeland Ecology and Management/Journal of Range Management Archives 33(2):136-142.

Gregg, M. A., J. K. Barnett, and J. A. Crawford. 2008. Temporal Variation in Diet and Nutrition of Pre-incubating Greater Sage-Grouse. Rangeland Ecology & Management 61(5):535–542.

Gregg, M. A., J. A. Crawford, M. S. Drut, and A. K. DeLong. 1994. Vegetational cover and predation of sage grouse nests in Oregon. Journal of Wildlife Management 58(1):162-166.

Gregory, R. W. 2014. Wyoming Trona Summary Report. Wyoming State Geological Survey. Internet website: https://www.wsgs.wyo.gov/products/wsgs-2014-trona-summary.pdf.

Griffin, D., and K. J. Anchukaitis. 2014. How unusual is the 2012-2014 California drought? Geophysical Research Letters 41(24):9017-9023.

Griffin, P., J. Bybee, H. Woodward, G. Collins, J. D. Hennig, J. C. Chambers. 2019. Wild horse and burro considerations [Chapter 8]. In: Crist, Michele R.; Chambers, Jeanne C.; Phillips, Susan L.; Prentice, Karen L.; Wiechman, Lief A., eds. Science framework for conservation and restoration of the sagebrush biome: Linking the Department of the Interior's Integrated Rangeland Fire Management Strategy to long-term strategic conservation actions. Part 2. Management applications. Gen. Tech. Rep. RMRS-GTR-389. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. p. 163-188.

Gurevitch, J., G. A. Fox, N. L. Fowler, and C. H. Graham. 2016. Landscape demography: Population change and its drivers across spatial scales. The Quarterly Review of Biology 91(4):459–485.

Guttery, M. R., D. K. Dahlgren, T. A. Messmer, J. W. Connelly, K. P. Reese, P. A. Terletzky, N. Burkepile, and D. N. Koons. 2013. Effects of landscape-scale environmental variation on greater sage-grouse chick survival. PLoS One 8(6):e65582.

Haacke, J. E., J. A. Luppens, D. C. Scott, L. M. Osmonson, T. J. Rohrbacher, M. S. Ellis. 2008. Assessment of Coal Geology, Resources, and Reserves in the Gillette Coalfield, Powder River Basin, Wyoming: US Geological Survey Open-File Report 2008-1202. Revised February 2, 2012.

Hagen, C. A. 2011. Predation on Greater Sage-Grouse: Facts, process, and effects. In: Greater sage-grouse: Ecology of a landscape species and its habitats (S. T. Knick and J. W. Connelly, editors). Cooper Ornithological Union, University of California Press, Berkeley. Pp. 95-100.

Hagen, C. A., J. W. Connelly, and M. A. Schroeder. 2007. A meta-analysis for greater sage-grouse nesting and brood rearing habitats. Wildlife Biology 13:42-50.

Hanser, S. E., P. A. Deibert, J. C. Tull, N. B. Carr, C. L. Aldridge, T. C. Bargsten, T. J. Christiansen, P. S. Coates, M. R. Crist, K. E. Doherty, E. A. Ellsworth, L. J. Foster, V. A. Herren, K. H. Miller, A. Moser, R. M. Naeve, K. L. Prentice, T. E. Remington, M. A. Ricca, D. J. Shinneman, R. I. Truex, L. A. Wiechman, D. C. Wilson, and Z. H. Bowen. 2018. Greater sage-grouse science (2015–17)—Synthesis and potential management implications: U.S. Geological Survey Open-File Report 2018–1017, 46 p., https://doi.org/10.3133/ofr20181017.

Hanley, T. A. and W. W. Brady. 1977. Feral burro impact on a Sonoran Desert range. Rangeland Ecology and Management/Journal of Range Management Archives, 30(5), 374-377.

Harju, S. M., P. S. Coates, S. J. Dettenmaier, J. B. Dinkins, P. J. Jackson, and M. P. Chenaille. 2021. Estimating Trends of Common Raven Populations in North America, 1966-2018. Human-Wildlife Interactions 15(3):5.

Hausleitner, D., K. P. Reese, and A. D. Apa. 2005. Timing of Vegetation Sampling at Greater Sage-Grouse Nests. Rangeland Ecology & Management 58(5):553-556.

Herren, V., E. Kachergis, A. Titolo, K. Mayne, S. Glazer, K. Lambert, B. Newman, and B. Franey. 2021. Greater Sage-Grouse Plan Implementation: Rangewide Monitoring Report for 2015–2020. U.S. Department of the Interior, Bureau of Land Management, Denver, CO

Hershler, R. and H. Liu. 2009. New Species and Records of *Pyrgulopsis* (Gastropoda: Hydrobiidae) from the Snake River Basin, Southeastern Oregon, Further Delineation of a Highly Imperiled Fauna Zootaxa 2006:1-22.

Hettinger, R. D., M. A. Krischbaum, L. N. R. Roberts, and L. R. H Biewick. 2000. A summary of coal distribution and geology in the Kaiparowits Plateau, Utah. Geologic Assessment of Coal in the Colorado Plateau: Arizona, Colorado, New Mexico, and Utah, 1625, J1-J17.

Howe, K. B., P. S. Coates, and D. J. Delehanty. 2014. Selection of Anthropogenic Features and Vegetation Characteristics by Nesting Common Ravens in the Sagebrush Ecosystem. The Condor: Ornithological Applications 116(1):35-49.

Holloran, M. J. 2005. Greater sage-grouse (*Centrocercus urophasianus*) Population Response to Natural Gas Field Development in Western Wyoming. Doctoral dissertation. University of Wyoming, Laramie.

Holloran, M. J. and S. H. Anderson. 2005. Spatial distribution of Greater Sage-Grouse nests in relatively contiguous sagebrush habitat. Condor 107(4):742-52.

Holloran M. J., B. J. Heath, A. G. Lyon, S. J. Slater, J. L. Kuipers, and S. H. Anderson. 2005. Greater sage-grouse nesting habitat and selection and success in Wyoming. Journal of Wildlife Management 69(2):638-649.

Holloran, M. J., R. C. Kaiser, and W. Hubert. 2010. Yearling greater sage-grouse response to energy development in Wyoming. Journal of Wildlife Management 74(1):65-72.

Homer, C. G., G. Xian, C. L. Aldridge, D. K. Meyer, T. R. Loveland, and M. S. O'Donnell. 2015. Forecasting sagebrush ecosystem components and greater sage-grouse habitat for 2050: Learning from past climate patterns and Landsat imagery to predict the future. Ecological Indicators 55: 131–145.

Howard, J. 2002. *Artemisia cana, Artemisia cana* subsp. *bolanderi, Artemisia cana* subsp. *cana, Artemisia cana* subsp. *viscidula* (silver sagebrush, Bolander silver sagebrush, plains silver sagebrush, mountain silver sagebrush). In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: https://www.fs.usda.gov/database/feis/plants/shrub/artcan/all.html.

Howe, K. B. 2012. Selection for Anthropogenic Structures and Vegetation Characteristics by Common Ravens (*Corvus corax*) within a Sagebrush-Steppe Ecosystem. Master's thesis. Idaho State University, Pocatello.

Hulbert, L. C. 1955. Ecological studies of Bromus tectorum and other annual bromegrasses. Ecological Monographs. 25:181-213.

Huwer, S. L., D. R. Anderson, T. E. Remington, and G. C. White. 2008. Using human-imprinted chicks to evaluate the importance of forbs to sage-grouse. The Journal of Wildlife Management, 72(7), 1622-1627.

IDFG (Idaho Department of Fish and Game). 2018. Greater sage-grouse habitat suitability index (HIS) model. Digital raster dataset. IDFG, Boise, Idaho.

IDFG (Idaho Department of Fish and Game). 2019a. Modeling sage-grouse habitat suitability at the local scale. Appendix B in State of Idaho. 2021. Idaho Sage-Grouse Habitat Quantification Tool (HQT) Scientific Methods Document, v 1.1. Prepared by HQT Science Team and Environmental Incentives, LLC. South Lake Tahoe, CA, with assistance from Willamette Partnership.

IDFG (Idaho Department of Fish and Game) IDFG (Idaho Department of Fish and Game). 2022. Greater sage-grouse breeding bird density, 2016-2020. Digital raster datasets. IDFG, Boise, Idaho.

IMPLAN® model. 2021 Data. Using inputs provided by the user and IMPLAN Group LLC, IMPLAN System (data and software), 16905 Northcross Dr., Suite 120, Huntersville, NC 28078. Internet website: https://www.IMPLAN.com.

Innes, R. J. 2022. *Ventenata dubia*, ventenata. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Missoula Fire Sciences Laboratory (Producer). Available: https://www.fs.usda.gov/database/feis/plants/graminoid/vendub/all.html.

Innes, Robin J. 2019. Fire regimes of Wyoming big sagebrush and basin big sagebrush communities. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Missoula Fire Sciences Laboratory (Producer). Available: https://www.fs.fed.us/database/feis/fire_regimes/WY_basin_big_sagebrush/all.html [2019, August 21].

Innes, R. J. and K. Zouhar, 2018. Fire regimes of mountain big sagebrush communities. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Missoula Fire Sciences Laboratory (Producer). Available: https://www.fs.usda.gov/database/feis/fire_regimes/mountain_big_sagebrush/all.html.

IPCC (Intergovernmental Panel on Climate Change). 2013. Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (T. F. Stocker, D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex, and P. M. Midgley, editors). Cambridge University Press, Cambridge, United Kingdom, and New York, New York, USA.

_____. 2019. Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Calvo Buendia, E., Tanabe, K., Kranjc, A., Baasansuren, J., Fukuda, M., Ngarize S., Osako, A., Pyrozhenko, Y., Shermanau, P. and Federici, S. (eds). Published: IPCC, Switzerland.

_____. 2021. Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (Masson-Delmotte, V., P. Zhai, A. Pirani, S. L. Connors, C. Péan, S. Berger, N. Caud, Y. Chen, L. Goldfarb, M. I. Gomis, M. Huang, K. Leitzell, E. Lonnoy, J. B. R. Matthews, T. K. Maycock, T. Waterfield, O. Yelekçi, R. Yu, and B. Zhou (eds.)]. Cambridge University Press, Cambridge, United Kingdom, and New York, New York, USA.

IWG (Interagency Working Group on Social Cost of Greenhouse Gases, United States Government). 2021. Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide. Internet website: https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf.

Jahner, J. P., D. Gibson, C. L. Weitzman, E. J. Blomberg, J. S. Sedinger, and T. L. Parchman. 2016. Fine-scale genetic structure among greater sage-grouse leks in central Nevada. BMC Evolutionary Biology 16(1):1-13.

Jakes A. F., N. J. DeCesare, P. F. Jones, C. C. Gates, S. J. Story, S. K. Olimb, K. E. Kunkel, M. Hebblewhite. 2020. Multi-scale habitat assessment of pronghorn migration routes. Plos One 15(12):e0241042.

Jamison, B. E., R. J. Robel, J. S. Pontius, and R. D. Applegate. 2002. Invertebrate biomass: associations with lesser prairie-chicken habitat use and sand sagebrush density in southwestern Kansas. Wildlife Society Bulletin 30(2):517-526.

Janson, R.G. 1946. A Survey of the Rabbits of Utah with Reference to Their Classification, Distribution, Life Histories and Ecology. Master's thesis. Utah State University, Logan.

Jenkins D. L., D. L. Davis, T. W. Stafford Jr, P. F. Campos, B. Hockett, G. T. Jones, L. S. Cummings, C. Yost, T. J. Connolly, R. M. Tohe, and S. C. Gibbons. 2012. Clovis age Western Stemmed projectile points and human coprolites at the Paisley Caves. Science 337(6091):223-228.

Johnson, D. J., M. J. Holloran, J. W. Connelly, S. E. Hanser, C. L. Amundson, and S. T. Knick. 2011. Influences of environmental and anthropogenic features on Greater Sage-Grouse population, 1997-2007. In: Studies in Avian Biology (S. T. Knick and J. W. Connelly, editors). Cooper Ornithological Union, University of California Press, Berkeley. Pp. 407-450.

Johnson, D. H., 1980. The Comparison of Usage and Availability Measurements for Evaluating Resource Preference. Ecology 61(1):65–71.

Johnson, D. D. and R. F. Miller. 2006. Structure and development of expanding western juniper woodlands as influenced by two topographic variables. Forest Ecology and Management 229(1-3): 7-15.

Johnson, G. D. and M. S. Boyce. 1990. Feeding trials with insects in the diet of sage grouse chicks. Journal of Wildlife Management 54(1):89-91.

Johnson, G. and Holloran, M. 2010. Greater Sage-Grouse & Wind Energy Development: A Review of the Issues. Western EcoSystems Technology, Inc. April 2010. Pinedale, Wyoming.

Johnson, G. D. and S. E. Stephens. 2011. Wind power and biofuels: A green dilemma for wildlife conservation. In: Energy Development and Wildlife Conservation in Western North America (D. E. Naugle, editor). Pp. 131-156.

Jolly, W. M., M. A. Cochrane, P. H. Freeborn, Z. A. Holden, T. J. Brown, G. J Williamson, D. M. Bowman. 2015. Climate-induced variations in global wildfire danger from 1979 to 2013. Nat Commun 6, 7537. https://doi.org/10.1038/ncomms8537.

Jones, A. 2000. Effects of cattle grazing on North American arid ecosystems: a quantitative review. Western North American Naturalist, 155-164.

Kaiser, R. C. 2006. Recruitment by Greater Sage-Grouse in association with natural gas development in western Wyoming. Master's thesis, University of Wyoming, Laramie.

Kauffman, M., B. Lowrey, J. Berg, S. Bergen, D. Brimeyer, P. Burke, T. Cufaude, J. W. Cain, J. Cole, A. Courtemanch, M. Cowardin, J. Cunningham, M. DeVivo, J. Diamond, O. Duvuvuei, J. Fattebert, J. R. Ennis, D. Finley, J. Fort, G. Fralick, E. Freeman, J. Gagnon, J. Garcia, E. Gelzer, M. Graham, J. Gray, E. Greenspan, L. E. Hall, C. Hendricks, A. Holland, B. Holmes, K. Huggler, M. A. Hurley, E. Jeffreys, A. Johnson, L. Knox, K. Krasnow, Z. Lockyer, H. Manninen, M. McDonald, J. L. McKee, J. Meacham, J. Merkle, B. Moore, T. W. Mong, C. Nielsen, B. Oates, K. Olsen, D. Olson, L. Olson, M. Pieron, J. Powell, A. Prince, K. Proffitt, C. Reddell, C. Riginos, R. Ritson, S. Robatcek, S. Roberts, H. Sawyer, C. Schroeder, J. Shapiro, N. Simpson, S. Sprague, A. Steingisser, N. Tatman, B. Turnock, C. F. Wallace, and L. Wolf. 2022. Ungulate migrations of the western United States, Volume 3: U.S. Geological Survey Scientific Investigations Report 2022–5088. Reston, Virginia.

Kaweck, M. M., J. P. Severson, and K. L. Launchbaugh. 2018. Impacts of wild horses, cattle, and wildlife on riparian areas in Idaho. Rangelands 40(2):45-52.

Kirol, C. P., J. L. Beck, J. B. Dinkins, and M. R. Conover. 2012. Greater sage-grouse nesting and brood-rearing microhabitat selection in xeric big sagebrush. Condor 114:75-89.

Kirol, C.P., J. L. Beck, S. V. Huzurbazar, M. J. Holloran, and S. N. Miller. 2015. Identifying greater sage-grouse source and sink habitats for conservation planning in an energy development landscape. Ecological Applications, v. 25, no. 4, p. 968-990.

Kirol, C. P and B. C. Fedy. 2023. Using individual-based habitat selection analyses to understand the nuances of habitat use in an anthropogenic landscape: a case study using greater sage-grouse trying to raise young in an oil and gas field. Wildlife Biology 2023:e01111 https://doi.org/10.1002/wlb3.01111.

Kirol, C. P. and B. C. Fedy. 2021. Does habitat reclamation following energy development benefit songbird nest survival? Avian Conservation and Ecology 16 (2):3. https://doi.org/10.5751/ACE-01913-160203.

Kirol, C. P., K. T. Smith, N. E. Graf, J. B. Dinkins, C. W. Lebeau, T. L. Maechtle, A. L. Sutphin, and J. L. Beck. 2020. Greater Sage-Grouse Response to the Physical Footprint of Energy Development. The Journal of Wildlife Management. 84. 10.1002/jwmg.21854.

Kirol, C. P., A. L. Sutphin, L. Bond, M. R. Fuller, and T. L. Maechtle. 2015. Mitigation effectiveness for improving nesting success of greater sage-grouse influenced by energy development. Wildlife Biology, v. 21, no. 2, p. 98-109.

Klebenow, D. A. 1985. Habitat management for sage grouse in Nevada. World Pheasant Association Journal 10: 34-46.

Klebenow, D. A. and G. M. Gray. 1968. Food habits of juvenile sage grouse. Journal of Range Management 21:80-83.

Knick, S. T. and J. T. Rotenberry. 1995. Landscape characteristics of fragmented shrub-steppe habitats and breeding passerine birds. Conservation Biology 9:1059-1071.

Knick, S. T. and J. W. Connelly. 2011. Greater sage-grouse ecology and conservation of a landscape species and its habitats. Berkeley, Calif., University of California Press, Studies in Avian Biology, no. 38, 564 p.

Knick, S. T. and S. E. Hanser. 2011. Connecting pattern and process in greater sage-grouse populations and sagebrush landscapes. pp. 383-406 *in* Greater Sage-Grouse: Ecology and conservation of a landscape species and its habitats. S.T. Knick and J.W. Connelly *editors.* Studies in Avian Biology, No. 38.

Knick S. T., S. E. Hanser, and K. L. Preston. 2013. Modeling ecological minimum requirements for distribution of greater sage-grouse leks: Implications for population connectivity across their western range. Ecology and Evolution 3: 1539-1551.

Knick, S. T., S. E. Hanser, R. F. Miller, D. A. Pyke, M. J. Wisdom, S. P. Finn, E. T. Rinkes, and C. J. Henny. 2011. Ecological influence and pathways of land use in sagebrush. In: Greater sage-grouse: Ecology of a landscape species and its habitats (S. T. Knick and J. W. Connelly, editors). Studies in Avian Biology Vol. 38:203-251. University of California Press, Berkeley.

Knight, D. H. 1994. Mountains and Plains, the Ecology of Wyoming Landscapes. New Haven, CT: Yale University Press.

Knight, R. L., H. A.L. Knight, and R.J. Camp. 1995. Common ravens and number and type of linear rights-of-way. Biological Conservation 74:6-67.

Knopf, F. L., J. A. Sedgwick, and D. B. Inkley. 1990. Regional correspondence among shrubsteppe bird habitats. Condor 92:45-53.

Kobilinsky, D. 2021. Common Ravens Disturb Greater Sage-Grouse. Internet website: https://wildlife.org/tws2021-common-ravens-disturb-greater-sage-grouse/.

Kohl, M. T., T. A. Messmer, B. A. Crabb, M. R. Guttery, D. K. Dahlgren, R. T. Larsen, S. N. Frey, S. Liguori, and R. J. Baxter. 2019. The effects of electric power lines on the breeding ecology of greater sage-grouse. PLoS One 14:e0209968 https://doi.org/10.1371/journal.pone.0209968.

Kramer K., T. A. Groen, and S. E Van Wieren. 2003. The interacting effects of ungulates and fire on forest dynamics: An analysis using the model FORSPACE Forest Ecology and Management, 181 (1-2) , pp. 205-222. Internet Website: https://doi.org/10.1016/S0378-1127(03)00134-8.

Kuchler, A. W. 1970. Potential natural vegetation. In: U.S. Department of the Interior, Geological Survey, the national atlas of the United States of America. Washington, DC: U.S. Government Printing Office: 89-92 (map scale 1:7,500,000).

Kunkel, C. 1976. Biology and production of the red-band trout (Salmo sp.) in four southeastern Oregon streams Thesis (M.S.): Oregon State University, 1977. 73 leaves, bound pp.

LANDFIRE. 2023. Existing Vegetation Type. Internet website: https://www.landfire.gov/evt.php.

Lambert M. S., H. Sawyer, and J. A. Merkle. 2022. Responses to natural gas development differ by season for two migratory ungulates. Ecological Applications 2022; e2652. DOI: 10.1002/eap.2652.

Lammers, W. M and M. W. Collopy. 2007. Effectiveness of avian predator perch deterrents on electric transmission lines. Journal of Wildlife Management 71:2752-2758.

Larrucea, E. S. and P. F. Brussard. 2008. Habitat selection and current distribution of the pygmy rabbit in Nevada and California, USA. Journal of Mammalogy 89:691-699.

Lawler, J. J., D. D. Ackerly, C. M. Albano, M. G. Anderson, S. Z. Dobrowski, J. L. Gill, ... and S. B. Weiss. 2014. The theory behind, and the challenges of, conserving nature's stage in a time of rapid change. Conservation Biology, 29(3), 618-629.

Lawrence, O. A. 2010. Geologic assessment of undiscovered oil and gas in the Powder River Basin Province Wyoming and Montana, in Total Petroleum Systems and Geologic Assessment of Oil and Gas Resources in the Powder River Basin Province, Wyoming and Montana: U.S. Geological Survey Series DDS–69–U, chap. 1, 97 p. Revised April 2010. Internet website: https://pubs.usgs.gov/dds/dds-069/dds-069-u/REPORTS/69_U_CH_1.pdf.

LCTCC (Lahontan Cutthroat Trout Coordinating Committee). 2019. Updated Goals and Objectives for the Conservation of Lahontan Cutthroat Trout (*Oncorhynchus clarkii henshawi*). Reno, Nevada.

LeBeau, C.W. 2012. Evaluation of greater sage-grouse reproductive habitat and response to wind energy development in south-central Wyoming. Master's thesis. University of Wyoming, Laramie.

LeBeau, C. W., J. L. Beck, G. D. Johnson, and M. J. Holloran. 2014. Short-term impacts of wind energy development on greater sage-grouse fitness. Journal of Wildlife Management 78:522-530.

LeBeau, C. W., J. L. Beck, G. D. Johnson, R. M. Nielson, M. J. Holloran, K. G. Gerow, and T. L. McDonald. 2017a. Greater sage-grouse male lek counts relative to a wind energy development: Wildlife Society Bulletin, v. 41, no. 1, p. 17–26. [Also available at https://doi.org/10.1002/wsb.725.]

LeBeau C. W., S. Howlin, A. Tredennick, and K. Kosciuch. 2020. Behavioral response of grouse to wind energy turbines: A quantitative review of survival, habitat selection, and lek attendance. Prepared for the National Wind Coordinating Collaborative, Washington DC, U.S.A. 24 pp.

LeBeau, C. W., G. D. Johnson, M. J. Holloran, J. L. Beck, R. M. Nielson, M. E. Kauffman, E. J. Rodemaker, and T. L. McDonald. 2017b. Greater sage-grouse habitat selection, survival, and wind energy infrastructure. Journal of Wildlife Management, v. 81, no. 4, p. 690–711.

LeBeau C. W., K. T. Smith, M. J. Holloran, J. L. Beck, M. E. Kauffman, and G. D. Johnson. 2019. Greater Sage-Grouse Habitat Function Relative to 230-kV Transmission Lines. Journal of Wildlife Management 83: 1773-1786.

Leu, M., and S. E. Hanser. 2011. Influences of the Human Footprint on Sagebrush Landscape Patterns. In: Greater sage-grouse: Ecology of a landscape species and its habitats (S. T. Knick and J. Connelly, editors). Cooper Ornithological Union, University of California Press, Berkeley. Pp. 253-271.

Lloyd J. D., C. L. Aldridge, T. D. Allison, C. W. LeBeau, L. B. McNew, and V. L. Winder. 2022. Prairie grouse and wind energy: The state of the science and implications for risk assessment. Wildlife Society Bulletin 46:e1305, https://doi.org/10.1002/wsb.1305.

Lockyer, Z. B., P. S. Coates, D. J. Delehanty. 2013. Greater Sage-Grouse nest predators in the Virginia Mountains of northwestern Nevada. Journal of Fish and Wildlife Management 4:242–255.

Lucht, W., S. Schaphoff, T. Erbrecht, U. Heyder, and W. Cramer. 2006. Terrestrial vegetation redistribution and carbon balance under climate change. Carbon Balance Manage 1, 6 (2006). https://doi.org/10.1186/1750-0680-1-6.

Lundgren, E. J., D. Ramp, O. S. Middleton, E. I. Wooster, E. Kusch, M. Balisi, W. J. Ripple, C. D. Hasselerharm, J. N. Sanchez, M. Mills, and A. D. Wallach. 2022. A novel trophic cascade between cougars and feral donkeys shapes desert wetlands. Journal of Animal Ecology DOI: 10.1111/1365-2656.13766.

Lyon, A. G. and S. H. Anderson. 2003. Potential gas development impacts on sage-grouse nest initiation and movement. Wildlife Society Bulletin 31:486-491.Manier, D.J., Z.H. Bowen, M.L. Brooks, M.L. Casazza, P.S. Coates, P.A. Deibert, S.E. Hanser, and D.H. Johnson. 2014. Conservation buffer distance estimates for Greater Sage-Grouse—A review: U.S. Geological Survey Open-File Report 2014–1239, 14 p., http://dx.doi.org/10.3133/ofr20141239.

Mack, R. N. and D. A. Pyke. 1983. The demography of Bromus tectorum: variation in time and space. Journal of Ecology. 71:69-93.

Mack, R. N. and J. N Thompson. 1982. Evolution in steppe with few large, hooved mammals. The American Naturalist, 119(6), 757-773.

Madders, M. and D. P. Whitfield. 2006. Upland raptors and the assessment of wind farm impacts. Ibis, 148, 43-56.

Manier, D. J. and N. T. Hobbs. 2006. Large herbivores influence the composition and diversity of shrub-steppe communities in the Rocky Mountains, USA. Oecologia 146:641-651.

Manier, D. J., D. J. A. Wood, Z. H. Bowen, R. Donovan, M. J. Holloran, L. M. Juliusson, K. S. Mayne, S. J. Oyler-McCance, F. R. Quamen, D. J. Saher, and A. J. Titolo. 2013. Summary of science, activities, programs and policies that influence the rangewide conservation of greater sage-grouse (*Centrocercus urophasianus*). US Geological Survey Open-File Report 2013-1098, Fort Collins, Colorado.

Manier, D. J., Z. H. Bowen, M. L. Brooks, M. L. Casazza, P. S. Coates, P. A. Deibert, S. E. Hanser, D. H. Johnson. 2014. Conservation buffer distance estimates for Greater Sage-grouse: a review. Open File Report 2014-1239, Fort Collins, Colorado.

Maser, C., J. W. Thomas, and R. G. Anderson. 1984. Wildlife Habitats in Managed Rangelands—The Great Basins of Southeastern Oregon: The Relationship of Terrestrial Vertebrates to Plant Communities and Structural Conditions. General Technical Report PNW-172. US Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station. Internet website: https://books.google.com/books?hl=en&lr=&id=WTnCSqg2BeQC&oi=fnd&pg=PA1&dq=General+Technical+Report+PNW-172+maser&ots=Ra89kfyTbS&sig=IrHmPwQq4OcPvHSbCaJAgoq3eTM#v=onepage&q&f=false.

Manzano, P., and S. R. White. 2019. Intensifying pastoralism may not reduce greenhouse gas emissions: wildlife dominated landscape scenarios as a baseline in life-cycle analysis. Climate Research, 77(2), 91-97.

Manzano, P., A., del Prado, and G., Pardo. 2023. Comparable GHG emissions from animals in wildlife and livestock dominated savannas. Climate and Atmospheric Science 6(1), 27.

McAdoo, J. K., B. W. Schultz, and S. R. Swanson. 2003. Wildlife Diversity in Sagebrush Habitats. University of Nevada Cooperative Extension, Fact Sheet 03-65.

McCaffery, R. and P. M. Lukacs, 2016. A generalized integrated population model to estimate greater sage-grouse population dynamics. Ecosphere, v. 7, no. 11, art. e01585, accessed December 2017 at https://doi.org/10.1002/ecs2.1585.

McIntire, S. E., J. C. Rabon, P. S. Coates, M. A. Ricca, and T. N. Johnson. 2020. Greater Sage-Grouse Chick Killed by Greater Basin Gopher Snake. Western North American Naturalist 80(1), 70-73. https://doi.org/10.3398/064.080.0107.

Meddens, A. J. H., J. A. Hicke, A. K. Macalady, P. C. Buotte, T. R. Cowles, and C. D. Allen. 2015. Patterns and causes of observed piñon pine mortality in the southwestern United States. New Phytologist 206:91-97.

Meehan, W. R. (ed.). 1991. Influences of Forest and Rangeland Management on Salmonid Fishes and Their Habitats. American Fisheries Society Special Publication 19. Bethesda, Maryland.

Meents, J. K., B. W. Anderson, and R. D. Ohmart. 1982. Vegetation relationships and food of sage sparrows wintering in honey mesquite habitat. Wilson Bull. 94:129-138.

Messmer T. A., R. Hasenyager, J. Burruss, and S Liguori. 2013. Stakeholder contemporary knowledge needs regarding the potential effects of tall structures on sage-grouse. Human–Wildlife Interactions 7(2):273-298.

Messmer, T. A. and C. Peterson. 2009. Evaluation of the role of strategic livestock grazing to enhance greater sage-grouse brood-rearing habitat on Anthro Mountain. Project Status Report: June-July 2009. Internet website: http://www.utahcbcp.org/files/uploads/AnthroPrelimaryReport.pdf.

Miller, J. D. 1978. Observations on the Diets of *Rana pretiosa*, *Rana pipiens*, and *Bufo boreas* from Western Montana. Northwest Science, 52, 243-249.

Miller, R. F. 2005. Biology, Ecology, and Management of Western Juniper. Oregon State University Agricultural Experiment Station Technical Bulletin 152. Corvallis, Oregon, USA.

Miller, R. F. and L. L. Eddleman. 2000a. Spatial and Temporal Changes of Sage-grouse Habitat in the Sagebrush Biome. Corvallis, OR: Oregon State University Agricultural Experiment Station Technical Bulletin 151.

_____. 2001. Spatial and temporal changes of Sage-Grouse habitat in the sagebrush biome. Agricultural Experiment Station, Oregon State University, Corvallis. Technical Bulletin 151.

Miller, R. F. and R. J. Tausch. 2000b. The role of fire in pinyon and juniper woodlands: a descriptive analysis. In Proceedings of the invasive species workshop: the role of fire in the control and spread of invasive species. Fire conference (pp. 15-30).

Miller, R. F., R. J. Tausch, E. D. McArthur, D. D. Johnson, and S. C. Sanderson. 2008. Age structure and expansion of piñon-juniper woodlands: a regional perspective in the Intermountain West. Res. Pap. RMRS-RP-69. Fort Collins, Colorado: United States Department of Agriculture, Forest Service, Rocky Mountain Research Station.

Miller, R. F., S. T. Knick, D. A. Pyke, C. W. Meinke, S. E. Hanser, M. J. Wisdom, and A. L. Hild. 2011. Characteristics of sagebrush habitats and limitations to long-term conservation. In: Greater Sage-Grouse: Ecology of a landscape species and its habitats (S. T. Knick, editor). Cooper Ornithological Union, University of California Press, Berkeley. Pp. 145-184.

Miller, R. F., J. C. Chambers, D. A. Pyke, F. B. Pierson, and C. J. Williams. 2013. USDA Forest Service RMRS GTR 308: A Review of Fire Effects on Vegetation and Soils in the Great Basin Region: Response and Ecological Site Characteristics. Available online: http://sagestep.org/pdfs/rmrs_gtr308.pdf.

Miller, R. F.; J. C. Chambers, L. Evers, J. C. Williams, K. A. Snyder, B. A. Roundy, F. B. Pierson. 2019. The Ecology, History, Ecohydrology, And Management of Pinyon And Juniper Woodlands In The Great Basin And Northern Colorado Plateau Of The Western United States. Gen. Tech. Rep. RMRS-GTR-403. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 284 p. Available online: https://www.fs.usda.gov/rm/pubs_series/rmrs/gtr/rmrs_gtr403.pdf.

Millennium Ecosystem Assessment. 2005. Global Assessment Reports. Internet website: https://www.millenniumassessment.org/en/index.html.

Mine Safety Health Administration. 2023. Wyoming quarterly coal mine production. US Department of Labor. Internet website: https://www.wsgs.wyo.gov/docs/wsgs-web-msha-23q1.xlsx.

Molvar, E. M., R. Rosentreter, D. Mansfield, and G. M. Anderson. 2024. Cheatgrass invasions: History, causes, consequences, and solutions (128 pp.). Hailey, ID: Western Watersheds Project.

Monroe, A. P., C. L. Aldridge, T. J. Assal, K. E. Veblen, D. A. Pyke, and M. L. Casazza. 2017. Patterns in greater sage-grouse population dynamics correspond with public grazing records at broad scales. Ecological Applications, v. 27, no. 4, p. 1096-1107.

Monroe, A. P., D. R. Edmunds, and C. L. Aldridge. 2016. Effects of lek count protocols on greater sage-grouse population trend estimates. Journal of Wildlife Management, v. 80, no. 4, p. 667–678. [Also available at https://doi.org/10.1002/jwmg.1050.]

Moore, R. and T. Mills. 1977. An environmental guide to western surface mining. Department of the Interior, Fish and Wildlife Service, Office of Biological Services, Western Energy and Land Use Team.

Mosley, J. C. and L. Roselle. 2006. Targeted livestock grazing to suppress invasive annual grasses. Targeted grazing: A natural approach to vegetation management and landscape enhancement, 67-76.

MTNHP (Montana Natural Heritage Program). 2024. Montana Field Guide. https://fieldguide.mt.gov/displayES_Detail.aspx?ES=5455.

Muñoz, D. A., P. S. Coates, and M. A. Ricca. 2021. Free-roaming horses disrupt greater sage-grouse lekking activity in the Great Basin. Journal of Arid Environments, v.184, no. 104304, 6 p. [Also available at 10.1016/j.jaridenv.2020.104304.]

Muntean, J. L., R. Micander, and B. Ayling. 2022. The Nevada Mineral Industry 2021. Nevada Bureau of Mines and Geology Special Publication MI-2021, 81 p.

NREL (National Renewable Energy Laboratory). 2016. Jobs and Economic Development Impact (JEDI) Geothermal Model. GT12.23.16. Internet website: https://www.nrel.gov/analysis/jedi/geothermal.html

NatureServe. 2022. NatureServe Explorer. Rocky Mountain Gambel Oak-Mixed Montane Shrubland. Internet Website: Rocky Mountain Gambel Oak-Mixed Montane Shrubland | NatureServe Explorer.

NatureServe. 2023. NatureServe Explorer. Anaxyrus boreas Western Toad. Internet Website: https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.102714/Anaxyrus_boreas.

_____. 2023d. NatureServe Explorer. *Spizella breweri* Brewer's Sparrow. Internet Website: https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.100732/Spizella_breweri.

_____. 2023e. NatureServe Explorer. Buteo regalis Ferruginous Hawk. Internet website: https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.103222/Buteo_regalis.

_____. 2023f. NatureServe Explorer. Aquila chrysaetos Golden Eagle. Internet website: https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.100925/Aquila_chrysaetos.

_____. 2023g. NatureServe Explorer. Gymnorhinus cyanocephalus Pinyon Jay. Internet website: https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.101291/Gymnorhinus_cyanocephalus.

Naugle, D. E., C. L. Aldridge, B. L. Walker, T. E. Cornish, B. J. Moynahan, M. J. Holloran, K. Brown, G. D. Johnson, E. T. Schmidtmann, R. T. Mayer, C. Y. Kato, M. R. Matchett, T. J. Christiansen, W. E. Cook, T. Creekmore, R. D. Falise, E. T. Rinkes, M. S. Boyce. 2004. West Nile virus—Pending crisis for Greater Sage-Grouse. Ecology Letters, v. 7, p. 704–713.

Naugle, D. E., K. E. Dohert, B. L. Walker, M. J. Holloran, and H. E. Copeland. 2011. Energy development and greater sage-grouse. Studies in Avian biology, 38, 489-503.

Neary, D., K. Ryan, and L. F. DeBano. 2005. Wildland fire in ecosystems: Effects of fire on soil and water. Gen. Tech. Rep. RMRS-GTR-32-vol. 4. US Department of Agriculture. Forest Service, Rocky Mountain Research Station. 250-251.

NIFC (National Interagency Fire Center) GIS. 2023. GIS data regarding acres burned. Boise, Idaho.

NOAA (National Oceanic and Atmospheric Administration). 2022. State Climate Summaries. Internet website: https://statesummaries.ncics.org/.

North American Bird Conservation Initiative, U.S. Committee. 2013. The state of the birds 2013 report on private lands. Washington, DC: U.S. Department of Interior. 48 p.

Northern Woodlands. 2023. Building Beaver Dam Analogs to Restore Watersheds. Allaire Diamond. September 1, 2023. Lyme, NH. Internet Website: https://northernwoodlands.org/articles/article/beaver-dam-analogs.

NRC (National Research Council). 2002. Biosolids Applied to Land: Advancing Standards and Practices.

NREL (National Renewable Energy Laboratory). 2021. Geothermal Power Production and District Heating Market Report. Golden, Colorado. July 2021. Internet website: https://www.nrel.gov/docs/fy21osti/78291.pdf.State of Nevada Commission on Mineral Resources.

_____. 2023. Division of Minerals. Nevada Geothermal Power Plants. January 2023. Las Vegas Office. Las Vegas, NV. Internet website: https://minerals.nv.gov/uploadedFiles/mineralsnvgov/content/Programs/Geo/NVGeoPowerPlants_20230117.pdf.

NSF (United States National Science Foundation). 2005. Heat and drought kills trees in southwest. NSF. https://www.nsf.gov/news/news_summ.jsp?cntn_id=104511#:~:text=According%20to%20newly%20published%20research,drought%20and%20lowered%20pest%20resistance.

NTT (Sage-Grouse National Technical Team). 2011. A Report on National Greater Sage-Grouse Conservation Measures. December 2011.

NWCC (National Wind Coordinating Collaborative). 2017. Greater Sage-Grouse, Overview and Effects of Wind Energy Development. Available at: https://www.energy.gov/sites/default/files/2018/05/f51/NWCC-Sage-Grouse-Fact-Sheet.pdf.

ODFW (Oregon Department of Fish and Wildlife). 2005. Oregon Native Fish Status Report Volume I Species Management Unit Summaries. Oregon Department of Fish and Wildlife.

Office for Coastal Management [OCM] Partners. 2023. 2021 Idaho NAIP 4-Band 8 Bit Imagery from 2010-06-15 to 2010-08-15. NOAA National Centers for Environmental Information. Available at: https://www.fisheries.noaa.gov/inport/item/68083.

O'Neil, S. T., P. S. Coates, B. E. Brussee, P. J. Jackson, K. B. Howe, A. M. Moser, L. J. Foster, D. J. Delehanty. 2018. Broad-scale occurrence of a subsidized avian predator: Reducing impacts of ravens on sage-grouse and other sensitive prey. J Appl Ecol. 2018; 55: 2641– 2652. https://doi.org/10.1111/1365-2664.13249.

Osborn, A., S. Vetter, R. Hartley, L. Walsh, and J. Brown. 1987. Impacts of Domestic Livestock Grazing on the Archaeological Resources of Capitol Reef National Park, Utah. Midwest Archeological Center Occasional Studies in Anthropology No. 20. US Department of the Interior, National Park Service, Midwest Archaeological Center, Lincoln, Nebraska.

Oregon Natural Heritage Advisory Council. 2010. Oregon Natural Areas Plan. Oregon Biodiversity Information Center, Institute for Natural Resources – Portland, Portland State University, Portland, OR. 198pp.

Oyler-McCance S. J., T. B. Cross, J. R. Row, M. K. Schwartz, D. E. Naugle, J. A. Fike, K. Winiarski, B. C. Fedy. 2022. New strategies for characterizing genetic structure in wide-ranging, continuously distributed species: A GRSG case study. PLoS ONE 17(9): e0274189. https://doi.org/10.1371/journal.pone.0274189.

Palmquist, K. A., D. R. Schlaepfer, R. R. Renne, S. C. Torbit, K. E. Doherty, T. E. Remington, G. Watson, J. B. Bradford, W. K. Laurenroth. 2021. Divergent climate change effects on widespread dryland plant communities driven by climatic and ecohydrological gradients. Global Change Biology, 27:5169–5185.

Patricelli, G. L., J. L. Blickley, and S. L. Hooper. 2013. Recommended management strategies to limit anthropogenic noise impacts on greater sage-grouse in Wyoming. Human–Wildlife Interactions 7(2):230–249. Fall 2013.

Patterson, R. L. 1952. The sage grouse in the upper Green River Basin of Wyoming. University of Michigan.

Payne, G. F., J. W. Foster, and W. C. Leininger. 1983. Vehicle impacts on northern Great Plains range vegetation. Journal of Range Management 36:327-331.

Pedersen, E. K., J. W. Connelly, J. R. Hendrickson, and W. E. Grant. 2003. Effect of sheep grazing and fire on sage grouse populations in southeastern Idaho. Ecological Modelling 165:23–47.

Peebles, L. W., M. R. and Conover. 2016. Effectiveness of the toxicant DRC-1339 in reducing populations of common ravens in Wyoming. Wildlife Society Bulletin, v. 40, no. 2, p. 281–287.

Pellant, M. 1990. Unpublished data on file at: U. S. Department of Interior, Bureau of Land Management, Idaho State Office, Boise, ID.

Pellant, M. 1996. Cheatgrass: the invader that won the west. Interior Columbia Basin Ecosystem Management Project, Bureau of Land Management, Idaho State Office, Boise, Idaho.

Pellant, M., P. Shaver, D. Pyke, and J. Herrick. 2020. Interpreting indicators of rangeland health. Version 5. Bureau of Land Management, National Science and Technology Center, Technical Reference 1734-6.

Perry, N. D., P. Morey, and G. San Miguel. 2015. Dominance of a Natural Water Source by Feral Horses. The Southwestern Naturalist, 60(4), 390–393. Internet website: http://www.jstor.org/stable/44731775.

Petersen, K. L. and L. B. Best. 1985. Nest-site selection by sage sparrows. Condor 87:217-221.

Peterson, J. G. 1970. The food habits and summer distribution of juvenile Sage-Grouse in central Montana. Journal of Wildlife Management 34:147-155.

Pilliod, D. S., J. L. Welty, and R. S. Arkle. 2017. Refining the cheatgrass-fire cycle in the Great Basin: Precipitation timing and fine fuel composition predict wildfire trends. Ecology and Evolution 7: 8126-8151.

Pitkin, M. and L. Quattrini. 2010. Pocket Guide to Sagebrush Birds. Rocky Mountain Bird Observatory and PRBO Conservation Science Independent Publication, 68 p.

Polley, H. W., D. D. Briske, J. A. Morgan, K. Wolter, D. W. Bailey, and J. R. Brown. 2013. Climate change and North American rangelands: trends, projections, and implications. Rangeland Ecology & Management 66:493-511.

Prather, P. R. and T. A. Messmer. 2010. Raptor and corvid response to power distribution line perch deterrents in Utah. The Journal of Wildlife Management 74(4):796-800.

Prochazka, B. G., P. S. Coates, M. A. Ricca, M. L. Casazza, K. B. Gustafson, and J. M. Hull. 2017. Encounters with pinyon-juniper influence riskier movements in greater sage-grouse across the Great Basin. Rangeland Ecology and Management, v. 70, p. 39–49.

Prochazka, B. G., P. S. Coates, C. L. Aldridge, M. S. O'Donnell, D. R. Edmunds, A. P. Monroe, S. E. Hanser, L. A. Wiechman, and M. P. Chenaille. 2024. Range-wide Population Trend Analysis for Greater Sage-Grouse (Centrocercus urophasianus)—Updated 1960–2023. USDOI; USGS. https://pubs.usgs.gov/dr/1190/dr1190.pdf.

Proville, J., K. A. Roberts, A. Peltz, L. Watkins, E. Trask, and D. Wiersma. 2022. The demographic characteristics of populations living near oil and gas wells in the USA. Population and Environment, 44(1), 1-14.Pruett, C.L., M.A. Patten, and D.H. Wolfe. 2009. Avoidance behavior by prairie grouse: Implications for development of wind energy. Conservation Biology 23:1253-1259.

Pyke, D. A. 2011. Restoring and rehabilitating sagebrush habitats. Pp. 531-548 in S. T. Knick and J. W. Connelly (editors). Greater sage-grouse: ecology and conservation of a landscape species and its habitats. Studies in Avian Biology 38. University of California Press. Berkeley, CA.

Pyke, D. A., J. C. Chambers, J. L. Beck, M. L. Brooks, and B. A. Mealor. 2016. Land uses, fire and invasion: Exotic annual bromus and human dimensions. In: M. J. Germino, J. C. Chambers, and C. S. Brown (editors). Exotic Brome-Grasses in Arid and Semiarid Ecosystems of the Western US: Causes, Consequences and Management Implications. New York, New York: Springer.

Pyne. 2004. Pyromancy: Reading stories in the flames. Conservation Biology 18: 874-877.

Pyrah, D. B. 1987. American pronghorn antelope in the Yellow Water Triangle, Montana. Montana Department of Fish, Wildlife and Parks and Bureau of Land Management. 121pp.

Pyle, W. H. 1993. Response of brood-rearing habitat of sage-grouse to prescribed burning in Oregon. Master's thesis. Oregon State University, Corvallis.

Radle, A. L. 2007. The Effect of Noise on Wildlife: A Literature Review. Internet website: https://winapps.umt.edu/winapps/media2/wilderness/toolboxes/documents/sound/radle_effect_noise_wildlife.pdf.

Ramboll. 2023. BLM Western US Photochemical Air Quality Modeling For 2032. Intended for US Bureau of Land Management and Environmental Management and Planning Solutions, Inc. (EMPSi). Prepared by Ramboll. October 2023.

Rassmussen, D. I. and L. A. Griner. 1938. Life history and management studies of the sage grouse in Utah, with special reference to nesting and feeding habits. Trans. North American Wildlife. Conf. 3 :852-864.

Reese, K. P. and R. T Bowyer. 2007. Monitoring populations of sage-grouse: Moscow, Idaho, University of Idaho, College of Natural Resources Experiment Station Bulletin 88, 54 p., accessed December 2017 at https://sgrp.usu.edu/files/uploads/grouseProcdngs4.pdf.

Reinhardt, J. R., D. E. Naugle, J. D. Maestas, B. Allred, J. Evans, and M. Falkowski. 2017. Next-generation restoration for sage-grouse: a framework for visualizing local conifer cuts within a landscape context. Ecosphere, 8(7), e01888.

Reisner, M. D., J. B. Grace, D. A. Pyke, and P. S. Doescher. 2013. Conditions favoring *Bromus tectorum* dominance of endangered sagebrush steppe ecosystems. Journal of Applied Ecology. doi: 10.1111/1365-2664.

Remington, T. E. and C. E. Braun. 1991. How surface coal mining affects sage grouse, North Park, Colorado. In Proceedings, Issues and Technology in the Management of Impacted Western Wildlife. Thorne Ecological Institute (Vol. 5, pp. 128-132).

Repasky, R. R. and D. Schluter. 1994. Habitat distributions of wintering sparrows along an elevational gradient: Tests of the food, predation and microhabitat structure hypotheses. Journal of Animal Ecology 63:569-582.

Reynolds, T. D. 1981. Nesting of the sage thrasher, sage sparrow, and Brewer's sparrow in southeastern Idaho. Condor 83:61-64.

Rice, M. B., L. G. Rossi, and A. D. Apa. 2016. Seasonal habitat use by greater sage-grouse (*Centrocercus urophasianus*) on a landscape with low density oil and gas development. PLoS ONE, v. 11, no. 10, article e0165399, 20 p.

Rich, T. D. 1980. Nest placement in sage thrashers, sage sparrows and Brewer's sparrows. The Wilson Bulletin 92:362-368.

Rich, T. 1985. Sage Grouse Population Fluctuations: Evidence of a 10-year Cycle. US Bureau of Land Management, Idaho State Office.

Richardson, W., T. K. Stringham, A. B. Nuss, B. Morra, and K. A. Snyder. 2023. Shifts in sage-grouse arthropod food sources across grazing and environmental gradients in upland meadow communities. Journal of Environmental Management 348 (2023) 119261.

Rigge, M. B, B. Bunde, K. Postma, and H. Shi. 2022. Rangeland Condition Monitoring Assessment and Projection (RCMAP) Sagebrush Fractional Component Time-Series Across the Western U.S. 1985-2021. U.S. Geological Survey data release, https://doi.org/10.5066/P9ODAZHC.

Rigge, M., C. Homer, H. Shi, D. K. Meyer, B. Bunde, B. Granneman, K. Postma, P. Danielson, A. Case, and G. Xian. 2021b. Rangeland fractional components across the western United States from 1985-2018. Remote Sensing 13(4):813. https://doi.org/10.3390/rs13040813.

Rigge, M., H. Shi, and K. Postma. 2021c. Projected change in rangeland fractional component cover across the sagebrush biome under climate change through 2085. Ecosphere 12(6): e03538.10.1002/ecs2.3538.

Rimbey, N. R., L. A. Torell, and J. A. Tanaka. 2007. Why grazing permits have economic value. Journal of Agricultural and Resource Economics, 20-40.

Ripple, W. J., P. Smith, H. Haberl, S. A. Montzka, C. McAlpine, and D. H. Boucher. 2014. Ruminants, climate change and climate policy. Nature climate change 4(1):2-5.

Rishel, G., J. A. Lynch, and E. S. Corbett. 1982. Seasonal Stream Temperature Changes Following Forest Harvesting. Journal of Environmental Quality Volume 11, Issue 1 p. 112-116.

Rotenberry, J. T. and J. A. Wiens. 1980. Habitat structure, patchiness, and avian communities in North American steppe vegetation: a multivariate analysis. Ecology 61:1228-1250.

Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology, Pagosa Springs.

Row, J. R., K. E. Doherty, T. B. Cross, M. K. Schwartz, S. J. Oyler-McCance, D. E. Naugle, S. T. Knick, B. C. Fedy. 2018. Quantifying functional connectivity: the role of breeding habitat, abundance, and landscape features on range-wide gene flow in sage-grouse. Evolutionary Applications, 11:1305–1321.

Row, J. R. and B. C. Fedy. 2017. Spatial and temporal variation in the range-wide cyclic dynamics of greater sage-grouse Oecologia, v. 185, no. 4, p. 687–698. [Also available at https://doi.org/10.1007/s00442-017-3970-9.]

Row, J. R., S. J. Oyler-McCance, and B. C. Fedy. 2016. Differential influences of local subpopulations on regional diversity and differentiation for greater sage-grouse (*Centrocercus urophasianus*). Molecular Ecology, v. 25, no. 18, p. 4424–4437. [Also available at https://doi.org/10.1111/mec.13776.]

Row, J. R., S. J. Oyler-McCance, J. A. Fike, M. S. O'Donnell, K. E. Doherty, C. L. Aldridge, Z. H. Bowen, and B. C. Fedy. 2015. Landscape characteristics influencing the genetic structure of greater sage-grouse within the stronghold of their range—A holistic modeling approach. Ecology and Evolution, v. 5, no. 10, p. 1955–1969. [Also available at https://doi.org/10.1002/ece3.1479.]

Rowland, M. M., L. H. Suring, R. J. Tausch, S. Geer, and M. J. Wisdom. 2008. Characteristics of western juniper encroachment into sagebrush communities in central Oregon. USDA Forest Service Forestry and Range Sciences Laboratory, La Grande, Oregon 97850, USA.

Rupke, A. 2015. Today's (and Tomorrow's?) Phosphate. Utah Geological Survey. Survey Notes, v. 47 no. 2, May 2015. Available online at: https://geology.utah.gov/map-pub/survey-notes/todays-and-tomorrows-phosphate/.

Sabatier, R., D. Durant, S. Ferchichi, K. Haranne, F. Léger, and M. Tichit. 2016. Effect of cattle trampling on ground nesting birds on pastures: An experiment with artificial nests. European Journal of Ecology, 1(2), 5-11. doi:10.1515/eje-2015-0012.

Sachs, B. 2023. As Coal Mines Close, Displaced Miners Find Work in Renewable Energy Boom. Capital & Main. https://capitalandmain.com/as-coal-mines-close-displaced-miners-find-work-in-renewable-energy-boom#:~:text=Reinvesting%20in%20America-,As%20Coal%20Mines%20Close%2C%20Displaced%20Miners%20Find%20Work%20in%20Renewable,behind%20in%20the%20energy%20transition.

Sada, D. W. and G. L. Vinyard. 2002. Anthropogenic changes in biogeography of Great Basin aquatic biota. Pages 277-293 in R. Hershler, D.B. Madsen, and D.R. Currey (eds.). Great Basin Aquatic Systems History. Smithsonian Contributions to the Earth Sciences, Number 33.

Sauer, J. R., D. K. Niven, J. E. Hines, D. J. Ziolkowski, Jr., K. L. Pardieck, J. E. Fallon, and W. A. Link. 2017. The North American Breeding Bird Survey, Results and Analysis 1966 - 2015. Version 2.07.2017 USGS Patuxent Wildlife Research Center, Laurel, MD. Available online at http://www.mbr-pwrc.usgs.gov/bbs/bbs.html.

Sawyer, H., R. M. Nielson, F. Lindzey, and L. L. McDonald. 2006. Winter habitat selection of mule deer before and during development of a natural gas field. The Journal of Wildlife Management, 70(2), 396-403.

Sawyer H., M. S. Lambert, and J. A. Merkle. 2020. Migratory disturbance thresholds with mule deer and energy development. J. Wildlife Management 1–8; 2020; DOI: 10.1002/jwmg.21847.

Scanes, P. R, A. McSorley, and A. Dickson. 2021. Feral horses (*Equus caballus*) increase suspended sediment in subalpine streams. Marine and Freshwater Research 2021(72): 1290–1302. CSIRO PUBLISHING. Internet website: https://doi.org/10.1071/MF20353.

Scasta, J. D., J. Hennig, and J. L. Beck. 2018. Framing contemporary U.S. wild horse and burro management processes in a dynamic ecological, sociological, and political environment. Human-Wildlife Interactions, 12(1), 31–45. https://doi.org/https://doi.org/10.26077/2fhw.

Schachtschneider, C. L. 2016. Targeted grazing applied to reduce fire behavior metrics and wildfire spread. University of Idaho.

Scheinost, P., M. Stannard, and T. Prather. 2008. Ventenata, *Ventenata dubia* (Leers) Coss. United States Department of Agriculture, Natural Resource Conservation Service Plant Guide. 3 pp.

Schlaepfer, D. R., K. A. Taylor, V. E. Pennington, K. N. Nelson, T. E. Martyn, C. M. Rottler, W. K. Lauenroth, and J. B. Bradford. 2015. Simulated big sagebrush regeneration supports predicted changes at the trailing and leading edges of distribution shifts. Ecosphere, v. 6, no.1, art. 3.

Schlatterer, E. F. 1972. A Preliminary Description of Plant Communities Found on the Sawtooth, White Cloud, Boulder and Pioneer Mountains. Ogden, UT: United States Department of Agriculture, Forest Service, Intermountain Region. Unpublished paper on file with United States Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory, Missoula, MT.

Schmalz, J. M., B. Wachocki, M. Wright, S. I. Zeveloff, and M. M. Skopec. 2014. HABITAT SELECTION BY THE PYGMY RABBIT (*BRACHYLAGUS IDAHOENSIS*) IN NORTHEASTERN UTAH. Western North American Naturalist, 74(4), 456–466. http://www.jstor.org/stable/24644914.

Schrag, A., S. Konrad, S. Miller, B. Walker, S. Forrest. 2011. Climate-change impacts on sagebrush habitat and West Nile virus transmission risk and conservation implications for greater sage-grouse. GeoJournal. 76. 561-575. 10.1007/s10708-010-9369-3.

Schroeder, M. A., J. R. Young, and C. E. Braun. 1999. Sage-Grouse (*Centrocercus urophasianus*). In: The Birds of North America, No. 425 (A. Poole and F. Gill, editors). The Birds of North America, Inc., Philadelphia, Pennsylvania.

Schroeder, M. A. and L. A. Robb. 2003. Fidelity of greater sage-grouse Centrocercus urophasianus to breeding areas in a fragmented landscape. Wildlife Biology, v. 9, no. 4, p. 291–299.

Schroeder, M. A., C. L. Aldridge, A. D. Apa, J. R. Bohne, C. E. Braun, S. D. Bunnell, J. W. Connelly, P. A. Deibert, S. C. Gardner, M. A. Hilliard, and G. D. Kobriger. 2004. Distribution of Sage-Grouse in North America. Condor 106:363-376.

Sedgwick, J. A. 1987. Avian habitat relationships in pinyon-juniper woodland. Wilson Bulletin 99:413-431.

Scott, J. W. 1942. Mating behavior of the sage grouse. The Auk, 59 (4), p.477-498.

Sedgwick, J. A. 1987. Avian Habitat Relationships in Pinyon-Juniper Woodland. The Wilson Bulletin, 99(3), 413–431.

Seegmiller, R. F. and R. D. Ohmart. 1981. Ecological relationships of feral burros and desert bighorn sheep. Wildlife Monographs, (78), 3-58.

Shinneman, D. J., C. L. Aldridge, P. S. Coates, M. J. Germino, D. S. Pilliod, and N. M. Vaillant. 2018. A conservation paradox in the Great Basin—Altering sagebrush landscapes with fuel breaks to reduce habitat loss from wildfire: U.S. Geological Survey Open-File Report 2018–1034, 70 p., https://doi.org/10.3133/ofr20181034.

Shipley, L. A., J. S. Forbey, and B. D. Moore. 2009. Revisiting the dietary niche: when is a mammalian herbivore a specialist? Integrative and comparative biology 49(3):274-790.

Shirk, A. J., M. A. Schroeder, L. A. Robb, and S. A. Cushman. 2015. Empirical validation of landscape resistance models—Insights from the greater sage-grouse (*Centrocercus urophasianus*). Landscape Ecology, v. 30, no. 10, p. 1837–1850.

Shriver, R. K., C. B. Yackulic, D. M. Bell, and J. B. Bradford. 2022. Dry Forest Decline Is Driven by Both Declining Recruitment and Increasing Mortality in Response to Warm, Dry Conditions. Global Ecology and Biogeography 31: 2259–69.

Slater, S. J. and J. P. Smith. 2010. Effectiveness of raptor perch deterrents on an electrical transmission line in southwestern Wyoming. Journal of Wildlife Management 74: 1080-1088.

Smith, R. E. 2012. Conserving Montana's sagebrush highway: Long distance migration in sage-grouse. Graduate Student Theses, Dissertations, & Professional Papers. 239. https://scholarworks.umt.edu/etd/239.

Smith, J. T., B. W. Allred, C. S. Boyd, K. W. Davies, A. R. Kleinhesselink, S. L. Morford, and D. E. Naugle. 2023. Fire need annual grasses more than annual grasses need fire. Biological Conservation. 286: 110299.

Smith, K. T., J. L. Beck, and A. C. Pratt. 2016. Does Wyoming's core area policy protect winter habitats for greater sage-grouse? Environmental Management, v. 58, no. 4, p. 585–596.

Smith, J.T., J. D. Tack, L. I. Berkeley, M. Szczypinski, D. E. and Naugle. 2018. Effects of livestock grazing on nesting sage-grouse in central Montana. Journal of Wildlife Management, v. 82, no. 7, p. 1503-1515.

Smith, I. T., J. L. Rachlow, L. K. Svancara, L. A. McMahon, and S. J. Knetter. 2019. Habitat specialists as conservation umbrellas: Do areas managed for greater sage-grouse also protect pygmy rabbits? Ecosphere 10(8):e02827. 10.1002/ecs2.2827.

Smith, J.T., J. D. Tack, K. E. Doherty, B. W. Allred, J. D. Maestas, L. I. Berkley, S. J. Dettenmaier, T. A. Messmer, and D. E. Naugle. 2001. Phenology largely explains taller grass at successful nests in greater sage-grouse. Ecology and Evolution, v. 8, no. 1, p. 356–364. [Also available at https://doi.org/10.1002/ece3.3679.]

State of Idaho. 2021. Policy For Greater Sage-Grouse Management in Idaho October 22, 2021 Version. Internet website: Attachment1_2021IdahoPlan-FINAL.pdf.

State of Nevada Commission on Mineral Resources. 2021. Nevada Geothermal Production for 2021. Internet website: https://minerals.nv.gov/uploadedFiles/mineralsnvgov/content/Programs/Geo/GEO%20PROD%20SUMMARY%202021.pdf.

State of Nevada Commission on Mineral Resources. 2023. Nevada Geothermal Power Plants Januar 2023. Internet website: NVGeoPowerPlants_20230117.pdf.

State of Wyoming Legislature. 2021. Distribution for FY 2021 Severance Taxes. W.S. 39-14-801. Internet website: https://www.wyoleg.gov/2021/Databook/Operations/Revenue/h-Severance%20Tax%20Flow%20Chart.pdf.

Stevens, B. S., J. W. Connelly, and K. P. Reese. 2012. Multi-scale assessment of greater sage-grouse fence collision as a function of site and broad scale factors. Journal of Wildlife Management 76:1370-1380.

Still, S. M. and B. A. Richardson. 2014. Projections of contemporary and future climate niche for Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*): A guide for restoration. Natural Areas Journal 35(1):30-43.

Stiver, S. J., E. T. Rinkes, D. E. Naugle, P. D. Makela, D. A. Nance, and J. W. Karl, eds. 2015. Sage-Grouse Habitat Assessment Framework: A Multiscale Assessment Tool. Technical Reference 6710-1. Bureau of Land Management and Western Association of Fish and Wildlife Agencies, Denver, Colorado.

Strand, E. K., K. L. Launchbaugh, R. F. Limb, and L. A. Torell. 2014. Livestock grazing effects on fuel loads for wildland fire in sagebrush dominated ecosystems. Journal of Rangeland Applications, 1, 35-57.

Strong, C., K. K. Neuman, J. L. Hutchinson, J. K. Miller, A. L. Clark, L. Chang, J. Iwanicha, E. Feucht, M. J. Lau, D. J. Lauten, S. Markegard, B. Pearl, D. L. Sherer, R. Tertes, S. Tharratt, and T. Wooten. 2021. Common Raven Impacts on Nesting Western Snowy Plovers: Integrating Management to Facilitate Species Recovery. Human–Wildlife Interactions: 15(3), Article 19.

Su, Y. and C. C. Lee. 2022. The impact of air quality on international tourism arrivals: a global panel data analysis. Environmental Science and Pollution Research, 29(41), 62432-62446.

Svejcar T., C. Boyd, K. Davies, M. Madsen, J. Bates, R. Sheley, C. Marlow, D. Bohnert, M. Borman, R. Mata-Gonzàlez, J. Buckhouse, T. Stringham, B. Perryman, S. Swanson, K. Tate, M. George, G. Ruyle, B. Roundy, C. Call, K. Jensen, K. Launchbaugh, A. Gearhart, L. Vermeire, J. Tanaka, J. Derner, G. Frasier, and K. Havstad. 2014. Western land managers will need all available tools for adapting to climate change, including grazing: A critique of Beschta et al. Environ Manage. 53(6):1035-8. June 2014.

Tabuchi, H. and N. Popovich. 2021. People of Color Breathe More Hazardous Air. The Sources Are Everywhere. The New York Times. Internet website: https://www.nytimes.com/2021/04/28/climate/air-pollution-minorities.html.

Tack, J. 2010. Sage-grouse and the human footprint: Implications for conservation of small and declining populations. M.S. Thesis, University of Montana. 106 pp.

Tait, C. K., J. L. Li, G. A. Lambert, T. N. Pearsons, and H. W. Li. 1994. Relationships between riparian cover and the community structure of high desert streams. The North American Benthological Society 13(1): 45-56.

Tausch, R. J. and R. S. Nowak. 1999. Fifty Years of Ecotone Change Between Shrub and Tree dominance in the Jack Springs Pinyon Research Natural Area. USDA, Forest Service Proceedings RMRS-P-00.

Taylor, O. J. 1987. Oil Shale, Water Resources, and Valuable Minerals of the Piceance Basin, Colorado: the Challenge and Choices of Development. US Geological Survey Professional Paper 1310. US Government Printing Office, Washington. Internet website: https://pubs.usgs.gov/pp/1310/report.pdf.

Taylor, R. L., D. E. Naugle, and L. S. Mills. 2012. Viability Analyses for Conservation of Sage-Grouse Populations: Buffalo Field Office, Wyoming Final Report. Prepared for Bureau of Land Management Buffalo Field Office, Buffalo, Wyoming. Wildlife Biology Program, University of Montana BLM Contract 09-3225-0012 Number G09AC00013. February 27, 2012.

Teige, E. C., L. M. Maxwell, S. E. Jordan, T. K. Rutherford, E. I. Dietrich, E. M. Samuel, A. L. Stoneburner, N. J. Kleist, J. K. Meineke, L. B. Selby, A. C. Foster, and S. K. Carter. 2023. Annotated bibliography of scientific research on greater sage-grouse published from October 2019 to July 2022 (ver. 1.1, November 2023): U.S. Geological Survey Open-File Report 2023–1082, 122 p., https://doi.org/10.3133/ofr20231082.

Tesky, J. L. 1994. Buteo regalis. In: Fire Effects Information System, [Online]. U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, Fire Sciences Laboratory (Producer). Available: http://www.fs.usda.gov/database/feis/animals/bird/bure/all.html [2024, January 16].

Tiller, B. L. 1997. Feral burro populations: Distribution and damage assessment. Pacific Northwest National Laboratory Report PNNL-11879. Fort Irwin, CA: U.S. Army, Department of Public Works. https://doi.org/10.2172/663550.

Tilley, D. J., D. Ogle, L. S. John, and B. Benson. 2023. Big Sagebrush Artemisia tridentata Nuttall: Plant Guide. Internet website: https://plants.usda.gov/DocumentLibrary/plantguide/pdf/pg_artrw8.pdf.

Tisdale, E. W. 1994. Wyoming big sagebrush SRM 403. In: T. N. Shiflet [ED]. Rangelands cover types of the United States. Denver, CO, USA: Society of Range Management. p. 42–43.

TNWCC (National Wind Coordinating Collaborative). 2017. Greater Sage-Grouse, Overview and Effects of Wind Energy Development. Available at: https://www.energy.gov/sites/default/files/2018/05/f51/NWCC-Sage-Grouse-Fact-Sheet.pdf.

Torell, L. A., J. A. Tanaka, N. Rimbey, T. Darden, L. Van Tassell, and A. Harp. 2002. Ranch-Level Impacts of Changing Grazing Policies on BLM Land to Protect the Greater Sage-Grouse: Evidence from Idaho, Nevada and Oregon. Caldwell, ID, USA: Policy Analysis Center for Western Public Lands. PACWPL Policy Paper SG-01-02.

Trudell, E. R. 1973. Geology of Eocene Rocks and Oil Yields of Green River Oil Shales on Part of Kinney Rim, Washakie Basin, Wyoming. Report of Investigations No. 7775. United States Department of Interior. Bureau of Mines. Rock Springs, Wyoming. Internet website: https://digital.library.unt.edu/ark:/67531/metadc38724/m2/1/high_res_d/metadc38724.pdf.

USDA (United States Department of Agriculture). 2023. Quantifying Greenhouse Gas Sources and Sinks in Animal Production Systems, In Quantifying Greenhouse Gas Fluxes in Agriculture and Forestry: Methods for Entity-Scale Inventory. Internet website: https://www.usda.gov/oce/entity-scale-ghg-methods.

_____. 2024. Farm Structure and Contracting. Internet website: https://www.ers.usda.gov/topics/farm-economy/farm-structure-and-organization/farm-structure-and-contracting/.

UDWR (Utah Department of Natural Resources, Division of Wildlife Resources). 2005b. Plant Information Compiled by the Utah Natural Heritage Program: A Progress Report. By M. A. Ben Franklin. State of Utah Department of Natural Resources Division of Wildlife Resources. Salt Lake City, Utah. December 2005.

_____. 2006a. Deer Herd Unit Management Plan: Deer Herd Unit #24 (Mt. Dutton). Utah Department of Natural Resources, Division of Wildlife Resources. April 2006.

_____. 2006b. Deer Herd Unit Management Plan: Deer Herd Unit #25 (Plateau). Utah Department of Natural Resources, Division of Wildlife Resources. April 2006.

_____. 2006c. Deer Herd Unit Management Plan: Deer Herd Unit #27 (Paunsaugunt). Utah Department of Natural Resources, Division of Wildlife Resources. April 2006.

_____. 2006d. Deer Herd Unit Management Plan: Deer Herd Unit #26 (Kaiparowits). Utah Department of Natural Resources, Division of Wildlife Resources. April 2006.

United States Department of Transportation, Federal Highway Administration. 2004. Synthesis of Noise Effects on Wildlife Populations Internet website: Synthesis of Noise Effects on Wildlife Populations (dot.gov).

US Forest Service. 1999. Final Rule: Endangered and threatened wildlife and plants; Determination of Threatened Status for Bull Trout in the Coterminous United States. Federal Register 64: 210.

_____. 2009a. Species Fact Sheet, Great Basin Redband Trout, Oncorhynchus mykiss gibbsi. Last updated: August 12, 2009. Internet website: http://www.fws.gov/oregonfwo/Species/Data/GreatBasinRedbandTrout/. Accessed on February 13, 2013.

_____. 2009b. Lahontan Cutthroat Trout (*Oncorhynchus clarkii henshawi*) 5-Year Review: Summary and Evaluation. Reno, Nevada.

_____. 2010a. Endangered and Threatened Wildlife and Plants; 12-Month Findings for Petitions to List the Greater Sage- Grouse (*Centrocercus urophasianus)* as Threatened or Endangered: Washington, DC, FWS-R6-ES-2010-0018, *Federal Register* v. 75, no. 55 (March 25, 2010).

_____. 2010b. Bull Trout Final Critical Habitat Justification. Chapter 24, Upper Snake Recovery Unit—Malheur River Basin Critical Habitat Unit.

_____. 2010c. 12-Month Finding on a Petition to List the Pygmy Rabbit as Endangered or Threatened. 75 Federal Register 60516, September 30, 2010.

_____. 2012a. Species Fact Sheet, Bull Trout, *Salvelinus confluentus*. Last updated: July 10, 2012. Internet website: http://www.fws.gov/oregonfwo/Species/Data/BullTrout/. Accessed on September 8, 2012.

_____. 2012b. Utah Prairie Dog (*Cynomys parvidens*) Final Revised Recovery Plan. Prepared by Utah Ecological Services Office and Utah Prairie Dog Recovery Team. West Valley City, Utah.

_____. 2013a. Greater Sage-grouse (*Centrocercus urophasianus*) Conservation Objectives: Final Report. U.S. Fish and Wildlife Service, Denver, CO. February 2013.

_____. 2013b. Species Fact Sheet, Lahontan Cuttroat Trout, *Oncorhynchus clarki henshawi*. Last updated: February 07, 2013. Internet website: http://www.fws.gov/oregonfwo/Species/Data/LahontanCutthroatTrout/. Accessed on February 13, 2013.

_____. 2013c Greater Sage-grouse (*Centrocercus urophasianus*) Conservation Objectives: Final Report. USFWS, Denver, Colorado. February 2013.

_____. 2013d. Recovery plan for the black-footed ferret (*Mustela nigripes*). Denver, Colorado.

_____. 2015a. Recovery plan for the coterminous United States population of bull trout (*Salvelinus confluentus*). Portland, Oregon.

_____. 2015b. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List Greater Sage-Grouse (*Centrocercus urophasianus*) as an Endangered or Threatened Species; Proposed Rule. 80 FR 59858 – 59942.

_____. 2015c. Greater sage-grouse Record of Decision for Idaho and Southwest Montana, Nevada and Utah and Land Management Plan Amendments. Internet website: https://www.fs.usda.gov/sites/default/files/sage-grouse-great-basin-rod.pdf.

USFWS (United States Fish and Wildlife Service). 1995. Recovery Plan for the Lahontan Cutthroat Trout. US Fish and Wildlife Service, Region 1, Portland, Oregon.

_____. 2017. Species Status Assessment Report for the White-tailed Prairie Dog (*Cynomys leucurus*). Washington, DC.

_____. 2019. Species Status Assessment Report for the Black-footed Ferret (*Mustela nigripes*) Prepared by the U.S. Fish and Wildlife Service Black-footed Ferret Recovery Program and members of the Black-footed Ferret Recovery Implementation Team. Washington, DC.

_____. 2020. Monarch (*Danaus plexippus*) Species Status Assessment Report, version 2.1. Washington, DC.

_____. 2021. 5-Year Review Short Form: Utah prairie dog (*Cynomys parvidens*). Utah Ecological Services Office. West Valley City, Utah.

_____. 2023. Management of Conflicts Associated with Common Ravens in the United States: A Technical Review of the Issues, 2023.

USFWS and NMFS (United States Fish and Wildlife Service and National Marine Fisheries Service). 1998. Endangered Species Consultation Handbook - Procedures for Conducting Consultation and Conference Activities Under Section 7 of the Endangered Species Act. Washington, DC and Silver Springs, Maryland.

USGCRP (United States Global Change Research Program). 2018. Fourth National Climate Assessment. Internet website: https://www.globalchange.gov/nca4.

USGS (United States Geological Survey). 2022. Invasive plants: Weeds of the west. Biological Threats and Invasive Species Research Program. Retrieved September 23, 2024, from https://www.usgs.gov/programs/biological-threats-and-invasive-species-research-program/science/invasive-plants-we-1.

_____. 2023a. Soda Ash Statistics and Information. Mineral Commodity Summaries. January 2023. Internet website: https://pubs.usgs.gov/periodicals/mcs2023/mcs2023-soda-ash.pdf.

_____. 2023b. Phosphate Rock Statistics and Information. Mineral Commodity Summaries. January 2023. Internet website: https://pubs.usgs.gov/periodicals/mcs2023/mcs2023-phosphate.pdf.

Vavra, M. 2005. Livestock Grazing and Wildlife: Developing Compatibilities. Rangeland Ecology & Management: March 2005, Vol. 58, No. 2, Pp. 128-134.

Veblen, K. E., D. A. Pyke, C. L. Aldridge, M. L. Casazza, T. J. Assal, and M. A. Farinha. 2011. Range-wide assessment of livestock grazing across the sagebrush biome. US Geological Survey, Reston, VA.

Walker, B. L. 2022. Resource selection by greater sage-grouse varies by season and infrastructure type in a Colorado oil and gas field. Ecosphere 13(5): e4018. http://doi.org/10.1002/ecs2.4018.

Walker, B. L., D. E. Naugle, and K. E. Doherty. 2007a. Greater Sage-Grouse Population Response to Energy Development and Habitat Loss. The Journal of Wildlife Management 71(8): 2644-2654.

Walker, B. L., D. E. Naugle, K. E. Doherty, and T. E. Cornish. 2007b. West Nile virus and greater sage-grouse: Estimating infection rate in a wild bird population. Avian Diseases 51:691-696.

Walker, B. L. and D. E. Naugle. 2011. West Nile virus ecology in sagebrush habitat and impacts on greater sage-grouse populations. Studies in Avian Biology, 38, 127-142.

Walter, W. D., D. M. Leslie, and J. A. Jenks. 2006. Response of Rocky Mountain elk (*Cervus elaphus*) to wind-power development. The American midland naturalist, 156(2), 363-375.

Wann, G. T., N. D. Van Schmidt, J. E. Shyvers, B. C. Tarbox, M. M. McLachlan, M. S. O'Donnell, A. J. Titolo, P. S. Coates, D. R. Edmunds, J. A Heinrichs, A. P. Monroe, and C. L Aldridge. 2022. U.S. range-wide spatial prediction layers of lek persistence probabilities for GRSG: U.S. Geological Survey data release, https://doi.org/10.5066/P95YAUPH.

_____. 2023. A regionally varying habitat model to inform management for greater sage-grouse persistence across their range. Global Ecology and Conservation. 41. e02349. 10.1016/j.gecco.2022.e02349.

Washington Wildlife Habitat Connectivity Working Group. 2012. Washington Connected Landscapes Project: Analysis of the Columbia Plateau Ecoregion. Washington's Department of Fish and Wildlife, and Department of Transportation, Olympia, Washington.

Weisberg, P. J., E. Lingua, and R. B. Pillai. 2007. Spatial patterns of pinyon–juniper expansion in central Nevada. Rangeland Ecology Management 60(2): 115–124. doi:10.2111/05-224R2.1.

Weiss, N. T. and B. J. Verts. 1984. Habitat and distribution of pygmy rabbits (*Sylvilagus idahoensis*) in Oregon. Great Basin Naturalist 44:563-571.

Welty, J. L. and M. I. Jeffries. 2018. Western US ruggedness reclassified into 6 classes. U.S. Geological Survey data release, https://doi.org/10.5066/F7348JN3.

Weltz, M.A., M. Hernandez, M. A. Nearing, K. E. Spaeth, G. Armendariz, F. B. Pierson, C. J. Williams, O. Z. Al-Hamdan, S. K. Nouwakpo, K. McGwire, J. Nesbit, D. Goodrich, and P. Guertin. 2017. Rangeland Hydrology and Soil Erosion Processes. United States Department of Agriculture, Agricultural Research Service, Handbook No. 646, 108 pg.

Westover, M., J. Baxter, R. Baxter, C. Day, R. Jensen, S. Petersen, and R. Larsen. 2016) Assessing greater sage-grouse selection of brood-rearing habitat using remotely-sensed imagery: can readily available high-resolution imagery be used to identify brood-rearing habitat across a broad landscape? PloS one, 11(5), e0156290.

Whisenant, Steven G. 1990. Changing Fire Frequencies on Idaho's Snake River Plains: Ecological and Management Implications. In McArthur, E. D., Romney, E. M., Smith, S. D., Tueller, P. T. (Comps.), *Proceedings of the Symposium on Cheatgrass Invasion, Shrub Die-Off, and Other Aspects of Shrub Biology and Management,* 1989 April 5-7; Las Vegas, NV. Gen. Tech. Rep. INT-276, 4-10. Ogden, UT: United States Department of Agriculture, Forest Service, Intermountain Research Station.

White, R. S. and P. O. Currie. 1983. The Effects of Prescribed Burning on Silver Sagebrush. Journal of Range Management 36(5): 611-613.

Whitford, N., and W. Bish. 2022. Chapter 12: Sage-Grouse. In: Tessman, S.A., and J.R. Bohne (Eds.) Wyoming Handbook of Biological Techniques, 3rd Edition, Rev. 2022. 12-1, 43p, Cheyenne, WY. https://wgfd.wyo.gov/WGFD/media/content/Wildlife/Techniques-Manual_SageGrouseCh_AgeSexGuide_Final_091622.pdf.

Wiedinmyer, C. and M. D. Hurteau. 2010. Prescribed Fire as a Means of Reducing Forest Carbon Emissions in the Western United States. Environmental Science Technology: 1926-1932.

Wiens, J. A. and J. T. Rotenberry. 1981. Habitat associations and community structure of birds in shrubsteppe environments. Ecological Monographs 51:21–42.

WSWG (Wild Sheep Working Group). 2012. Recommendations for Domestic Sheep and Goat Management in Wild Sheep Habitat. Western Association of Fish and Wildlife Agencies.

Williams, C. F., M. J. Reed, R. H. Mariner, J. DeAngelo, and P. S. Galanis, Jr. 2008. Assessment of moderate- and high-temperature geothermal resources of the United States. US Geological Survey Fact Sheet 2008-3082.

Wilson, G. R., and M. J., Edwards. 2008. Native wildlife on rangelands to minimize methane and produce lower-emission meat: kangaroos versus livestock. Conservation Letters, 1(3), 119-128.

Wisdom, M. J., C. W. Meinke, S. T. Knick, and M. A. Schroeder. 2011. Factors associated with extirpation of sage-grouse. Pp. 451-474 in S. T. Knick and C.J.W., editors. Greater Sage-Grouse: ecology of a landscape species and its habitats. Cooper Ornithological Union, University of California Press, Berkeley, CA.

WOGCC (Wyoming Oil and Gas Conservation Commission). 2023. Powder River Basin Production Data. Wyoming. Internet website: http://pipeline.wyo.gov/coalbedchart.cfm.

Wood, D. J. A., T. Seipel, K. M. Irvine, L. J. Rew, and P. C. Stoy. 2019. Fire and development influences on sagebrush community plant groups across a climate gradient in northern Nevada. Ecosphere 10(12): 1–20.

Wolfe, M. L. 1980. Feral horse demography: A preliminary report. Journal of Range Management 33 (5):354-360.

Wolfe, M. L., L. C. Ellis, and R. MacMullen. 1989. Reproductive rates of feral horses and burros. Journal of Wildlife Management 53 (4):916-919.

WSGWG (Wyoming Sage-Grouse Working Group). 2003. Wyoming Greater Sage-grouse Conservation Plan. Cheyenne, Wyoming.

Wyoming Consensus Revenue Estimating Group (CREG). 2023. Mineral Price and Production Estimates, General Fund Revenues, Severance Taxes, Federal Mineral Royalties, Common School Land Income Account and State Royalties, Total State Assessed Valuation. Internet website: https://www.wyoleg.gov/budget/CREG/Reports/October2023CREGReport.pdf.

Wyoming Department of Environmental Quality (DEQ). 2003. Wyoming's Long-Term Strategy for Visibility Protection, 2003 Review Report, Appendix G. Air Quality Division. Cheyenne, Wyoming. Internet website: https://eqc.wyo.gov/public/ViewPublicDocument.aspx?DocumentId=5282.

Wyoming Mining Association. 2023. Trona. Internet website: https://www.wyomingmining.org/minerals/trona/.

Xerces Society. 2021. Wetlands as Pollinator Habitat. Internet website: https://xerces.org/blog/wetlands-as-pollinator-habitat.

_____. 2023. Morrison Bumble Bee. Internet website: https://xerces.org/endangered-species/species-profiles/at-risk-bumble-bees/morrison-bumble-bee.

Yapp, G., J. Walker, and R. Thackway. 2010. Linking Vegetation Type and Condition to Ecosystem Goods and Services. Ecological Complexity 7(3): 292-301. Internet Website: https://doi.org/10.1016/j.ecocom.2010.04.008

Yoakum, J. D. 2004. Foraging Ecology, Diet Studies, and Nutrient Values. Pages 447-502 in Pronghorn: ecology and management. O'Gara, B. W. and J. D. Yoakum, (eds.). University Press of Colorado. Boulder, Colorado. 903 pp.

Yoder, J. M., E. A. Marschall, and D. A. Swanson. 2004. The cost of dispersal: predation as a function of movement and site familiarity in ruffed grouse. Behavioral Ecology, 15(3), 469-476.

Zabihi, K., G. B. Paige, A. L. Hild, S. N. Miller, A. Wuenschel, and M. J. Holloran. 2017. A fuzzy logic approach to analyse the suitability of nesting habitat for greater sage-grouse in western Wyoming. Journal of Spatial Science, 62(2), 215-234.

Zimmerman, S. J., C. L. Aldridge, M. S. O'Donnell, D. R. Edmunds, P. S. Coates, B. G. Prochazka, J. A. Fike, T. B. Cross, B. C. Fedy, and S. J. Oyler-McCance. 2022. A genetic warning system for a hierarchically structured wildlife monitoring framework. Ecological Applications. 10.1002/eap.2787.

Ziolkowski Jr., D. J., M. Lutmerding, W. B. English, V. I. Aponte, and M-A. R. Hudson. 2023. 2023 Release - North American Breeding Bird Survey Dataset (1966 - 2022) [Data set]. U.S. Geological Survey. https://doi.org/10.5066/P9GS9K64.

Zou, L., S. N. Miller, and E. T. Schmidtmann. 2006. Mosquito larval habitat mapping using remote sensing and GIS: Implications of coalbed methane development and West Nile virus. Journal of Medical Entomology 43:1034-1041.

Glossary

Acquisition. Acquisition of lands can be pursued to facilitate various resource management objectives. Acquisitions, including easements, can be completed through exchange, Land and Water Conservation Fund purchases, donations, or receipts from the Federal Land Transaction Facilitation Act sales or exchanges.

Adaptive management. A type of natural resource management in which decisions are made as part of an ongoing science-based process. Adaptive management involves testing, monitoring, and evaluating applied strategies, and incorporating new knowledge into management approaches that are based on scientific findings and the needs of society. Results are used to modify management policy, strategies, and practices.

Adjacent (rights-of-way). Installation of authorized improvements parallel, near, or next to existing authorized rights-of-way.

Allocation. The identification in a land use plan of the activities and foreseeable development that are allowed, restricted, or excluded for all or part of the planning area, based on desired future conditions.

Amendment. The process for considering or making changes in the terms, conditions, and decisions of approved Resource Management Plans or management framework plans. Usually only one or two issues are considered that involve only a portion of the planning area.

Area of Critical Environmental Concern (ACEC). Areas within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards. The identification of a potential ACEC shall not, of itself, change or prevent change of the management or use of public lands.

Artifact. A human-modified object, often appearing on an archaeological site, that typically dates to over 50 years in age.

Authorized Officer. Any employee of the BLM to whom authority has been delegated to perform the duties described.

Avoidance/avoidance area. These terms usually address mitigation of some activity (i.e., resource use). Paraphrasing the CEQ Regulations (40 CFR 1508.20), avoidance means to circumvent, or bypass, an impact altogether by not taking a certain action, or parts of an action. Therefore, the term "avoidance" does not necessarily prohibit a proposed activity, but it may require the relocation of an action, or the total redesign of an action to eliminate any potential impacts resulting from it. Also see *"right-of-way avoidance area"* definition.

Best management practices (BMPs). A suite of techniques that guide or may be applied to management actions to aid in achieving desired outcomes. BMPs are often developed in conjunction with land use plans, but they are not considered a planning decision unless the plans specify that they are mandatory.

Biologically significant unit (BSU). A geographical/spatial area that includes Greater Sage-Grouse priority habitat management areas that is used as the basis for comparative calculations to support evaluation

of changes to habitat. In Utah, each BSU correlates to the priority habitat management area within a population area.

Co-location (communication sites). The installation of new equipment/facilities on or within or adjacent to existing authorized equipment/facilities or within a communication site boundary as designated in the Communication Site Plan.

Co-location (electrical lines). Installation of new rights-of-way adjacent to current ROWs boundaries, not necessarily placed on the same power poles.

Co-location (other rights-of-way (ROW). Installing new authorized ROWs within or on the existing footprint of an approved ROW boundary.

Communication site. Sites that include broadcast types of uses (e.g., television, AM/FM radio, cable television, broadcast, translator) and non-broadcast uses (e.g., commercial or private mobile radio service, cellular telephone, microwave, local exchange network, passive reflector).

Controlled surface use (CSU). CSU is a category of moderate constraint stipulations that allows some use and occupancy of public land while protecting identified resources or values and is applicable to fluid mineral leasing and all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, construction of wells and/or pads). On BLM-administered lands, CSU areas are open to fluid mineral leasing but the stipulation allows the BLM to require special operational constraints, or the activity can be shifted more than 200 meters (656 feet) to protect the specified resource or value.

Cultural resources. The present expressions of human culture and the physical remains of past activities, such as historic buildings, structures, objects, districts, landscapes, and archaeological sites. These resources can be significant in the context of national, regional, or local history, architecture, archaeology, engineering, or culture. They may also include sacred sites and natural features of landscapes that are significant to living communities.

Cultural resource inventories. Both a systematic review of records, files, and archived databases and a survey to determine the past human use of an area.

Cumulative Impact (Effect). The impact on the environment that results from the incremental impact of the action when added to other past, present, or reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

De-watering. The process of removing surface and ground water from a particular location.

Designated Roads and Trails. Those roads and trails that are specifically identified by the BLM as the only allowable routes for motor vehicle travel in the specific area involved. Travel on designated roads and trails may be allowed seasonally or yearlong. Additional roads or trails may be constructed and authorized for travel as need dictates in conformance with the land use plan or activity plan.

Disposal lands. Transfer of public land out of federal ownership to another party through sale, exchange, Recreation and Public Purposes Act of 1926, Desert Land Entry or other land law statutes.

Disturbance response groups. A process that examines local knowledge, soil mapping data and published literature on soils, plant ecology, plant response to various disturbances, disturbance history of the area, and any other important attributes necessary to sort pre-existing ecological sites into groups of ecological sites based on their responses to natural or human-induced disturbances.

Easement. A right afforded a person or agency to make limited use of another's real property for access or other purposes.

Ecological site. A distinctive kind of land with specific characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation.

Ecological site description. A report that provides detailed information about an ecological site.

Erosion. The wearing away of the land surface by running water, wind, ice, or other geological agents.

Ethnographic resources. Variations of natural resources and standard cultural resource types. They are subsistence and ceremonial locales and sites, structures, objects, and rural and urban landscapes assigned cultural significance by traditional users.

Exchange. A transaction whereby the federal government receives land or interests in land in exchange for other land or interests in land.

Exclusion areas. An area on the public lands where a certain activity(ies) is prohibited to ensure protection of other resource values present on the site. The term is frequently used in reference to lands/realty actions and proposals (e.g., rights-of-way, etc.), but is not unique to lands and realty program activities. This restriction is functionally analogous to the phrase "no surface occupancy" used by the oil and gas program and is applied as an absolute condition to those affected activities. These less restrictive term is avoidance area. Also see "right-of-way exclusion area" definition.

Existing habitat. Habitat that currently supports greater sage-grouse, even if not currently occupied. This can include seasonal habitats, such as wintering, nesting and brood-rearing**.**

Exploration. Active drilling, geophysical operations, surface sampling and trenching, or smallscale mining or similar activities, to: a. Determine the presence of the mineral resource; or b. Determine the extent of the reservoir or mineral deposit.

Feature. In reference to archaeology, a feature is a collection of one or more contexts representing some non-portable activity, such as a hearth or wall.

Federal mineral estate. Subsurface mineral estate owned by the US and administered by the BLM. Federal mineral estate under BLM jurisdiction is composed of mineral estate underlying BLM lands, tribal lands, privately owned lands, and state-owned lands.

Federal mineral interest. See Federal mineral estate.

Fluid minerals. Oil, gas, coal bed natural gas, and geothermal resources.

Fully Processed Grazing Authorization. A grazing permit or lease that has been issued in accordance with all applicable laws, regulation, and policy including the NEPA, Endangered Species Act (ESA), and decision processes provided in 43 CFR 4160.

General Habitat Management Areas (GHMA). Lands that are, or have the potential to become, occupied seasonal or year-round habitat outside of PHMA, managed to sustain GRSG populations. These areas are defined differentially by state wildlife management agencies, but generally are of poorer GRSG habitat quality with reduced occupancy when compared to PHMA. Some state wildlife agencies have identified areas of GHMA as important for restoration, connectivity, or seasonal habitats. The objective intent for GHMA is to maintain habitat conditions to support GRSG populations consistent with the state agency designations of recovery, connectivity, or seasonal habitats.

Geophysical exploration. Efforts to locate or better define mineral or oil and gas deposits, using geophysical methods such as seismic refraction, electrical resistivity, induced magnetism, or other methods.

Geothermal energy. Natural heat from within the Earth captured for production of electric power, space heating, or industrial steam.

GRSG nesting habitat. Areas with protective grass and high lateral shrub cover where hens nest, typically under sagebrush shrubs.

GRSG early brood-rearing habitat. Upland sagebrush sites relatively close to nest sites, typically characterized by high species richness with an abundance of forb sand insects, where sage-grouse hens raise young chicks (<21 days).

GRSG winter habitat. Sagebrush habitats that provide access to sagebrush above the snow for all food and cover requisite needs.

Habitat. Areas that currently provide GRSG resources (such as space, food, cover, and water) and environmental conditions (such as temperature, precipitation, presence or absence of predators and competitors) that promote occupancy of sage-grouse during a particular stage of its annual life cycle (e.g., breeding, nesting) and allows for them to survive and reproduce.

Habitat Assessment Framework. The Habitat Assessment Framework (HAF) is a tool to measure the suitability of GRSG habitat at multiple scales.

> **Mid-scale HAF areas**. Areas conceptually linked to GRSG dispersal capabilities in population and subpopulation areas as described by Connelly and others (2004). Mid-scale HAF delineations also conceptually provide the life requisite space for GRSG dispersal, allowing for migration movements based on the following key inputs: availability of sagebrush habitat, size and number of habitat patches, connectivity of habitat patches, characteristics of linkage areas between patches, landscape matrix and edge effects, and anthropogenic disturbances.
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> **Fine-scale HAF areas**. Fine-scale HAF delineations generally describe the extent of all seasonal use areas used by local populations. Fine-scale areas include suitable habitats within home range areas that have contiguous mosaics of sagebrush shrublands or grassland/sagebrush connecting seasonal use areas.

Indicators. Factors that describe resource condition and change and can help the BLM determine trends over time.

Intact landscape. Landscapes with healthy sagebrush ecosystems that have not been disrupted by anthropogenic activities or catastrophic natural events, including invasion by non-native grasses and associated wildfires.

Invasive Species (Invasive Plant Species, Invasives). An alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health. The species must cause, or be likely to cause, harm, and be exotic to the ecosystem it has infested before considered invasive.

Key areas of critical environmental concern. Special management areas that have been identified as having a high utility for GRSG conservation. These land allocations were designated in previous RMPs to protect other relevant and important resource values; however, they also contain quality GRSG habitat, are within PHMA, and contain leks. They should be priority areas for GRSG management as well as the values for which the ACEC was designated; site-specific ACEC management plans will be prepared at the implementation level.

Key research natural area. A special type of ACEC that was designated in a previous RMP to protect specific intact representative native plant communities. These areas are in PHMA and are used for long term vegetation monitoring of relatively unaltered native plant communities important for GRSG. These areas can provide baseline vegetation information on natural processes such as successional changes, and future vegetation shifts in the plant communities from changes in precipitation and temperature (climate change). Key RNAs either contain GRSG leks or are within 0.1 to 4 miles of leks and are, or likely are, used for nesting, brood-rearing, foraging, breeding or wintering.

Land tenure adjustments. Land ownership or jurisdictional changes. To improve the manageability of BLM-administered lands and their usefulness to the public, the BLM has numerous authorities for repositioning lands into a more consolidated pattern, disposing of lands, and entering into cooperative management agreements. These land pattern improvements are completed primarily through the use of land exchanges but also through land sales, through jurisdictional transfers to other agencies, and through the use of cooperative management agreements and leases.

Leasable minerals. Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. These include energy-related mineral resources such as oil, natural gas, coal, and geothermal, and some nonenergy minerals, such as phosphate, sodium, potassium, and sulfur. Geothermal resources are also leasable under the Geothermal Steam Act of 1970.

Lease. Section 302 of the Federal Land Policy and Management Act of 1976 provides the BLM's authority to issue leases for the use, occupancy, and development of public lands. Leases are issued for purposes such as a commercial filming, advertising displays, commercial or noncommercial croplands, apiaries, livestock holding or feeding areas not related to grazing permits and leases, native or introduced species harvesting, temporary or permanent facilities for commercial purposes (does not include mining claims), residential occupancy, ski resorts, construction equipment storage sites, assembly yards, oil rig stacking sites, mining claim occupancy if the residential structures are not incidental to the mining operation, and water pipelines and well pumps related to irrigation and nonirrigation facilities. The regulations establishing procedures for processing these leases and permits are found in 43 CFR 2920. (BLM)

Lease stipulation. A modification of the terms and conditions on a standard mineral lease form established at the time of the lease sale.

Lek. The BLM is adopting the Western Association of Fish and Wildlife Agencies (WAFWA) lek definitions (Cook et al., 2022).

> **Lek.** A lek is a traditional location where at least 2 male greater sage-grouse congregate during at least 2 springs within a 10-year period to perform their strutting display and opportunistically breed

with females. Although males are territorial on leks and occupy an area, not a point, the representative location for the lek is the estimated or calculated center of the display activity. The 'lek' is the standard reporting and analysis unit for evaluating population status and long-term trends.

Active lek. A lek that has more than 2 males counted during two or more lek counts within the last 10 years.

Inactive lek. A lek at which all observations within the last 10 years have been less than 2 males and that has had at least 2 males recorded during a lek count between 11 to 20 years ago.

Pending Active lek. A lek with one observation of at least 2 males in the last 10 years and at least one observation of at least 2 males more than 10 years ago.

Sub-lek. A sub-lek is similar to a lek in most respects, except that its location represents an actual activity center for a specific year or series of years while a lek can represent multiple sub-leks over an extended number of years. Sub-leks are generally ≤¼ the average inter-lek distance from other sub-leks included within the same lek. In relatively static situations, there may be only one sub-lek within a lek. The sub-lek is not used to evaluate population status and long-term trends but may be used to examine breeding behavior, habitat use, or other aspects of natural history

Undetermined Lek. A location where male sage-grouse are displaying that has not been documented in multiple years and does not meet the definition of a lek. Sage-grouse may spontaneously display in an alternate location that is not maintained through time; therefore, any undetermined leks should be verified in subsequent breeding seasons.

Lessee. A person or entity authorized to use and occupy National Forest System land under a specific instrument identified as a lease. Forest special use leases are limited to authorize certain wireless communication uses. Leases are also used for certain mineral leasable activities.

Linkage and Connectivity Habitat Management Area (LCHMA). BLM-administered lands that have been identified as broader regions of connectivity important to facilitate the movement of Greater Sage-Grouse and maintain ecological processes.

Linkage Management Area. Areas that have been identified as broader regions of connectivity important to facilitate the movement of GRSG and to maintain ecological processes.

Locatable minerals. Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872, as amended. This includes deposits of gold, silver, and other uncommon minerals not subject to lease or sale (17 Stat. 19-96).

Major Rights of Way. (Refer to definition in Rights of Way)

Mineral. Any naturally formed inorganic material, solid or fluid inorganic substance that can be extracted from the earth, any of various naturally occurring homogeneous substances (as stone, coal, salt, sulfur, sand, petroleum, water, or natural gas) obtained usually from the ground. Under federal laws, considered as locatable (subject to the general mining laws), leasable (subject to the Mineral Leasing Act of 1920), and saleable (subject to the Materials Act of 1947).

Mineral entry. The filing of a claim on public land to obtain the right to any locatable minerals it may contain.

Mineral estate. The ownership of minerals, including rights necessary for access, exploration, development, mining, ore dressing, and transportation operations.

Mining claim. A parcel of land that a miner takes and holds for mining purposes, having acquired the right of possession by complying with the Mining Law and local laws and rules. A mining claim may contain as many adjoining locations as the locator may make or buy. There are four categories of mining claims: lode, placer, millsite, and tunnel site.

Mining Law of 1872, as amended. Provides for claiming and gaining title to locatable minerals on public lands. Also referred to as the "Mining Law."

Minor Rights of Way. (Refer to definition for Rights of Way).

Mitigation. Includes specific means, measures, or practices that could reduce, avoid, or eliminate adverse impacts. Mitigation can include avoiding the impact altogether by not taking a certain action or parts of an action; minimizing the impact by limiting the degree of magnitude of the action and its implementation; rectifying the impact by repairing, rehabilitation, or restoring the affected environment; reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and compensating for the impact by replacing or providing substitute resources or environments.

Modification. A change to the provisions of a lease stipulation, either temporarily or for the term of the lease. Depending on the specific modification, the stipulation may or may not apply to all sites within the leasehold to which the restrictive criteria are applied.

Naturalness. Refers to whether an area looks natural to the average visitor who is not familiar with the biological composition of natural ecosystems versus human-affected ecosystems. New, nonrecreational modifications are not visually obvious or evident from trails.

National Register of Historic Places. A listing of resources that are considered significant at the national, state, or local level and that have been found to meet specific criteria of historic significance, integrity, and age.

Neighborhood Cluster. Represents a GRSG population unit and includes local aggregations of leks and seasonal habitats used by birds attending those leks based on state wildlife agency and research data.

Neighborhood Cluster Scale. Spatial scale used for population trend analyses.

No surface occupancy (NSO). A major constraint where use or occupancy of the land surface for fluid mineral exploration or development and all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, construction of wells and/or pads) are prohibited to protect identified resource values. Areas identified as NSO are open to fluid mineral leasing, but surface occupancy or surface-disturbing activities associated with fluid mineral leasing cannot be conducted on the surface of the land. Access to fluid mineral deposits would require horizontal drilling from outside the boundaries of the NSO area.

Nonenergy leasable minerals. Those minerals or materials designated as leasable under the Mineral Leasing Act of 1920. Nonenergy minerals include resources such as phosphate, sodium, potassium, and sulfur.

Non-habitat. Areas within the historical distribution of GRSG that are not occupied and are not capable of supporting GRSG or necessary habitats to support GRSG, and do not have the potential to provide habitat in the foreseeable future (< 100 years). GRSG may occasionally use these areas (e.g., migration), but these areas do not provide the necessary resources to support GRSG seasonally year-round.

Potential habitat. An area that is currently unoccupied by GRSG but has the potential for occupancy in the foreseeable future (< 100 years)**.** These areas are capable of supporting GRSG habitats based on soil types, climate, etc., and can include areas of habitat previously disturbed but that can be restored to GRSG habitats through either natural succession or human intervention.

Priority Habitat Management Areas (PHMA). Areas that have the highest value to maintaining sustainable GRSG populations and can include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors. The BLM objective intent for these areas is to maintain and enhance habitat conditions that will support persistent and healthy GRSG populations through management to minimize habitat loss and degradation.

PHMA with limited exceptions. Areas within PHMA requiring additional protections to support conservation of GRSG populations. **Required design features (RDFs).** Means, measures, or practices intended to reduce or avoid adverse environmental impacts. A suite of features that would establish the minimum specifications for certain activities (i.e., water developments, mineral development, and fire and fuels management) and mitigate adverse impacts. These design features would be required to provide a greater level of regulatory certainty than through implementation of best management practices. In general, the design features are accepted practices that are known to be effective when implemented properly at the project level.

Remoteness. Represents how far a visitor is from a road or trail. The farther a visitor is from a road or trail, the more primitive the remoteness setting.

Renewable energy. Energy resources that constantly renew themselves or that are regarded as practically inexhaustible. These include solar, wind, geothermal, hydro, and biomass. Although particular geothermal formations can be depleted, the natural heat in the Earth is a virtually inexhaustible reserve of potential energy.

Resource Management Plan Designated Corridor. A corridor designated through a Resource Management Plan Record of Decision in compliance with Section 202 of the Federal Land Policy and Management Act (FLPMA).

Rights-of-way (ROW). Public lands authorized to be used or occupied for specific purposes pursuant to a right-of-way grant, which are in the public interest and which require ROWs over, on, under, or through such lands. ROWs may be issued for linear features (pipelines, powerlines, communication cable, roads, canals, access, etc.) or for sites (communication towers, airports, reservoirs, pumping stations, power generating facilities, etc.). For BLM GRSG Management ROWs are divided into major or minor depending on possible level of impact to GRSG (see below). For example, ROWs for buried linear features with limited to no surface disturbance are minor, but high voltage overhead transmission lines are major. Other projects may depend on the specific development plan and location, connected actions, and will require a determination by the BLM (refer to ROW management direction in Chapter 2, Table 2-2 and 2-3). For example, to use federal pore space for carbon sequestration would be minor, however, ROWs for associated and/or connected actions such as surface facilities to support carbon sequestration could be major depending on the scope of surface disturbance and infrastructure.

> **Major ROW**. Major ROW projects include transmission lines > 100kv and distribution pipelines > 24" diameter but may also include smaller electrical transmission and/or distribution lines and pipelines, as well as, other ROW projects that require large distances, density or footprints, with

high levels of activity or surface disturbance. In addition, major ROW sites may contain multiple types of above and below ground features leading to a high density of infrastructure, or many tall structures.

Minor ROW. Minor/Other ROW Projects include typical distribution, small transmission facilities, or low volume gathering features that create minimal surface disturbance. These types include but are not limited to local roads, pipelines, powerlines, and small communication sites.

Right-of-way avoidance area. An area identified through resource management planning to be avoided but may be available for ROW location with special stipulations.

Right-of-way exclusion area. An area identified through resource management planning that is not available for ROW location under any conditions.

Riparian Area. A form of wetland transition between permanently saturated wetlands and upland areas. These areas exhibit vegetation or physical characteristics reflective of permanent surface or subsurface water influence. Lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels are typical riparian areas (See BLM Manual 1737). Included are ephemeral streams that have vegetation dependent upon free water in the soil. All other ephemeral streams are excluded.

Runoff. The total stream discharge of water, including both surface and subsurface flow, usually expressed in acre-feet of water yield.

Sagebrush Focal Area. Areas identified by the USFWS that represent recognized "strongholds" for Greater Sage-Grouse that have been noted and referenced as having the highest densities of Greater Sage-Grouse and other criteria important for the persistence of Greater Sage-Grouse.

Spatial relationships. How one object is located in space relative to another, important for spatial analysis of cultural resources.

Split estate. This is the circumstance where the surface of a particular parcel of land is owned by a different party than the minerals underlying the surface. Split estates may have any combination of surface/subsurface owners: federal/state; federal/private; state/private; or percentage ownerships. When referring to the split estate ownership on a particular parcel of land, it is generally necessary to describe the surface/subsurface ownership pattern of the parcel.

Saleable Minerals. Minerals that may be disposed of through sales and free use permits under the Materials Act of 1947, as amended. Included are common varieties of sand, stone, gravel, and clay (See also Mineral Materials).

Season of Use. A livestock grazing permit term and condition identifying the time during which livestock graze a given area to achieve management and resource condition objectives.

Special Use Authorization. A written permit, term permit, lease, or easement that authorizes use or occupancy of National Forest System lands and specifies the terms and conditions under which the use or occupancy may occur.

Stipulation (oil and gas). A provision that modifies standard oil and gas lease terms and conditions in order to protect other resource values or land uses and is attached to and made a part of individual lease

requirements at the time the lease is issued. Once a mineral lease is issued, the applied stipulations cannot generally be changed or altered. Exceptions, modifications, or waivers may be granted under certain conditions outlined in the LUP. Typical lease stipulations include No Surface Occupancy (NSO), Timing Limitations (TL), and Controlled Surface Use (CSU), and Protection of Survey Corner and Boundary Line Markers. Lease stipulations are developed through the land use planning (RMP) process.

Surface Discharge. The release of produced water onto the unconfined land surface or into an existing drainage system.

Surface Disturbing Activities. An action that alters the vegetation, surface/near surface soil resources, and/or surface geologic features, beyond natural site conditions and on a scale that affects other Public Land values. Examples of surface disturbing activities may include: operation of heavy equipment to construct well pads, roads, pits and reservoirs; installation of pipelines and power lines; and the conduct of several types of vegetation treatments (e.g., prescribed fire, etc.). Surface disturbing activities may be either authorized or prohibited (WY IB-2007-029).

Surface Management Agency (SMA). Depicts surface estate Federal land for the United States and classifies this land by its active Federal surface managing agency.

Timing limitation (TL). The TL stipulation, a moderate constraint, is applicable to fluid mineral leasing, all activities associated with fluid mineral leasing (e.g., truck-mounted drilling and geophysical exploration equipment off designated routes, construction of wells and/or pads), and other surface-disturbing activities (i.e., those not related to fluid mineral leasing). Areas identified for TL are closed to fluid mineral exploration and development, surface-disturbing activities, and intensive human activity during identified time frames. This stipulation does not apply to operation and basic maintenance activities, including associated vehicle travel, unless otherwise specified. Construction, drilling, completions, and other operations considered to be intensive in nature are not allowed. Intensive maintenance, such as workovers on wells, is not permitted. TLs can overlap spatially with NSO and CSU, as well as with areas that have no other restrictions.

Traditional cultural property (TCP). A property that is eligible for inclusion in the National Register of Historic Places (NRHP) based on its associations with the cultural practices, traditions, beliefs, lifeways, arts, crafts, or social institutions of a living community. TCPs are rooted in a traditional community's history and are important in maintaining the continuing cultural identity of the community.

Transmission line. A set of electrical current conductors, insulators, supporting structures, and associated equipment used to move large quantities of power at high voltage, usually over long distances (e.g., between a power plant and the communities that it serves).

Transmission corridor. An electric or pipeline transmission corridor is a route approved on public lands, in a BLM or other federal agency land use plan, as a location that may be suitable for the siting of electric or pipeline transmission systems.

Undisturbed habitats. Areas that are not presently directly or indirectly impacted by anthropogenic development.

Utility corridor. Tract of land varying in width forming passageway through which various commodities such as oil, gas, and electricity are transported.

Utility-scale solar. Solar projects with nameplate capacity (theoretical output registered with authorities) of 5 megawatt (MW) or higher that deliver electricity to the electricity transmission grid.

Utility-scale wind. The U.S. Department of Energy defines utility-scale wind projects as land-based and offshore projects larger than 1 megawatt (MW) (Wind Energy Technologies Office, WINDExchange, Office of Energy Efficiency & Renewable Energy, U.S. Department of Energy).

Valid existing rights. Documented, legal rights or interests in the land that allow a person or entity to use said land for a specific purpose and that are still in effect. Such rights include but are not limited to fee title ownership, mineral rights, rights-of-way, easements, permits, licenses and adjudicated RS 2477 or RS 2339. Such rights may have been reserved, acquired, leased, granted, permitted, or otherwise authorized over time.

Vandalism. An action involving deliberate destruction or damage, in this case to cultural resources.

Watershed. The area of land, bounded by a divide, that drains water, sediment, and dissolved materials to a common outlet at some point along a stream channel (Dunne and Leopold, 1978), or to a lake, reservoir, or other body of water. Also called drainage basin or catchment

West Nile Virus. A virus that is found in temperate and tropical regions of the world and most commonly transmitted by mosquitoes. West Nile virus can cause flu-like symptoms in humans and can be lethal to birds, including Greater Sage-Grouse.

Wetlands. Those areas that are inundated by surface water or groundwater with a frequency sufficient to support, and under normal circumstances do or would support, a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mudflats, and natural ponds.

Withdrawal. Withdrawals are used to transfer jurisdiction of management of public lands to other federal agencies.

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Appendix 2

Comparison of Proposed RMP Amendment to Existing Greater Sage-Grouse RMP Management Direction

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Appendix 2. Comparison of Proposed RMP Amendment to Existing Greater Sage-Grouse RMP Management Direction

INTRODUCTION

This appendix includes the GRSG approved RMP amendment language from the 2015 and 2019 amendments (as applicable). Each state has a separate section in this appendix with state-specific page numbering. In addition, the goals, objectives, and decisions/actions are numbered from their state-specific planning efforts. This appendix presents the GRSG approved RMP amendment language from the 2015 and 2019 records of decision for each participating state in a table format. Changes between 2015 and 2019 are noted. The tables identify the goals, objectives, and management decisions/actions and appendices that would be amended by the Proposed RMPA, either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMPA include: no change, partial revision, complete revision, and new direction.

The Proposed RMP Amendment applies to the following land use plans within each participating state. This list includes RMPs, management framework plans, and other BLM planning-level documents, referred to collectively as RMPs. It is important to note that the language in this appendix may not be the exact language from the applicable 2015 or 2019 amendments. During the implementation process, some states have completed subsequent amendments that change the decisions in the 2015 or 2019 ARMPAs or plan maintenance to further refine or document the decisions. The language in this appendix presents the current management, inclusive of all such changes that have occurred subsequent to the original records of decision.

Resource Management Plans by State

California:

- Altura RMP (2008)
- Eagle Lake RMP (2008)
- Surprise RMP (2008)

Colorado:

- Colorado River Valley RMP (2015), including Roan Plateau RMPA (2016)
- Grand Junction RMP (2015)
- Kremmling RMP (2015)
- Little Snake RMP (2011)
- White River RMP (1997) and associated amendments, including the White River Oil and Gas Amendment (2015)

Idaho:

- Bennett Hills/Timmerman Hills Management Framework Plan (MFP) (1980)
- Big Desert MFP (1981)
- Big Lost MFP (1983)

- Bruneau MFP (1983)
- Cassia RMP (1985)
- Challis RMP (1999)
- Craters of the Moon National Monument RMP (2006)
- Four Rivers RMP (2023)
- Jarbidge RMP (2015)
- Lemhi RMP (1987)
- Little Lost-Birch Creek MFP (1981)
- Magic MFP (1975)
- Medicine Lodge MFP (1981)
- Monument RMP (1985)
- Owyhee RMP (1999)
- Pocatello RMP (2012)
- Snake River Birds of Prey National Conservation Area RMP (2008)
- Sun Valley MFP (1981)
- Twin Falls MFP (1982)

Montana/Dakotas:

- Billings and Pompeys Pillar Nation Monument RMP (2015)
- Butte RMP (2009)
- Dillon RMP (2006)
- HiLine RMP (2015)
- Lewistown RMP (2021)
- Miles City RMP (2015)
- North Dakota RMP (1988)
- South Dakota RMP (2015)
- Upper Missouri River Breaks National Monument RMP (2008)

Nevada:

- Black Rock Desert-High Rock Canyon Emigrant Trails National Conservation Area RMP (2004)
- Carson City Field Office Consolidated RMP (2001)
- Elko RMP (1987)
- Ely RMP (2008)
- Shoshone-Eureka RMP (1986)
- Tonopah RMP (1997)
- Wells RMP (1985)
- Winnemucca District RMP (2015)

Oregon:

- Andrews RMP (2005)
- Baker RMP (1989)
- Brothers/La Pine RMP (1989)
- Lakeview RMP (2003)
- Southeastern Oregon RMP (2002)

- Steens Mountain Cooperative Management and Protection Area RMP (2005)
- Three Rivers RMP (1992)
- Upper Deschutes RMP (2005)

Utah:

- Vernal RMP (2008)
- Price RMP (2008)
- Richfield RMP (2008)
- Kanab RMP (2008)
- Kanab/Escalante Planning Area RMP (2020)
- Grand Staircase-Escalante National Monument – Grand Staircase Unit RMP (2020)
- Cedar/Beaver/Garfield/Antimony RMP (1986)
- Pinyon MFP (1978)
- Warm Springs RMP (1987)
- House Range RMP (1987)
- Pony Express RMP (1990)
- Box Elder RMP (1986)
- Randolph MFP (1980)
- Park City MFP (1975)
- Salt Lake District Isolated Tracts Planning Analysis (1985)

Wyoming:

- Buffalo RMP (2015)
- Casper RMP (2007
- Cody RMP (2015)
- Kemmerer RMP (2010)
- Lander RMP (2014)
- Newcastle RMP (2000)
- Pinedale RMP (2008)
- Rawlins RMP (2008)
- Green River RMP (1997)
- Worland RMP (2015)

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Appendix 2.1
Colorado RMPs

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Appendix 2. Comparison of Proposed RMP Amendment to Existing Greater Sage-Grouse RMP Management Direction

2.1 COLORADO RMPS

This appendix presents the GRSG approved RMP amendment language from the 2015 and 2019 records of decision for Colorado. Changes between 2015 and 2019 are noted. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment (RMPA), either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMPA include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable 2015 and 2019 appendices that are listed in **Section 2.1.2** of this appendix. For the additional state-specific Colorado management direction for the Proposed RMPA, see Chapter 2, Table 2-5.

2.1.1 Colorado

Table 1: Comparison of Proposed RMP Amendment to Existing GRSG RMP Management Direction in Colorado

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
SPECIAL STATUS SPECIES (SSS)	***SPECIAL STATUS SPECIES (SSS)***	
Objectives:	**Objectives:**	
No similar action	No similar action	New: rangewide goal added
Objective SSS-1: Maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain GRSG populations.	No changes made.	Completely Revised-revised by rangewide
Management Decisions (MD):	**Management Decisions (MD):**	
MD SSS-1: Adaptive Management: Implement Adaptive Management Plan including soft and hard triggers as described in Appendix H (Guidelines for Implementation and Adaptive Management). The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter.	No changes made.	Completely Revised-revised by rangewide

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD SSS-2: In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer distances identified in the U.S. Geological Survey Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review (Open File Report 2014-1239) in accordance with Appendix B.	**MD SSS-2:** In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will evaluate the lek buffer distances during project-specific NEPA analyses, in accordance with Appendix H (Guidelines for Implementation and Adaptive Management). Appendix B of the 2015 ROD/ARMPA will not be carried forward.	No change (same as 2019)
MD SSS-3: In all sage-grouse habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions.	**MD SSS-3:** In all Greater Sage-Grouse habitat, before authorizing third-party actions that result in habitat loss and degradation, the BLM will complete the following steps, in alignment with the Governor of Colorado's Executive Orders 2015-004 (May 15, 2015) and 2018-036 (December 2018), including avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. 1. If the proponent has not already done so pursuant to Colorado Executive Order 2015-004 and 2018-036, and 2 CCR 404-1:1200 et seq. or other applicable law, policy or regulation, BLM will notify Colorado Parks and Wildlife to determine if the State requires or recommends any additional mitigation – including compensatory mitigation – under State regulations, policies, or programs related to the conservation of Greater Sage-Grouse. 2. Incorporate state required or recommended mitigation into the BLM's NEPA and decisionmaking process, if the CPW determines that there are unacceptable residual impacts on Greater Sage-Grouse or its habitat and compensatory mitigation is required as a part of a State policy or authorization, or if a proponent voluntarily offers mitigation. 3. Analyze whether the compensatory mitigation: • achieves measurable outcomes for Greater Sage-Grouse habitat function that are at least equal to	Completely Revised- revised by rangewide and state specific

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
	the lost or degraded values • provides benefits that are in place for at least the duration of the impacts • accounts for a level of risk that the mitigation action may fail or not persist for the full duration of the impact 4. Verify that the project proponent has coordinated with the State of Colorado to ensure it complies with Executive Orders 2015-004 and 2018-036 and, when necessary, complies with 2 CCR 404-1:1200 et seq. or other applicable state law, policy or regulation relating to its proposal. 5. Through coordination with CPW, ensure mitigation outcomes are consistent with the State of Colorado's mitigation strategy and principles outlined in **Appendix H** (Guidelines for Implementation and Adaptive Management).	
No similar action	No similar action	New: rangewide predation actions added
VEGETATION (VEG)	***VEGETATION (VEG)***	
Objectives:	**Objectives:**	
Objective VEG-1: (1) Use habitat restoration as a tool to create and/or maintain landscapes that benefit GRSG; (2) Use Integrated Vegetation Management to control, suppress, and eradicate, where possible, noxious and invasive species per BLM Handbook H-1740-2; and (3) In PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Technical Reference 1734-6).	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Management Decisions (MD):	**Management Decisions (MD):**	
Sagebrush Steppe (Habitat Restoration)	***Sagebrush Steppe (Habitat Restoration)***	
MD VEG-1: (ADH) When planning restoration treatments in GRSG habitat, identify seasonal habitat availability, and prioritize treatments in areas that are thought to be limiting GRSG distribution and/or abundance. The habitat objectives for GRSG (**Table 2**) are a list of indicators and values that describe GRSG seasonal habitat conditions. The values for the indicators were derived using a synthesis of current local and regional GRSG habitat research and data and reflect variability of ecological sites. The habitat cover indicators are consistent with existing indicators used by the BLM. When determining if a site is meeting habitat objectives, the measurements from that particular site would be assessed based on the range of values for the indicators in **Table 2**. **Table 2** is one component of GRSG multi-scale habitat assessment (see **Appendix D**, Greater Sage-Grouse Monitoring Framework). The results of the habitat assessment would be used during the land health evaluation to ascertain if the land health standard applicable to GRSG habitat (e.g., special status species habitat standard) is being met. When authorizing activities in GRSG habitat, the BLM would consider if habitat objectives are being achieved. If the habitat objectives are not being achieved, and the site has the potential for achieving these objectives, the BLM would determine the causal factor(s) and make the necessary management adjustments to address the causal factor(s), following current BLM regulations and policy.	No changes made.	Completely Revised-revised by rangewide

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD VEG-2: (PHMA) Include GRSG habitat parameters as defined by Connelly et al. (2000), Hagen et al. (2007), or, if available, state GRSG conservation plans and appropriate local information in habitat restoration objectives. Make meeting these objectives within GRSG PHMA areas a high restoration priority.	No changes made.	Completely Revised-revised by rangewide
MD VEG-3: (ADH) Require use of native plant seeds that are beneficial for GRSG for vegetation treatments based on availability, adaptation (site potential), probability for success (Richards et al. 1998), and the vegetation management objectives for the area covered by the treatment. Where probability of success or native seed availability is low, use species that meet soil stability and hydrologic function objectives as well as vegetation and GRSG habitat objectives (Pyke 2011).	No changes made.	No change (same as 2015)
MD VEG-4: (PHMA) Design post restoration management to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse management, travel management, and other uses, to achieve and maintain the desired condition of emergency stabilization and rehabilitation (ESR) projects to benefit GRSG (Eiswerth and Shonkwiler 2006).	No changes made.	No change (same as 2015)
MD VEG-5: (ADH) Manage for a habitat objective that is primarily sagebrush with a mosaic of seral stages and sagebrush in all age classes. On a site-by-site basis, do not allow treatments that would adversely affect GRSG populations.	No changes made.	Completely Revised-revised by rangewide

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD VEG-6: (ADH) Make reestablishment of sagebrush and desirable understory plant cover (relative to ecological site potential) the highest priority for restoration efforts. Consider GRSG habitat requirements in conjunction with all resource values managed by the BLM, and give preference to GRSG habitat unless site-specific circumstances warrant an exemption.	No changes made.	No change (same as 2015)
MD VEG-7: (ADH) Authorize local sagebrush seed collection to support local restoration efforts.	No changes made.	No change (same as 2015)
MD VEG-8: (ADH) Treat areas that contain *Bromus tectorum* and other invasive or noxious species to minimize competition and favor establishment of desired species.	No changes made.	No change (same as 2015)
Conifer Encroachment	***Conifer Encroachment***	
MD VEG-8: Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those September 2015 *Northwest Colorado Greater Sage-Grouse Approved RMP Amendment* 2-7 included in the Fire and Invasives Assessment Team report (Chambers et. al., 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated. See **Appendix H**, Guidelines for Implementation and Adaptive Management.	No changes made.	No change (same as 2015)
FIRE AND FUELS MANAGEMENT (FIRE)	***FIRE AND FUELS MANAGEMENT (FIRE)***	
Objectives:	**Objectives:**	
Objective FIRE-1: Manage fire to maintain and enhance large blocks of contiguous sagebrush.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Management Decisions (MD):	**Management Decisions (MD):**	
Suppression (Fire Operations)	***Suppression (Fire Operations)***	
MD FIRE-1: (PHMA) The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. Consider GRSG habitat requirements commensurate with all resource values at risk managed by the BLM.	No changes made.	No change (same as 2015)
MD FIRE-2: (GHMA) The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. Consider GRSG habitat requirements commensurate with all resource values at risk managed by the BLM.	No changes made.	No change (same as 2015)
MD FIRE-3: (PHMA/GHMA) Temporary closures would be considered in accordance with 43 CFR subparts 8364, 8351, 6302 and 8341. Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence (43 CFR, Part 8341.2). A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.		
Objectives:	**Objectives:**	
Objective FIRE-2: Manage the fuels program to avoid GRSG habitat loss and restore damaged habitat.	No changes made.	No change (same as 2015)
Management Decisions (MD):	**Management Decisions (MD):**	
Fuels Management	***Fuels Management***	
MD FIRE-4: (PHMA) Do not reduce sagebrush canopy cover to less than 15 percent (Connelly et al. 2000; Hagen et al. 2007) in a project area unless a vegetation management objective requires additional reduction in sagebrush cover to meet strategic protection of GRSG PHMA and conserve habitat quality for the species, in consultation with the State of Colorado.	No changes made.	No change (same as 2015)
MD FIRE-5: (PHMA) Apply appropriate seasonal restrictions for implementing vegetation management treatments according to the type of seasonal habitats present in a Colorado management zone (MZ).	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD FIRE-6: (PHMA) Allow no treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around or in the winter range and will maintain winter range habitat quality, unless in consultation with the State of Colorado it is deemed necessary to reduce risk to life and property.	No changes made.	No change (same as 2015)
MD FIRE-7: (ADH) Do not use fire to treat sagebrush in less than 12-inch precipitation zones (e.g., Wyoming big sagebrush or other xeric sagebrush species) (Connelly et al. 2000; Hagen et al. 2007; Beck et al. 2009). However, if as a last resort and after all other treatment opportunities have been explored, and site-specific variables allow, the use of prescribed fire or natural ignition fire for fuels breaks that would disrupt fuel continuity or enhance land health could be considered where cheatgrass is deemed a minor threat. If prescribed fire is used in GRSG habitat, the NEPA analysis for the burn plan will address: • why alternative techniques were not selected as viable options • how GRSG goals and objectives would be met by its use • how the COT report objectives would be addressed and met • a risk assessment to address how potential threats to GRSG habitat would be minimized Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the burn plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
GRSG habitat in PHMA (e.g., creating fuel designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer-reduction treatments, or being used as a component with other treatment methods to combat annual grasses and restore native plant communities). Prescribed fire in known winter range shall only be considered after the NEPA analysis for the burn plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat would need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.		
MD FIRE-8: (ADH) Monitor and control invasive vegetation post treatment.	No changes made.	No change (same as 2015)
MD FIRE-9: (ADH) Require use of native plant seeds for vegetation treatments based on availability, adaptation (site potential), probability for success (Richards et al. 1998), and the vegetation management objectives for the area covered by the treatment. Where probability of success or native seed availability is low, use species that meet soil stability and hydrologic function objectives as well as vegetation and GRSG habitat objectives (Pyke 2011).	No changes made.	No change (same as 2015)

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MD FIRE-10: (PHMA) Design post fuels management to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse management, travel management, and other uses, to achieve and maintain the desired condition of ESR projects to benefit GRSG (Eiswerth and Shonkwiler 2006).	No changes made.	No change (same as 2015)
MD FIRE-11: (ADH) Design vegetation treatments in GRSG habitats to strategically facilitate firefighter safety, reduce wildfire threats, and extreme fire behavior. This may involve spatially arranging new vegetation treatments with past treatments, vegetation with fire-resistant serial stages, natural barriers, and roads in order to constrain fire spread and growth. This may require vegetation treatments to be implemented in a more linear versus block design (Launchbaugh et al. 2007).	No changes made.	No change (same as 2015)
MD FIRE-12: (PHMA) During fuels management project design, consider the utility of using livestock to strategically reduce fine fuels (Diamond at al. 2009), and implement grazing management that will accomplish this objective (Davies et al. 2011; Launchbaugh et al. 2007). Consult with ecologists to minimize impacts to native perennial grasses consistent with the objectives and conservation measures of the grazing section.	No changes made.	No change (same as 2015)
Objectives:	**Objectives:**	
Objective FIRE-3: Use ESR to address post-wildfire threats to GRSG habitat.	No changes made.	No change (same as 2015)

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Management Decisions (MD):	**Management Decisions (MD):**	
Post-Fire Management (Emergency Stabilization and Rehabilitation)	***Post-Fire Management (Emergency Stabilization and Rehabilitation)***	
MD FIRE-13: (ADH) Require use of native plant seeds that are beneficial for GRSG for vegetation treatments based on availability, adaptation (site potential), probability for success (Richards et al. 1998), and the vegetation management objectives for the area covered by the treatment. Where attempts to use native seeds have failed, or native seed availability is low, use species that meet soil stability and hydrologic function objectives, as well as vegetation and GRSG habitat objectives (Pyke 2011).	No changes made.	No change (same as 2015)
MD FIRE-14: (ADH) Design post-fire ESR and Burn Area Emergency Rehabilitation management to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse management, travel management, and other uses to achieve and maintain the desired condition of ESR and Burn Area Emergency Rehabilitation projects to benefit GRSG (Eiswerth and Shonkwiler 2006).	No changes made.	No change (same as 2015)
MD FIRE-15: (ADH) Rest burned areas from grazing for two full growing seasons unless vegetation recovery dictates otherwise (Wyoming Game and Fish Department 2011).	—	No change (same as 2015)

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RANGE MANAGEMENT (RM)	***RANGE MANAGEMENT (RM)***	
Objectives:	**Objectives:**	
Objective RM-1: GRSG objectives and well-managed livestock operations are compatible because forage availability for livestock and hiding cover for GRSG are both dependent on healthy plant communities. Agreements with partners that promote sustainable GRSG populations concurrent with sustainable ranch operations offer long-term stability. In the context of sustainable range operations, manage the range program to: 1) maintain or enhance vigorous and productive plant communities; 2) maintain residual herbaceous cover to reduce predation during GRSG nesting and early brood-rearing; 3) avoid direct adverse impacts to GRSG-associated range project infrastructure; and 4) employ grazing management strategies that avoid concentrating animals on key GRSG habitats during key seasons.	No changes made.	Completely Revised- revised by rangewide
Management Decisions (MD):	**Management Decisions (MD):**	
MD RM-1: (ADH) Within ADH, incorporate GRSG habitat objectives and management considerations into all BLM grazing allotments through Allotment Management Plans.	No changes made.	Completely Revised- revised by rangewide
MD RM-2: (ADH) Work cooperatively on integrated ranch planning within GRSG habitat. Develop management strategies that are seamless with respect to actions on public and private lands within BLM grazing allotments.	No changes made.	Completely Revised-revised by rangewide
MD RM-3: (PHMA) The BLM will prioritize: 1. the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and 2. the processing of grazing permits/leases in PHMA.	No changes made.	Completely Revised-revised by rangewide

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In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.		
MD RM-4: (ADH) Conduct land health assessments that include (at a minimum) indicators and measurements of vegetation structure/condition/composition specific to achieving GRSG habitat objectives (Doherty et al. 2011). If local/state seasonal habitat objectives are not available, use GRSG habitat recommendations from Connelly et al. 2000 and Hagen et al. 2007.	No changes made.	Completely Revised-revised by rangewide
Implementing Management Actions after Land Health and Habitat Evaluations	***Implementing Management Actions after Land Health and Habitat Evaluations***	
MD RM-5: (ADH) Develop specific objectives—through NEPA analysis conducted in accordance with the permit/lease renewal process—to conserve, enhance, or restore GRSG habitat. Base benchmarks on Ecological Site/Range Site Descriptions. When existing on Ecological Site/Range Site Descriptions have not been developed, or are too general to serve adequately as benchmarks, identify and document local reference sites for areas of similar potential that exemplify achievement of GRSG habitat objectives and use these sites as the benchmark reference. Establish measurable objectives related to GRSG habitat from baseline monitoring data, ecological site descriptions, or land health assessments/evaluations, or other habitat and successional stage objectives.	No changes made.	Completely Revised-revised by rangewide

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MD RM-6: (ADH) Manage for vegetation composition and structure consistent with ecological site potential and within the reference state subject to habitat objectives, including successional stages.	No changes made.	Completely Revised-revised by rangewide
MD RM-7: (ADH) Include terms and conditions on grazing permits and leases that address disruptive activities that affect GRSG and assure plant growth requirements are met and residual forage remains available for GRSG hiding cover. Specify as necessary: 1. Season or timing of use 2. Numbers of livestock (include temporary non-use or livestock removal) 3. Distributions of livestock use 4. Intensity of use (utilization or stubble height objectives) 5. Kind of livestock (e.g., cattle, sheep, horse, llama, alpaca, and goat) 6. Class of livestock (e.g., yearlings versus cow/calf pairs) 7. Locations of bed grounds, sheep camps, trail routes, and the like	No changes made.	Completely Revised-revised by rangewide
MD RM-8: (ADH) Develop drought contingency plans at the appropriate landscape unit that provide for a consistent/appropriate BLM response. Plans shall establish policy for addressing ongoing drought and post-drought recovery for GRSG habitat objectives.	No changes made.	Completely Revised-revised by rangewide
MD RM-9: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA would include specific management thresholds based on Table 2.3 in the Proposed Plan, Land Health Standards (43 CFR, Part 4180.2), ecological site potential, and one	No changes made.	Completely Revised-revised by rangewide

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or more defined responses that would allow the authorizing officer to make adjustments to livestock grazing that have already been subject to NEPA analysis.		
MD RM-10: Allotments within PHMA, focusing on those containing riparian areas, including wet meadows, would be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.	No changes made.	Completely Revised-revised by rangewide
Riparian Areas and Wet Meadows	***Riparian Areas and Wet Meadows***	
MD RM-11: (ADH) Manage riparian areas and wet meadows for proper functioning condition within ADH.	No changes made.	Completely Revised-revised by rangewide
MD RM-12: (ADH) Within ADH, manage wet meadows to maintain diverse species richness, including a component of perennial forbs, relative to site potential (i.e., reference state).	No changes made.	Completely Revised-revised by rangewide
MD RM-13: (ADH) Establish permit/lease terms and conditions in conjunction with grazing strategies to ensure that the timing and level of utilization results in wet meadows with diverse species richness, including a component of perennial forbs, relative to site potential (i.e., reference state).	No changes made.	Completely Revised-revised by rangewide
MD RM-14: (ADH) Authorize new water development only after determining that the project will not adversely impact GRSG from habitat loss. Ensure that adequate long-term grazing management is in effect before authorizing water developments that may increase levels of use or change season of use. Give specific consideration to adjacent or downstream wetland habitat when a project entails a diversion from a spring or seep.	No changes made.	Completely Revised-revised by rangewide

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MD RM-15: (ADH) Analyze springs, seeps and associated pipelines to determine if modifications are necessary to maintain the continuity of the predevelopment riparian area. If necessary to maintain GRSG populations or reverse a downward population trend caused by habitat loss, modify the project as necessary to restore the applicable wetland habitat.	No changes made.	Completely Revised-revised by rangewide
Treatments to Increase Forage for Livestock/Wild Ungulates	***Treatments to Increase Forage for Livestock/Wild Ungulates***	
MD RM-16: (ADH) Manage for a habitat objective that is primarily sagebrush with a mosaic of seral stages and sagebrush in all age classes. On a site-by-site basis, do not allow treatments that would adversely affect GRSG populations. See Appendix H, Guidelines for Implementation and Adaptive Management.	No changes made.	Completely Revised-revised by rangewide
MD RM-17: (PHMA) Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to GRSG PHMA to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings are part of an Allotment Management Plan/Conservation Plan or if they provide value in conserving or enhancing the rest of PHMA, then no restoration would be necessary. Assess the compatibility of these seedings for GRSG habitat or as a component of a grazing system during the land health assessments (Davies et al. 2011). For example: Some introduced grass seedings are an integral part of a livestock management plan and reduce grazing pressure in important sagebrush habitats or serve as a strategic fuels management area.	No changes made.	Completely Revised-revised by rangewide

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Structural Range Improvements and Livestock Management Tools	***Structural Range Improvements and Livestock Management Tools***	
MD RM-18: (ADH) Design new range improvement projects to enhance livestock distribution and to control the timing and intensity of utilization. Examples of structural range improvement projects are cattle guards, fences, corrals, pipelines, troughs, storage tanks, windmills, ponds/reservoirs, solar panels, and spring developments. Include a plan to monitor and control invasive plant species following any related ground disturbance. Place mineral or salt supplements away from water sources and leks in locations that enhance livestock distribution.	No changes made.	Completely Revised-revised by rangewide
MD RM-19: (PHMA) Where conditions create the potential for impacts from West Nile virus from developments or modification of water developments, use preferred design features (PDFs)/RDFs to mitigate the potential impacts. See **Appendix C** (Required Design Features, Preferred Design Features, and Suggested Design Features).	No changes made.	Completely Revised-revised by rangewide
MD RM-20: (PHMA) Evaluate existing structural range improvements to determine if modifications are necessary to maintain GRSG populations or reverse a downward population trend caused by habitat loss. Modify, relocate, or remove projects as necessary. Place mineral and salt supplements away from water sources and leks in locations that enhance livestock distribution.	No changes made.	Completely Revised-revised by rangewide

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MD RM-21: (ADH) Mark fences in high risk areas (Christiansen 2009; Stevens 2011). (PHMA) Where marking fences does not reduce fence-related GRSG mortality, modify fences. Where modification does not reduce GRSG mortality and the fence-related mortality is sufficient to adversely affect GRSG populations, remove fences.	No changes made.	Completely Revised-revised by rangewide
MD RM-22: (ADH) Monitor for and treat invasive species associated with existing range improvements (Gelbard and Belnap 2003; Bergquist et al. 2007).	—	Completely Revised-revised by rangewide
Retirement of Grazing Privileges	***Retirement of Grazing Privileges***	
MD RM-23: (ADH) At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized shall remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3. When a permittee or lessee voluntarily relinquishes grazing preference, consider conversion of the allotment to a reserve common allotment that will remain available for use on a temporary, nonrenewable basis for the benefit of GRSG habitat. Authorize temporary nonrenewal permits in Reserve Common Allotments to meet resource objectives elsewhere such as rest or deferment due to fire or vegetation treatments. Temporary use of reserve common allotments would not be allowed due to drought or overuse of customary allotments.	No changes made.	Completely Revised-revised by rangewide

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WILD HORSES AND BURROS (WHB)	***WILD HORSES AND BURROS (WHB)***	
Objectives:	**Objectives:**	
Objective WHB-1: Manage wild horses in a manner designed to 1) avoid reductions in grass, forb, and shrub cover, and 2) avoid increasing unpalatable forbs and invasive plants such as Bromus tectorum.	No changes made.	Completely Revised-revised by rangewide
Management Decisions (MD):	**Management Decisions (MD):**	
MD WHB-1: (ADH) Manage wild horse population levels within established appropriate management levels.	No changes made.	Completely Revised-revised by rangewide
MD WHB-2: (ADH) Prioritize gathers in GRSG PHMA, unless removals are necessary in other areas to prevent catastrophic environmental issues, including herd health impacts. Consider GRSG habitat requirements in conjunction with all resource values managed by the BLM, and give preference to GRSG habitat unless site-specific circumstances warrant an exemption.	No changes made.	Completely Revised-revised by rangewide
MD WHB-3: (PHMA) Within PHMA, develop or amend BLM HMA plans to incorporate GRSG habitat objectives and management considerations for all BLM HMAs. When developing HMA plans, apply all appropriate conservation measures from the range program, including, but not limited to, utilization of forage and structural range improvements.	No changes made.	No change (same as 2015)

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MD WHB-4: (PHMA) For all BLM HMAs within PHMA, prioritize the evaluation of all appropriate management levels based on indicators that address vegetation structure/condition/composition and measurements specific to achieving GRSG habitat objectives. Consider GRSG habitat requirements in conjunction with all resource values managed by the BLM, and give preference to GRSG habitat unless site-specific circumstances warrant an exemption.	No changes made.	Completely Revised-revised by rangewide
MD WHB-5: (ADH) Coordinate with other resources (range, wildlife, and riparian) to conduct land health assessments to determine existing vegetation structure/condition/composition within all BLM HMAs.	No changes made.	No change (same as 2015)
MD WHB-6: (PHMA) When conducting NEPA analysis for wild horse management activities, water developments, or other rangeland improvements for wild horses in PHMA, address the direct and indirect effects to GRSG populations and habitat. Implement any water developments or rangeland improvements using the criteria identified for domestic livestock identified above in PHMA.	No changes made.	No change (same as 2015)
MINERALS (MR)	***MINERALS (MR)***	
Objectives:	**Objectives:**	
Objective MR-1: Manage fluid minerals to avoid, minimize, and compensate for: 1) direct disturbance, displacement, or mortality of GRSG; 2) direct loss of habitat or loss of effective habitat through fragmentation; and 3) cumulative landscape-level impacts. Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to	No changes made.	Completely Revised-revised by rangewide

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applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 US Code 226(p) and 43 CFR, Part 3162.3-1(h).		
Management Decisions (MD):	**Management Decisions (MD):**	
Unleased Fluid Minerals	***Unleased Fluid Minerals***	
MD MR-1: No new leasing 1 mile from active leks in ADH.	**MD MR-1:** One mile from active leks: Open to leasing subject to **NSO-1**. **NSO-1: **Exceptions or modifications** may be considered if, in consultation with the State of Colorado, it can be demonstrated that there is no impact on Greater Sage-Grouse based on one of the following: • Topography/areas of non-habitat create an effective barrier to impacts • No additional impacts would be realized above those created by existing major • infrastructure (for example, State Highway 13) • The exception or modification precludes or offsets greater potential impacts if the action were proposed on adjacent parcels (for example, due to landownership patterns) **In order to approve exceptions or modifications to this lease stipulation, the Authorized Officer must obtain: agreement, including written justification, between the BLM District Managers and CPW that the proposed action satisfies at least one of the criteria listed above. Waiver: No waivers are authorized unless the area or	Completely Revised-revised by rangewide and state specific

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	resource mapped as possessing the attributes protected by the stipulation is determined during collaboration with the State of Colorado to lack those attributes or potential attributes. A 30-day public notice and comment period is required before waiver of a stipulation. Waivers would require BLM State Director approval.	
MD MR-2: No Surface Occupancy (NSO) without waiver or modification in PHMA. See **Appendix G** (Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations) for exceptions. The following stipulation would apply: **GRSG NSO-46e:** See **Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations, for waiver, modification, and exception criteria.	**MD MR-2** (one mile from active leks to the remainder of PHMA): Open to leasing subject to No Surface Occupancy (**NSO-2**) with waivers, exceptions, or modifications in PHMA. Surface occupancy can occur in PHMA with approved waivers, exceptions, or modifications. The following stipulation would apply: **NSO-2:** See Appendix G, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations for waiver, modification and exception criteria.	Completely Revised-revised by rangewide and state specific
MD MR-3: In GHMA, any new leases would include **TL** stipulations to protect GRSG and its habitat. The following stipulation would apply: **GRSG TL-46e:** No activity associated with construction, drilling, or completions within 4 miles from active leks during lekking, nesting, and early brood-rearing (March 1 to July 15). Authorized Officer could grant an exception, modification, or waiver in consultation with the State of Colorado (**Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations).	No changes made.	Completely Revised-revised by state specific
MD MR-4: No Surface Occupancy (NSO) within 2 miles of active leks in GHMA. Waivers, exceptions, and modification could be obtained under conditions described in **Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations.	No changes made.	Completely Revised-revised by state specific

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MD MR-5: Disturbance on new leases would be limited to 3 percent in PHMA (biologically significant unit) (see **Appendix E**, Methodology for Calculating Disturbance Caps) and would limited to 1 disturbance per 640 acres calculated by Colorado MZ. The following Lease Notice (LN) would apply: **GRSG LN-46e**: Any lands leased in PHMA are subject to the restrictions of 1 disturbance per 640 acres calculated by biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ) to allow clustered development (**Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations).	No changes made.	Completely Revised-revised by state specific
No similar action	No similar action	New: see new actions in state-specific table
MD MR-6: No new leasing in PHMA if disturbance cap exceeds 3 percent calculated by biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ) or 1 disturbance per 640 acres density is exceeded (see **Appendix E**, Methodology for Calculating Disturbance Caps).	No changes made.	Completely Revised-revised by state specific
MD MR-7: (PHMA) Allow geophysical exploration within PHMA to obtain information for existing federal fluid mineral leases or areas adjacent to state or fee lands within PHMA. Allow geophysical operations only using helicopter-portable drilling, wheeled or tracked vehicles on existing roads, or other approved methods conducted in accordance with seasonal TLs and other restrictions that may apply. Geophysical exploration shall be subject to seasonal restrictions that preclude activities in breeding, nesting, brood-rearing, and winter habitats during their season of use by GRSG.	No changes made.	Partially Revised- minor updates to language

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Objectives:	**Objectives:**	
Objective MR-2: Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator or project proponent in developing an Application for Permit to Drill for the lease to avoid, minimize, and compensate for impacts to GRSG or its habitat and will ensure that the best information about GRSG and its habitat informs and helps guide development of such federal leases.	No changes made.	Completely Revised-revised by rangewide
Management Decisions (MD):	**Management Decisions (MD):**	
Leased Fluid Minerals	***Leased Fluid Minerals***	
MD MR-8: Within 1 mile of active leks, disturbance, disruptive activities, and occupancy are precluded. If it is determined that this restriction would render the recovery of fluid minerals infeasible or uneconomic, considering the lease as a whole, or where development of existing leases requires that disturbance density exceeds 1 disturbance per 640 acres and/or the 3 percent disturbance cap (see **Appendix E**, Methodology for Calculating Disturbance Caps), use the **criteria*** below to site proposed lease activities to meet GRSG habitat objectives and require mitigation as described in **Appendix F** (Greater Sage-Grouse Mitigation Strategy). **Criteria*:** • Location of proposed lease activities in relation	No changes made.	Completely Revised-revised by state specific

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to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat • An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation • An evaluation of the proposed lease activities, including design features, in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. This is particularly likely in Colorado MZ 17, which has an atypical GRSG habitat featuring benches with GRSG habitat interspersed with steep ravines To authorize an activity based on the criteria above, the environmental record of review must show no significant direct disturbance, displacement, or mortality of GRSG.		
MD MR-9: In PHMA and within 4 miles of an active lek, the **criteria*** below would be applied to guide development of the lease or unit that would result in the fewest impacts possible to GRSG. **Criteria*:** • Location of proposed lease activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat • An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be	No changes made.	Completely Revised-revised by state specific

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accomplished through compensatory or off-site mitigation • An evaluation of the proposed lease activities, including design features, in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. This is particularly likely in Colorado MZ 17, which has an atypical GRSG habitat featuring benches with GRSG habitat interspersed with steep ravines To authorize an activity based on the criteria above, the environmental record of review must show no significant direct disturbance, displacement, or mortality of GRSG.		
MD MR-10: Based on site-specific conditions, prohibit construction, drilling, and completion within PHMA within 4 miles of a lek during lekking, nesting, and early brood-rearing (March 1 to July 15). In consultation with the State of Colorado, this TL may be adjusted based on application of the criteria below. **Criteria*:** • Location of proposed lease activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat • An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation • An evaluation of the proposed lease activities,	No changes made.	Completely Revised-revised by state specific

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including design features, in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. This is particularly likely in Colorado MZ 17, which has an atypical GRSG habitat featuring benches with GRSG habitat interspersed with steep ravines To authorize an activity based on the criteria above, the environmental record of review must show no significant direct disturbance, displacement, or mortality of GRSG.		
MD MR-11: Within PHMA, operators would be encouraged to complete Master Development Plans in consultation with the State of Colorado, instead of single-well Applications for Permit to Drill for all but exploratory wells. (Notice to Lessees-54e: see **Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations.)	No changes made.	No change (same as 2015)
MD MR-12: When necessary, conduct effective mitigation in 1) GRSG PHMA or—less preferably—2) GHMA (dependent upon the area-specific ability to increase GRSG populations and in consultation with the State of Colorado).	No changes made.	Partially Revised- moving decision to mitigation section
MD MR-13: Conduct effective compensatory mitigation first within PHMA in the same Colorado MZ where the impact is realized; if not possible, then conduct mitigation within the same population as the impact, or in other Colorado GRSG populations, in consultation with the State of Colorado.	No changes made.	Partially Revised- moving decision to mitigation section

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD MR-14: For future actions in ADH, require a full reclamation bond specific to the site in accordance with 43 CFR, Parts 3104.2, 3104.3, and 3104.5. Ensure bonds are sufficient for costs relative to reclamation (Connelly et al. 2000; Hagen et al. 2007) that would result in full restoration of the lands to the condition it was found prior to disturbance. Base the reclamation costs on the assumption that contractors for the BLM will perform the work.	No changes made.	Partially Revised- minor updates to language
Objectives:	**Objectives:**	
Objective MR-3: Manage solid mineral programs to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction.	No changes made.	No change (same as 2015)
Management Decisions (MD):	**Management Decisions (MD):**	
Locatable Minerals	***Locatable Minerals***	
MD MR-15: (PHMA) In plans of operations required prior to any proposed surface-disturbing activities include as appropriate effective mitigation for conservation in accordance with existing policy (BLM Washington Office Instruction Memorandum 2013-142).	No changes made.	No change (same as 2015)
MD MR-16: (PHMA) Where applicable to prevent unnecessary or undue degradation, apply seasonal restrictions if deemed necessary.	No changes made.	No change (same as 2015)
Objectives:	**Objectives:**	
Objective MR-4: Manage solid mineral programs to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Management Decisions (MD):	**Management Decisions (MD):**	
Saleable Minerals	***Saleable Minerals***	
MD MR-17: (PHMA) Close PHMA to new mineral material sales. However, these areas would remain open to free use permits and the expansion of existing active pits, only if the following criteria are met: • The activity is within the biologically significant unit and the project area disturbance cap • The activity is subject to the provisions set forth in the mitigation strategy (Appendix F) • All applicable required/preferred design features are applied; and [if applicable] the activity is permissible under the regional screening criteria (Appendix H, Guidelines for Implementation and Adaptive Management).	No changes made.	No change (same as 2015)
MD MR-18: (ADH) Restore salable mineral pits no longer in use to meet GRSG habitat conservation objectives. Require reclamation/restoration of GRSG habitat as a viable long-term goal to improve the GRSG habitat (Appendix H, Guidelines for Implementation and Adaptive Management).	No changes made.	No change (same as 2015)
Objectives:	**Objectives:**	
Objective MR-5: Manage solid mineral programs to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction.	No changes made.	No change (same as 2015)
Management Decisions (MD):	**Management Decisions (MD):**	
Nonenergy Leasable Minerals	***Nonenergy Leasable Minerals***	
MD MR-19: No new nonenergy mineral leasing in PHMA.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD MR-20: Existing nonenergy mineral leases: Apply the following conservation measures as conditions of approval (COAs) where applicable and feasible: • Preclude new surface occupancy on existing leases within 1 mile of active leks (Blickley et al. 2012; Harju et al. 2012). • If the lease is entirely within 1 mile of an active lek, require any development to be placed in the area of the lease least harmful to GRSG based on vegetation, topography, or other habitat features (Appendix G, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations). • Preclude new surface disturbance on existing leases within 2 miles of active leks within PHMA. If the lease is entirely within 2 miles of an active lek, require any development to be placed in the area of the lease least harmful to GRSG based on vegetation, topography, or other habitat features (Appendix G, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations). • Limit permitted disturbances to 1 disturbance per 640 acres average across the landscape in PHMA. Disturbances may not exceed 3 percent in PHMA (see Appendix E, Methodology for Calculating Disturbance Caps) in any biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ). GRSG TL-47-51 – Based on site-specific conditions, prohibit surface occupancy or disturbance within PHMA within 4 miles of a lek during lekking, nesting, and early brood-rearing (March 1 to July 15).	No changes made.	Partially Revised- updates "active" lek to "occupied" lek

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Objectives:	**Objectives:**	
Objective MR-6: Utilize federal authority to protect GRSG habitat on split-estate lands to the extent provided by law.	No changes made.	No change (same as 2015)
Management Decisions (MD):	**Management Decisions (MD):**	
Mineral Split-Estate	***Mineral Split-Estate***	
MD MR-21: (PHMA/GHMA) Where the federal government owns the mineral estate in PHMA and GHMA, and the surface is in nonfederal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs/PDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.	No changes made.	No change (same as 2015)
MD MR-22: (PHMA/GHMA) Where the federal government owns the surface and the mineral estate is in nonfederal ownership in PHMA and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs/PDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.	No changes made.	No change (same as 2015)
Objectives:	**Objectives:**	
Objective MR-7: Manage solid mineral programs to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Management Decisions (MD):	**Management Decisions (MD):**	
Solid Minerals – Coal	***Solid Minerals – Coal***	
MD MR-23: (ADH) *Existing Coal Leases:* During the term of the lease, encourage the lessee to voluntarily follow PDFs (**Appendix C**, Required Design Features, Preferred Design Features, and Suggested Design Features) to reduce and mitigate any adverse impacts to GRSG. At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1). To authorize expansion of existing leases, the environmental record of review must show no significant direct disturbance, displacement, or mortality of GRSG based on these criteria: • Important GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat • An evaluation of the threats affecting the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation • An evaluation of terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD MR-24: No new surface coal mine leases would be allowed in PHMA. At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM would determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1).	No changes made.	Completely Revised-revised by rangewide
MD MR-25: *New Underground Coal Mine Leases would be subject to:* Special Stipulations: • All surfaces disturbances will be placed more than 2 miles from active leks. • No surface disturbance on remainder of PHMA subject to the following conditions: If, after consultation with the State of Colorado, and in consideration of the following criteria, there is no significant direct disturbance, displacement, or mortality of GRSG or impact to GRSG habitat; • 3 percent disturbance cap in PHMA with disturbances limited to 1 disturbance per 640 acres density calculated by Colorado MZ and proposed project analysis area would apply to new lease activities • No new leasing in PHMA if disturbance cap exceeds 3 percent (see **Appendix E**, Methodology for Calculating Disturbance Caps) for the biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ) or 1 disturbance per 640 acres is exceeded	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD MR-26: (ADH) Underground mining exemption criteria for new leases: 1. Federal lands with coal deposits that would be mined by underground mining methods shall not be assessed as unsuitable where there would be no surface coal mining operations, as defined in 43 CFR, Part 3400.0-5(mm) of this title, on any lease, if issued. Where underground mining will include surface operations and surface impacts on federal lands to which a criterion applies, the lands shall be assessed as unsuitable unless the surface management agency find that a relevant exception or exemption applies. See 43 CFR, Part 3461.1(b). Where practicable, limit permitted disturbances as defined in Appendix H, Guidelines for Implementation and Adaptive Management, to 3 percent in any biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ). Where disturbance exceeds 3 percent in any biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ), make additional, effective mitigation necessary to offset the resulting loss of GRSG habitat.	No changes made.	No change (same as 2015)
MD MR-27: (PHMA) See 43 CFR, Part 3461.4 (a) and (b), Exploration. Authorized exploration activities may be conducted only if the Authorized Officer reviews any application for an exploration license on such lands to ensure that any exploration does not harm any value for which the area has been assessed as unsuitable and determines that the exploration will not adversely affect GRSG populations due to habitat loss or disruptive activities or that the impact can be fully mitigated.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Where practicable, limit permitted disturbances as defined in **Appendix H**, Guidelines for Implementation and Adaptive Management, to 3 percent in PHMA any biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ). Where disturbance exceeds 3 percent in any biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ), make additional, effective mitigation necessary to offset the resulting loss of GRSG habitat.		
MD MR-28: (PHMA) *Underground mining – lease renewals:* • Require that all surface mining appurtenant facilities for underground mining be located outside of PHMA (unless the lessee establishes that that such location is not technically feasible). • If surface mining facilities must be located in PHMA, require the facilities be located in areas of existing disturbance and to have the smallest footprint possible utilizing design strategies to minimize disturbance, such as those identified in the PDF section of this table. • Apply as conditions of lease renewal all appropriate conservation measures, PDFs, and mitigation designed to avoid or minimize impacts to GRSG. (ADH) *Surface mining – lease renewals/readjustments:* Apply as conditions of lease renewal all appropriate conservation measures, PDFs, and mitigation designed to avoid or minimize impacts to GRSG.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD MR-29: (ADH) Recommend or require as appropriate during all relevant points of the coal leasing and authorization process, minimization of surface-disturbing or disrupting activities (including operations and maintenance) where needed to reduce the impacts of human activities on important seasonal GRSG habitats. Apply these measures during activity-level planning (jurisdiction is managed by the State). The Office of Surface Mining or a delegated State Regulatory authority under the Surface Mining Control and Reclamation Act of 1977 authorizes surface-disturbing activities of active coal mining operations on federal mineral estate. The BLM coordinates with the Surface Mining Control and Reclamation Act of 1977 in overseeing coal leasing and permitting on federal lands. The resource recovery and protection plan for which BLM recommends approval to the Secretary integrates the reclamation plan recommended by the Surface Mining Control and Reclamation Act of 1977 for active coal mines on federal mineral estate. Approval of coal mining plans on lands containing leased federal coal is reserved to the Secretary of the Interior (30 CFR, Part 740.4). BLM issues coal leases and exploration licenses for right of entry to promote development of minerals on federal lands. See the following in regards to BLM exploration: 43 CFR, Part 3461.4, Exploration. States with delegated authority on federal lands from the Office of Surface Mining may have their own GRSG guidance in association with state wildlife agencies and such guidance may differ from state to state.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD MR-30: (ADH) (a) Assessment of any area as unsuitable for all or certain stipulated methods of coal mining operations pursuant to Section 522 of the Surface Mining Control and Reclamation Act of 1977 (30 US Code 1272) and the regulations of this subpart does not prohibit exploration of such area under 43 CFR, Parts 3410 and 3480, and 43 CFR, Part 3461.4(a)	No changes made.	No change (same as 2015)
MD MR-31: (ADH) (b) An application for an exploration license on any lands assessed as unsuitable for all or certain stipulated methods of coal mining shall be reviewed by the BLM to ensure that exploration does not harm any value for which the area has been assessed as unsuitable (43 CFR, Part 3461.4(b))	No changes made.	No change (same as 2015)
RENEWABLE ENERGY (WIND AND SOLAR) (RE)	***RENEWABLE ENERGY (WIND AND SOLAR) (RE)***	
Objectives:	**Objectives:**	
Objective RE-1: Manage the Lands and Realty program to avoid, minimize, and compensate for the loss of habitat and habitat connectivity through the authorizations of ROWs, land tenure adjustments, proposed land withdrawals, agreements with partners, and incentive programs.	No changes made.	No change (same as 2015)
Management Decisions (MD):	**Management Decisions (MD):**	
Wind Energy Development	***Wind Energy Development***	
MD RE-1: (PHMA) Manage PHMA as exclusion areas for wind energy development.	No changes made.	Completely Revised-revised by rangewide
No similar action	No similar action	New: rangewide PHMA with Limited Exceptions allocation added
MD RE-2: (GHMA) Manage GHMA as avoidance areas for wind energy development.	No changes made.	Completely Revised-revised by state specific
Industrial Solar Development	***Industrial Solar Development***	
MD RE-3: (PHMA) Manage PHMA as exclusion areas for industrial solar projects.	No changes made.	Completely Revised-revised by rangewide

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
No similar action	No similar action	New: rangewide PHMA with Limited Exceptions allocation added
MD RE-4: (GHMA) Manage GHMA as avoidance areas for industrial solar projects.	No changes made.	Completely Revised-revised by state specific
LANDS AND REALTY (LR)	***LANDS AND REALTY (LR)***	
Objectives:	**Objectives:**	
Objective LR-1: Manage the Lands and Realty program to avoid, minimize, and compensate for the loss of habitat and habitat connectivity through the authorizations of ROWs, land tenure adjustments, proposed land withdrawals, agreements with partners, and incentive programs.	No changes made.	No change (same as 2015)
Objective LR-2: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available.	No changes made.	No change (same as 2015)
Management Decisions (MD):	**Management Decisions (MD):**	
Land Use Authorizations	***Land Use Authorizations***	
MD LR-1: Manage areas within PHMA as avoidance areas* for BLM ROW permits. (See **Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations.) ***GRSG PHMA ROW Avoidance.** ROWs may be issued after documenting that the ROWs would not adversely affect GRSG populations based on the following criteria: • Location of proposed activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat. • An evaluation of the potential threats from proposed activities that may affect the local population as compared to benefits that could be	No changes made.	Completely Revised-revised by rangewide and state specific

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
accomplished through compensatory or off-site mitigation • An evaluation of the proposed activities in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors.		
MD LR-2: Manage areas within GHMA as avoidance areas* for major (transmission lines greater than 100 kilovolts and pipelines greater than 24 inches) and minor BLM ROW permits. (See **Appendix G**, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations.) ***GRSG PHMA ROW Avoidance.** ROWs may be issued after documenting that the ROWs would not adversely affect GRSG populations based on the following criteria: • Location of proposed activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat. • An evaluation of the potential threats from proposed activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation An evaluation of the proposed activities in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors.	No changes made.	Completely Revised-revised by rangewide and state specific

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD LR-3: No new roads or above-ground structures would be authorized within 1 mile of an active lek. Above-ground structures are defined as structures that are located on or above the surface of the ground, including but not limited to: roads, fences, communication towers, and/or any structure that would provide perches. Above-ground structures would only be authorized if: 1. It is consistent with the overall objective of the RMP Amendment; 2. The effect on GRSG populations or habitat is nominal or incidental; 3. Allowing the exception prevents implementation of an alternative more detrimental to GRSG or similar environmental concern, and; 4. Rigid adherence to the restriction would be the only reason for denying the action.	No changes made.	Completely Revised-revised by state specific
MD LR-4: PHMA and GHMA are designated as avoidance areas for high-voltage transmission line ROWs, except for the transmission projects specifically identified below. All authorizations in these areas, other than the following identified projects, must comply with the conservation measures outlined in this ARMPA, including the RDFs and avoidance criteria presented in this document. The BLM is currently processing applications for the TransWest and Energy Gateway South Transmission Line projects, and the NEPA review for these projects is well underway. Conservation measures for GRSG are being analyzed through the projects' NEPA review	No changes made.	Completely Revised-revised by state specific

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
process, which should achieve a net conservation benefit for the GRSG. ***GRSG PHMA ROW Avoidance.** ROWs may be issued after documenting that the ROWs would not adversely affect GRSG populations based on the following criteria: • Location of proposed activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat. • An evaluation of the potential threats from proposed activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation An evaluation of the proposed activities in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors.		
No similar action	No similar action	New: see new actions in state-specific table
MD LR-5: Any new projects within PHMA would be subject to the 3 percent disturbance cap as described in **Appendix E**, Methodology for Calculating Disturbance Caps. If the 3 percent disturbance cap is exceeded in PHMA in any Colorado MZ, no new ROW would be authorized in PHMA within that biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ), unless site-specific analysis documents no impact to GRSG. Within existing designated utility corridors, the 3 percent	No changes made.	Completely Revised-revised by state specific

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location.		
MD LR-6: Prohibit surface occupancy and surface-disturbing activities associated with BLM ROW within 4 miles from active leks during lekking, nesting, and early brood-rearing (March 1 to July 15). (See special stipulations applicable to **GRSG PHMA ROW TL**.)	No changes made.	Completely Revised-revised by state specific
MD LR-7: Construct new roads to the appropriate Gold Book standard and add the surface disturbance to the total disturbance in the PHMA.	No changes made.	No change (same as 2015)
MD LR-8: (PHMA) In PHMA, or within 4 miles of an active lek, for ROW renewals, where existing facilities cannot be removed, buried, or modified, require perch deterrents.	No changes made.	Partially Revised- expands to PHMA and GHMA
MD LR-9: (PHMA) Reclaim and restore ROWs considering GRSG habitat requirements.	No changes made.	Partially Revised- expands to PHMA and GHMA
MD LR-10: (PHMA) Designate new ROW corridors in GRSG PHMA only where there is a compelling reason to do so and location of the corridor within PHMA will not adversely affect GRSG populations due to habitat loss or disruptive activities.	No changes made.	Partially Revised- expands to PHMA and GHMA
MD LR-11: (PHMA) Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in Table D.2 of the Monitoring Framework (Appendix D)−under valid existing rights prior to authorizing new projects in PHMA.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Land Tenure Adjustment	***Land Tenure Adjustment***	
MD LR-11: Retain public ownership of GRSG PHMA. Consider exceptions where: It can be demonstrated that: 1) disposal of the lands, including land exchanges, will provide a net conservation gain to the GRSG; or 2) the disposal of the lands, including land exchanges, will have no direct or indirect adverse impact on GRSG conservation. There is mixed ownership, and land exchanges would allow for additional or more contiguous federal ownership patterns within the GRSG PHMA.	No changes made.	No change (same as 2015)
MD LR-12: (PHMA) In isolated federal parcels, only allow tract disposals that are beneficial or neutral to long-term management of GRSG populations.	No changes made.	No change (same as 2015)
MD LR-13: (GHMA) For lands in GHMA that are identified for disposal, the BLM would only dispose of such lands consistent with the goals and objectives of this ARMPA, including, but not limited to, the ARMPA objective to maintain or increase GRSG abundance and distribution.	No changes made.	No change (same as 2015)
MD LR-14: (ADH) Consider GRSG habitat values in acquisitions. For example: Identify key GRSG habitats on private or state land, adjacent to existing BLM land, where acquisition and protection by BLM could substantially benefit the local GRSG population. This could be accomplished via purchase, exchange, or donation to satisfy mitigation requirements.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
RECREATION (REC)	***RECREATION (REC)***	
Objectives:	**Objectives:**	
Objective REC-1: Manage recreation to avoid activities that 1) disrupt GRSG, 2) fragment GRSG habitat, or 3) spread noxious weeds.	No changes made.	No change (same as 2015)
Management Decisions (MD):	**Management Decisions (MD):**	
MD REC-1: (PHMA) Do not allow special recreation permits with the potential to adversely affect GRSG or GRSG habitat.	No changes made.	No change (same as 2015)
TRAVEL AND TRANSPORTATION (TTM)	***TRAVEL AND TRANSPORTATION (TTM)***	
Objectives:	**Objectives:**	
Objective TTM-1: Manage travel and transportation to 1) reduce mortality from vehicle collisions, 2) limit change in GRSG behavior, 3) avoid, minimize, and compensate for habitat fragmentation, 4) limit the spread of noxious weeds, and 5) limit disruptive activity associated with human access.	No changes made.	No change (same as 2015)
Management Decisions (MD):	**Management Decisions (MD):**	
MD TTM-1: (PHMA) Limit off-highway vehicle (OHV) travel to existing roads, primitive roads, and trails at a minimum. Special Zone Provision: Colorado MZ 13 – Manage the Wolford Mountain open OHV area.	No changes made.	No change (same as 2015)
MD TTM-2: (PHMA) Evaluate and consider permanent or seasonal road or area closures as needed to address a current threat.	No changes made.	No change (same as 2015)
MD TTM-3: (PHMA) Complete activity level travel plans as soon as possible, subject to funding. During activity level planning, where appropriate, designate routes with current administrative/agency purpose or need to administrative access only.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD TTM-4: (PHMA) Complete activity level travel plans as soon as possible, subject to funding. Limit route construction to routes that will not adversely affect GRSG populations due to habitat loss or disruptive activities.	No changes made.	No change (same as 2015)
MD TTM-5: (PHMA) Use existing roads or realignments whenever possible. If it is necessary to build a new road, and the use of existing roads would cause adverse impacts to GRSG, construct new roads to the appropriate minimum Gold Book standard and add the surface disturbance to the total disturbance in the PHMA if it meets the criteria in **Appendix H**, Guidelines for Implementation and Adaptive Management. Construct no new roads if the biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ) is over the 3 percent disturbance cap (see **Appendix E**, Methodology for Calculating Disturbance Caps), unless there is an immediate health and safety need, or to support valid existing rights that cannot be avoided. Evaluate and implement additional, effective mitigation necessary to offset the resulting loss of GRSG habitat.	No changes made.	No change (same as 2015)
MD TTM-6: (PHMA) Allow upgrades to existing routes after documenting that the upgrade will not adversely affect GRSG populations due to habitat loss or disruptive activities.	No changes made.	No change (same as 2015)
MD TTM-7: (PHMA) Conduct restoration of roads, primitive roads and trails not designated in travel management plans. This also includes primitive route/roads that were not designated in wilderness study areas and within lands with wilderness characteristics that have been selected for protection in previous LUPs.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD TTM-8: (PHMA) When reseeding roads, primitive roads and trails, use appropriate seed mixes and consider the use of transplanted sagebrush.	No changes made.	No change (same as 2015)

Table 2. Seasonal Habitat Desired Conditions for GRSG (2015 and 2019 Plans)

Attribute	Indicators	Desired Condition
BREEDING AND NESTING [1,2,3] (Seasonal Use Period March 1-June 15) Apply 4 miles from active leks. [15]		
Lek Security	Proximity of trees [4]	Trees or other tall structures are none to uncommon within 1.86 miles of leks [5,6]
	Proximity of sagebrush to leks [5]	Adjacent protective sagebrush cover within 328 feet of lek[5]
Cover	Seasonal habitat extent [6]	>80% of the breeding and nesting habitat
	Sagebrush canopy cover [5,6,7,17] Arid sites Mesic sites	15 to 30% 20 to 30%17
	Sagebrush height [6, 17] Arid sites [5,6,9] Mesic sites [5,6,10]	11.8 to 31.5 inches (30-80 cm) 15.7 to 31.5 inches (40-80 cm)
	Predominant sagebrush shape [5]	>50% in spreading [11]
	Perennial grass canopy cover (such as native bunchgrasses) [5,6, 17] Arid sites [6,9] Mesic sites [6,10,17]	>10% >20%[17]
	Perennial grass and forb height (includes residual grasses) [5,6,7]	>6 inches6, [16, 17]
	Perennial forb canopy cover [5,6,7] Arid sites [9] Mesic sites [10]	>5%[5,6,17] >15%[5,6,17]

Attribute	Indicators	Desired Condition
BROOD-REARING/SUMMER[1] (Seasonal Use Period June 16-October 31)		
Cover	Seasonal habitat extent [6]	>40% of the brood-rearing/summer habitat
	Sagebrush canopy cover [5, 6,7, 17] Arid sites Mesic sites	10 to 25% 10 to 25%
	Sagebrush height [6,7, 17] Arid sites Mesic sites	11.8 to 31.5 inches (30 to 80 cm) 13.8 to 31.5 inches (35 to 80 cm)
	Perennial grass canopy cover and forbs [6,7,17] Arid sites Mesic sites	>15%[17] >25%[17]
	Riparian areas (both lentic and lotic systems)	Proper Functioning Condition [13]
	Upland and riparian perennial forb availability [5,6]	Preferred forbs are common with several preferred species present [12]
WINTER[1] (Seasonal Use Period November 1-February 28)		
Cover and Food	Seasonal habitat extent [5,6,7]	>80% of the winter habitat
	Sagebrush canopy cover above snow [5,6,7,17]	>20% Arid, 25% Mesic[17]
	Sagebrush height above snow [5,6,7]	>10 inches [14]

[1] Seasonal dates can be adjusted; that is, start and end dates may be shifted either earlier or later, but the amount of days cannot be shortened or lengthened by the local unit.
[2] Doherty 2008
[3] Holloran and Anderson 2005.
[4] Baruch-Mordo et al. 2013
[5] Stiver et. al. 2014
[6] Connelly et al. 2000
[7] Connelly et al. 2003
[9] 10–12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub-species for this type site (Stiver et. al. 2014).
[10] >12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (Stiver et. al. 2014).
[11] Sagebrush plants with a spreading shape provide more protective cover than sagebrush plants that are more tree or columnar shaped (Stiver et. al. 2014).
[12] Preferred forbs are listed in Habitat Assessment Framework Table III-2 (Stiver et. al. 2014). Overall, total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred in Table III-2.
[13] Existing land management plan desired conditions for riparian areas/wet meadows (spring seeps) may be used in place of properly functioning conditions, if appropriate for meeting GRSG habitat requirements.
[14] The height of sagebrush remaining above the snow depends upon snow depth in a particular year. Intent is to manage for tall, healthy, sagebrush stands.
[15] Buffer distance may be changed only if 3 out of 5 years of telemetry studies indicate the 4 miles is not appropriate.
[16] Measured as "droop height"; the highest naturally growing portion of the plant.
[17] Colorado Greater Sage-grouse Steering Committee 2008

2.1.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 plans have management direction that would change by the Proposed RMP Amendment. Note that if 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The appendices can be found on the Colorado GRSG ePlanning website.

ARMPA Appendix Name	Year	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Approved RMP Amendment Maps	2015	Completely Revised-revised by rangewide
B: Buffer Distances and Evaluation of Impacts on Leks	2015	No change (same as 2019 Plan where appendix was not carried forward, for Proposed Plan appendix still not carried forward and contents will be incorporated in Guidelines for Implementation appendix)
C: Required Design Features, Preferred Design Features, and Suggested Design Features	2015	Partially Revised- Applies rangewide livestock grazing BMPs
D: Greater Sage-Grouse Monitoring Framework	2015	Completely Revised-revised by rangewide
E: Methodology for Calculating Disturbance Caps	2015	Partially Revised- Applies rangewide disturbance cap approach
F: Greater Sage-Grouse Mitigation Strategy	2015	Completely Revised- appendix not carried forward because the mitigation strategy for GRSG is described in the mitigation section of the Proposed Plan
G: Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations	2015, 2019	Partially Revised- Applies rangewide exceptions, modifications, and waivers
H: Guidelines for Implementation and Adaptive Management	2015, 2019	Completely Revised-revised by rangewide

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Appendix 2.2
Idaho RMPs

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2.2 IDAHO RMPS

This appendix presents the GRSG approved RMP amendment language from the 2015 and 2019 records of decision for Idaho. Changes between 2015 and 2019 are noted. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment, either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMP Amendment include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable 2015 and 2019 appendices that are listed in **Section 2.2.2** of this appendix. For additional state-specific Idaho management direction for the Proposed RMP Amendment, see Chapter 2, Table 2-6.

2.2.1 Idaho

Table 1: Comparison of Proposed RMP Amendment to Existing GRSG RMP Management Direction in Idaho

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
SPECIAL STATUS SPECIES (SSS)	***SPECIAL STATUS SPECIES (SSS)***	—
GOAL:	**GOAL:**	—
Goal SSS 1: Maintain and/or increase the abundance, distribution and connectivity of GRSG by conserving, enhancing or restoring GRSG habitat to maintain resilient populations by reducing, eliminating or minimizing threats to GRSG habitats.	No changes made.	Completely Revised-revised by rangewide
Goal SSS 2: Provide for the needs of GRSG and their habitat while also providing for resource uses in accordance with BLM's direction for multiple use and sustained yield as described in FLPMA.	No changes made.	No change (same as 2015)
Goal SSS 3: Manage anthropogenic development and human disturbance to minimize the likelihood of adverse population level effects on GRSG.	No changes made.	No change (same as 2015)
Goal SSS 4: Reduce the risk of West Nile Virus or other disease outbreaks from BLM management actions.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Goal SSS 5: Conserve, enhance, and restore the sagebrush ecosystem upon which GRSG populations depend on in an effort to maintain and/or increase their abundance and distribution, in cooperation with other conservation partners.	No changes made.	Completely Revised (rangewide).
Objectives:	**Objectives:**	—
Objective SSS 1: Maintain or make progress toward all lands within PHMA and IHMA (at least 70%) capable of producing sagebrush so there is a minimum of 15 percent sagebrush cover and conifers absent to uncommon within 1.86 miles of occupied leks.	No changes made.	No change (same as 2015)
Objective SSS 2: Incorporate GRSG Seasonal Habitat Objectives (**Table 2**), into the design of projects or activities, as appropriate, based on site conditions and ecological potential, unless achievement of fuels management objectives require additional reduction in sagebrush cover to meet strategic protection of GRSG habitat and conserve habitat quality for the species or at least one of the following conditions can be demonstrated and documented in the NEPA analysis associated with the specific project: • A specific objective is not applicable to the site-specific conditions of the project or activity; • An alternative objective is determined to provide equal or better protection for GRSG or its habitat (based on appropriate scientific findings); or • Analysis concludes that following a specific objective will provide no more protection to GRSG or its habitat than not following it, for the project being proposed**.** • These habitat objectives in **Table 2** summarize	**Objective SSS 2:** Within PHMA and IHMA, maintain large intact sagebrush steppe communities with vegetative characteristics consistent with their ecological potential such that GRSG can select suitable seasonal habitats for breeding, nesting, rearing young, and wintering. GRSG actively select suitable use areas within large intact sagebrush ecosystems. Not every site will provide for every GRSG need, which is why they require large intact sagebrush ecosystems. The desired conditions for GRSG (the Desired Conditions table (Table 2-2) in the 2015 Final EIS) are a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that GRSG select. While the desired conditions are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to	Completely Revised-revised by rangewide.

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
the characteristics that research has found represent the seasonal habitat needs for GRSG. The specific seasonal components identified in the table were adjusted based on local science and monitoring data to define the range of characteristics used in this subregion. Thus, the habitat objectives provide the broad vegetative conditions we strive to obtain across the landscape that indicate the seasonal habitats used by GRSG. These habitat indicators are consistent with the rangeland health indicators used by the BLM. • The habitat objectives will be part of the GRSG habitat assessment to be used during land health evaluations (see **Appendix D**, Monitoring Framework). These habitat objectives are not obtainable on every acre within the designated GRSG habitat management areas. Therefore, the determination on whether the objectives have been met will be based on the specific site's ecological ability to meet the desired condition identified in the table. • All BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives. If monitoring data show the habitat objectives have not been met nor progress being made towards meeting them, there will be an evaluation and a determination made as to the cause. If it is determined that the authorized use is a cause, the use will be adjusted by the response specified in the instrument that authorized the use.	greater survival of individuals within a population. When permitting land use activities, the BLM **shall** consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site. The seasonal habitat descriptions in Table 2-2 [the Desired Conditions table in the 2015 Final EIS] vary across the range of GRSG, within a sub-region, and between sites. They are not land health standards but are quantitative measures that **help** inform the Special Status Species Habitat Land Health Standard for GRSG. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing GRSG habitat selection. Local data or recent science may indicate that GRSG select for vegetation structure and composition in seasonal habitats not characterized by the values in the desired conditions table. In these cases, it may be appropriate to adjust the values. Desired Conditions should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for GRSG. As appropriate**,** they may be used to demonstrate trends over time, during plan evaluations for effectiveness of GRSG conservation, or when identifying limiting habitat characteristics for a given area. The indicators, characteristics, values, and desired seasonal habitat conditions in the GRSG Plan Desired Conditions Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health	

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
	assessments. Results from the LHS evaluation should be used to support the BLM in land use authorization processes and during development of appropriate objectives for management actions such as vegetation treatments. The Desired Conditions Tables are to be used as follows: a. To assess habitat suitability, as defined by BLM policy and the Habitat Assessment Framework, for GRSG at the appropriate scale b. To describe desired conditions that provide habitat at multiple spatial scales, as defined by the best available science c. To evaluate land use plan effectiveness for GRSG conservation d. To develop measurable project objectives for actions in BLM-designated GRSG habitat management areas, as needed, when considered alongside land health standards, ecological potential and local information.	
Table 2 Habitat Objectives (full table on following this table) For nesting/early brood rearing habitat: Indicator: Perennial grass (and forb) height (includes residual grasses) Desired Condition: ≥ 7 inches	**Table 3 Desired Conditions** (full table following this table; same as 2015 except) For nesting/early brood rearing habitat: Indicator: Perennial grass (and forb) height (includes residual grasses) Desired Condition: - Adequate Nesting Cover References (add): Hausleitner 2005; Holloran et al. 2005; Gibson et al. 2016; Smith et al. 2017; Smith et al. 2018	Completely Revised- by rangewide and state-specific
Greater Sage-Grouse Management Areas	**2.3 GREATER SAGE-GROUSE MANAGEMENT AREAS** The boundaries of the habitat designations have been adjusted to correct administrative mapping errors that occurred when PHMA was designated	Completely Revised by rangewide and state-specific

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
	in 2015. Habitat management area boundary changes also include removing some areas of non-habitat that were added to PHMA by the 2015 ROD/ARMPA as part of the SFA designations. Additionally, in the West Owyhee Conservation Area, the circle of 60,706 acres of PHMA (Brown's Creek area) that is surrounded by IHMA will be re-designated as IHMA (see Map 1); 11,828 acres of non-Greater Sage-Grouse habitat managed as PHMA, in the Mountain Valleys Conservation Area, would be changed to non-habitat (Donkey Hills ACEC and mapping errors). (See Appendix A).	
Objective SSS 3: Maintain a resilient population of GRSG in Idaho.	No changes made.	No change (same as 2015)
Objective SSS 4: Designate GRSG management areas and associated management to maintain a resilient population and to designate strategically located adjacent areas to provide a buffer from unpredictable habitat loss such as wildfire to the resilient population areas.	No changes made.	No change (same as 2015)
Objective SSS 5: Identify and strategically protect larger intact sagebrush areas and areas of lower fragmentation to maintain GRSG population persistence.	No changes made.	No change (same as 2015)
Management Decisions (MD):	**Management Decisions (MD):**	—
MD SSS-1: Designate four GRSG Conservation Areas (see Glossary) within the subregion to form the geographic basis for achieving population objectives; evaluating the disturbance density and adaptive regulatory triggers; and tailor adaptive management responses. These conservation areas are depicted in **Figure 2-14**. These areas are referred to as Mountain Valleys, Desert, West Owyhee, and Southern Conservation Areas. <u>Conservation Area Description</u>	No changes made.	Partially Revised-state-specific management direction

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Mountain Valleys Conservation Area – generally located north of the Snake River Plain, including GRSG habitat in the Salmon and Challis areas, and habitat in west-central population area. It extends west from Rexburg, north and west of Highway 33 to Howe, north and west of Highway 33/22 to Arco, north and west of Highway 26/20/93 to Carey, north and west of Highway 20 west to Hill City, north and west of Highway 20 to the Dylan Karaus Road, west to Canyon Creek. Canyon Creek to the confluence with the Snake River form the western boundary. Desert Conservation Area – located north of the Snake River and south of the Mountain Valleys Conservation Area. It extends from the confluence of Canyon Creek and the Snake River, eastward to Idaho Falls. The Snake River and Henry's Fork form the eastern boundary. West Owyhee Conservation Area – located south of the Snake River and west of the Bruneau River. Southern Conservation Area – located south of the Snake River and east of the Bruneau River, including East Idaho uplands and Bear Lake Plateau, and the Utah portion of the Sawtooth National Forest in Box Elder County. In general, GRSG habitats in the Desert and West Owyhee CAs are relatively contiguous, while those in the Mountain Valleys and Southern CAs tend to be more fragmented due to more complex topography, and elevational differences and/or effects from wildfires, agriculture, urbanization or other factors.		
MD SSS 2: Within each Conservation Area	No changes made.	Partially Revised-revised by rangewide and state-

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
designate GRSG Habitat Management Areas: Priority, Important and General Habitat Management Areas (**Figure 2-1**). **Priority Habitat Management Areas (PHMA**) focus on conserving the two key meta-populations in the subregion. PHMA encompasses areas with the highest conservation value to GRSG, based on the presence of larger leks, habitat extent, important movement and connectivity corridors and winter habitat. PHMA include adequate area to accommodate continuation of existing land uses and landowner activities. **Important Habitat Management Areas (IHMA)** contain additional habitat and populations that provide a management buffer for the PHMA and to connect patches of PHMA. IHMA encompasses areas of generally moderate to high conservation value habitat and/or populations and in some Conservation Areas includes areas beyond those identified by USFWS as necessary to maintain redundant, representative and resilient populations (Priority Areas for Conservation (PACs)). IHMA are typically adjacent to PHMA but generally reflect somewhat lower GRSG population status and/or reduced habitat value due to disturbance, habitat fragmentation or other factors. **General Habitat Management Areas (GHMA)** encompass habitat that is outside of PHMA or IHMA. GHMA contain approximately 10 percent of the occupied leks that are also of relatively low male attendance compared to leks in PHMA or IHMA. GHMA are generally characterized by lower quality disturbed or patchy habitat of low lek connectivity.		specific management direction

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD SSS 3: Designate PHMA and IHMA to encompass 90 percent of the breeding males in Idaho.	No changes made.	No change (same as 2015)
MD SSS 4: Annually prioritize Conservation Areas at the state scale considering results of the annual adaptive regulatory trigger evaluations relative to implementation of restoration and mitigation activities.	No changes made.	Partially Revised-revised by state-specific management direction
MD SSS 5: Prioritize activities and mitigation to conserve, enhance and restore GRSG habitats (i.e., fire suppression activities, fuels management activities, vegetation treatments, invasive species treatments etc.) first by Conservation Area, if appropriate (Conservation Area under adaptive management or at risk of meeting an adaptive management soft or hard trigger), followed by PHMA, then IHMA then GHMA within the Conservation Areas. Local priority areas within these areas will be further refined as a result of completing the GRSG Wildfire and Invasive Species Habitat Assessments as described in **Appendix H**. This can include projects outside GRSG habitat when those projects will provide a benefit to GRSG habitat.	No changes made.	Partially Revised- revised by state-specific management direction
MD SSS 6: The management area map and Biologically Significant Unit (BSU) baseline map will be re- evaluated in conjunction with plan evaluation processes (i.e. approximately every 5 years). This re- evaluation can indicate the need to adjust PHMA, IHMA or GHMA or the habitat baseline. These adjustments can occur upon completion of the appropriate analysis and process (e.g., plan amendment) to review the allocation decisions based on the map. Results from the Wildfire and Invasive Species Assessments, such as identified	**MD SSS 6:** The management area map and Biologically Significant Unit (BSU) baseline map will be re- evaluated in conjunction with plan evaluation processes (i.e. approximately every 5 years). This re- evaluation can indicate the need to adjust Conservation Area Boundaries, PHMA, IHMA or GHMA or the habitat or the population baselines. These adjustments can occur upon completion of the appropriate analysis and process (e.g., plan maintenance in coordination with the teams identified in MD SSS 44) to review the allocation	Partially Revised- revised by state-specific management direction

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
focal or emphasis areas will also be used to help inform mapping adjustments during this evaluation.	decisions based on the map. Results from the Wildfire and Invasive Species Assessments, such as identified focal or emphasis areas will also be used to help inform mapping adjustments during this evaluation.	
MD SSS 7: GRSG habitat within the project area will be assessed during project-level NEPA analysis within the management area designations (PHMA, IHMA, GHMA). Project proposals and their effects will be evaluated based on the habitat and values affected.	No changes made.	No change (same as 2015)
MD SSS 8: Idaho BLM will annually update the Key Habitat map, in order to reflect habitat changes resulting from wildfire, succession, and vegetation treatments that occurred or were observed since the last update. Key habitat includes areas of generally intact sagebrush that provide sage-grouse habitat during some portion of the year. This map also identifies potential restoration areas (perennial grassland annual grasslands, conifer encroachment and recent burns). This map a broad scale current vegetation map that changes as habitat is lost or restored. The Key Habitat Map is not an allocation decision such as PHMA, IHMA, and GHMA. Updates to the map will also occur if it is determined that mapping errors or omissions have occurred, or that radio-telemetry studies indicate that GRSG are consistently utilizing an area. Updates are also intended to capture recommendations by the field offices, GRSG Local Working Groups, or agency partners in GRSG conservation. Project-level evaluations of GRSG habitat during the NEPA process can also be used to inform the annual update.	No changes made.	Completely Revised-revised by state-specific management direction

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD SSS 9: Areas of habitat outside of delineated habitat management areas identified during the Key habitat update process will be evaluated during site specific NEPA for project level activities and GRSG required design features (**Appendix C**) and buffers (**Appendix B**) will be included as part of project design. These areas will be further evaluated during plan evaluation and the 5-year update to the management areas, to determine whether they should be included as PHMA, IHMA, or GHMA.	This decision has been deleted.	No change (same as 2019)
MD SSS 10: Designate Sagebrush Focal Areas (SFA) as shown on **Figure 1-2**. SFA will be managed as PHMA, with the following additional management • Recommended for withdrawal from the General Mining Act of 1872, as amended, subject to valid existing rights. • Managed as NSO, without waiver, exception, or modification, for fluid mineral leasing. Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration (see specific management sections).	This decision has been deleted.	No change (same as 2019)
Adaptive Management	***Adaptive Management***	—
MD SSS 11: Use hard and soft population and habitat triggers to determine an appropriate management response as described in MD SSS 16 to MD SSS 26. Hard and soft triggers responses are applied at the Conservation Area (MD SSS-1) scale (**Appendix E**).	No changes made.	Completely Revised-revised by rangewide

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD SSS 12: Utilize monitoring information collected through the Monitoring Framework (**Appendix D**) to determine when adaptive regulatory triggers have been met.	No changes made.	Completely Revised-revised by rangewide
MD SSS 13: BLM will maintain GRSG habitat information, through use of the Key Habitat map or latest sagebrush/vegetation map, which will be used to track and identify habitat changes to assess the habitat trigger in the adaptive management approach. Key habitat map updates are made each winter by BLM in coordination with the Forest Service and IDFG, using the process described in Appendix F of the FEIS.	No changes made.	Completely Revised-revised by rangewide
MD SSS 14: BLM will coordinate with the IDFG regarding population information collected and maintained by the IDFG to track and identify population changes to assess the population trigger in the adaptive management approach.	No changes made.	Completely Revised-revised by rangewide
MD SSS 15: The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD, and twice each year thereafter the applicable monitoring information will be reviewed to determine if any adaptive management triggers have been met.	**MD SSS 15:** The data from the lek counts and the key habitat map update will be reviewed annually to determine if any hard or soft adaptive management triggers have been met.	Completely Revised-revised by rangewide
MD SSS 16: Adaptive habitat triggers will be individually calculated across all ownerships within the BSUs (**Appendix E**). The BSU is defined as the IDFG modeled nesting and wintering habitat (IDFG 2013, unpublished data) within PHMA and IHMA within a Conservation Area. The sagebrush component of the BSU is represented by the Key habitat within the BSU present during the 2011 baseline and as mapped during subsequent annual Key habitat map updates. Key habitat is defined as areas of generally intact sagebrush that provide	No changes made.	Completely Revised-revised by rangewide

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
GRSG habitat during some portion of the year (ISAC 2006).		
MD SSS 17: Habitat Hard Triggers are defined as: • A 20 percent loss of Key Habitat within the BSU of the PHMA of a Conservation Area when compared to the 2011 baseline, inclusive of all land ownerships or • A 20 percent loss of Key Habitat within the BSU of the IHMA of a Conservation Area when compared to the 2011 baseline.	No changes made.	Completely Revised-revised by rangewide
MD SSS 18: Habitat Soft Triggers are defined as: • A 10 percent loss of Key Habitat within the BSU of the PHMA of a Conservation Area when compared to the 2011 baseline; or • A 10 percent loss of Key Habitat within the BSU of the IHMA of a Conservation Area when compared to the 2011 baseline.	No changes made.	Completely Revised-revised by rangewide
MD SSS 19: Population Hard Triggers are defined as: • A 20 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change (λ) significantly below 1.0 within PHMA within a Conservation Area over the same 3-year period; or • A 20 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change (λ) significantly below 1.0 within IHMA within a Conservation Area over the same 3-year period. • Significance is defined by the 90 percent confidence interval around the current 3-year	No changes made.	Completely Revised-revised by rangewide

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
finite rate of change. If the 90 percent confidence interval is less than, and does not include 1.0, then the finite rate of change is considered significant. The finite rate of change and variance will be calculated following Garton et al. (2011).		
MD SSS 20: Population Soft Triggers are defined as: • A 10 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change (λ) below 1.0 within PHMA within a Conservation Area over the same 3-year period; or • A 10 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change (λ) below 1.0 within IHMA within a Conservation Area over the same 3-year period.	**MD SSS 20:** Population Soft Triggers are defined as: A. A 10 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change (λ) below 1.0 within PHMA within a Conservation Area over the same 3-year period; or B. A 10 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change (λ) below 1.0 within IHMA within a Conservation Area over the same 3-year period. Significance for soft triggers is defined by the 90 percent confidence interval around the current 3-year finite rate of change. If the 80 percent confidence interval is less than and does not include 1.0, then the finite rate of change is considered significant. The finite rate of change and variance will be calculated following Garton et al. (2011).	Completely Revised-revised by rangewide
MD SSS 21: When any of the Criteria for Soft Triggers have been met the Implementation Team will evaluate causal factors and recommend additional potential implementation level activities (**Appendix E**).	No changes made.	Completely Revised-revised by rangewide

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD SSS 22: When any of the Criteria for Hard Triggers have been met then all PHMA management actions will be applied to the IHMA within that Conservation Area and the Implementation Team will evaluate causal factors and recommend additional potential implementation level activities.	No changes made.	Partially Revised-revised by state-specific – references to Conservation Areas updated to reflect rangewide evaluation areas
MD SSS 23: If an adaptive regulatory trigger is tripped and livestock grazing is identified as a probable limiting factor then adjustments will follow the Adaptive Grazing Management Response described in **Appendix E**.	No changes made.	Completely Revised-revised by rangewide
MD SSS 24: Remove any adaptive management response when the habitat or maximum male population count (i.e., 3-year average) returns to or exceeds the 2011 baseline levels within the associated Conservation Area in accordance with the Adaptive Management Strategy (**Appendix E**). In such a case, changes in management allocations resulting from a tripped trigger will revert back to the original allocation (MD SSS 22)**.**	**MD SSS 24:** Remove the automatic hard trigger adaptive management response when the habitat or maximum male population count (i.e., 3-year average) returns to or exceeds the 2011 baseline levels within the associated Conservation Area, in accordance with the Adaptive Management Strategy (**Appendix E**). In such a case, changes in management allocations resulting from a tripped trigger will revert to the original allocation (MD SSS 22)**.**	Completely Revised-revised by rangewide
MD SSS 26: When a hard trigger is hit in a BSU within a PAC that has multiple BSUs, including those that cross state lines, the WAFWA Management Zone Greater Sage-Grouse Conservation Team will convene to determine the causal factor, put project-level responses in place, as appropriate and discuss further appropriate actions to be applied. The team will also investigate the status of the hard triggers in other BSUs within the PAC and will invoke the appropriate plan response.	No changes made.	Completely Revised-revised by rangewide

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Anthropogenic Disturbance	***Anthropogenic Disturbance***	—
MD SSS 27: If the 3 percent anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG PHMA (or IHMA in Idaho) Habitat Management Areas in any given BSU, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the General Mining Law of 1872, as amended, valid existing rights, etc.) will be permitted by BLM within GRSG PHMA and IHMA in any given BSU until the disturbance has been reduced to less than the cap, as measured according to the Disturbance and Adaptive Management Appendix (**Appendix E**) for the intermediate scale. For Idaho, if the 3 percent disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area (**Appendix E**) in a PHMA (or IHMA in Idaho), then no further anthropogenic disturbance will be permitted by BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap (subject to applicable laws and regulations, such as the General Mining Law of 1872, as amended, valid existing rights, etc.). Within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be	**MD SSS 27:** If the 3 percent anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG PHMA (or IHMA in Idaho) Habitat Management Areas in any given BSU, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the General Mining Law of 1872, as amended, valid existing rights, etc.) will be permitted by BLM within GRSG PHMA and IHMA in any given BSU until the disturbance has been reduced to less than the cap, as measured according to the Disturbance and Adaptive Management Appendix (**Appendix E**) for the intermediate scale. For Idaho, the BSU (**Figure 2-2**) is defined as the currently mapped nesting and wintering habitat within PHMA and IHMA within a Conservation Area, inclusive of all ownerships. Anthropogenic disturbance excludes habitat disturbance from wildfire and fuels management activities and includes the following developments (see **Appendix E** for further details): • Oil and Gas Wells and Development Facilities • Coal Mines • Wind Towers • Solar Fields • Geothermal Development Facilities • Mining (Active Locatable, Non-Energy Leasable and Salable Developments) • Roads • Railroads • Power lines	Completely Revised-revised by rangewide

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exceeded as a result of any project co-location. The BSU (**Figure 2-2**) is defined as the currently mapped nesting and wintering habitat within PHMA and IHMA within a Conservation Area, inclusive of all ownerships. Anthropogenic disturbance excludes habitat disturbance from wildfire and fuels management activities and includes the following developments (see **Appendix E** for further details): • Oil and Gas Wells and Development Facilities • Coal Mines • Wind Towers • Solar Fields • Geothermal Development Facilities • Mining (Active Locatable, Non-Energy Leasable and Saleable Developments) • Roads • Railroads • Power lines • Communication Towers • Other Vertical Structures • Coal bed Methane Ponds • Meteorological Towers (e.g., wind energy testing) • Nuclear Energy Facilities • Airport Facilities and Infrastructure • Military Range Facilities and Infrastructure • Hydroelectric Plants • Recreation Areas Facilities and infrastructure For Idaho this disturbance is measured by direct footprint or by ROW width for linear features (power lines, pipelines and roads). For Montana disturbance is measured similar to the Wyoming	• Communication Towers • Other Vertical Structures • Coal bed Methane Ponds • Meteorological Towers (e.g., wind energy testing) • Nuclear Energy Facilities • Airport Facilities and Infrastructure • Military Range Facilities and Infrastructure • Hydroelectric Plants • Recreation Areas Facilities and infrastructure This disturbance is measured by direct footprint or by the distance between the outermost lines on transmission lines (Leu et al. 2008).	

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Disturbance Density Calculation Tool process described in **Appendix E**. Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in the Priority Habitat Management Area within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is co-located into an existing disturbed area.		
MD SSS 28: New anthropogenic disturbances within PHMA or IHMA within a Conservation Area where the disturbance cap is already exceeded from any source or where the proposed development will result in the cap being exceeded will not be allowed in within that Conservation Area until enough habitat has been restored within that Conservation Area to maintain the area under this cap (subject to valid existing rights).	No changes made.	Completely Revised-revised by rangewide
MD SSS 29: New anthropogenic disturbances within PHMA (Idaho only): Anthropogenic Disturbance Screening Criteria. In order to avoid surface-disturbing activities in PHMA, priority will be given to development (including ROWs, fluid minerals and other mineral resources subject to applicable stipulations) outside of PHMA. When authorizing development in PHMA, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. In addition to the PHMA and IHMA Anthropogenic Disturbance Development Criteria (MD SSS 30),	**MD SSS 29**: Subject to valid existing rights, new anthropogenic disturbances in PHMA: Anthropogenic Disturbance Screening Criteria. In order to avoid surface-disturbing activities in PHMA, priority will be given to development of rights-of-way (ROWs), fluid minerals, and other mineral resources subject to applicable stipulations outside of PHMA. When authorizing development in PHMA, priority will be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. In addition to the PHMA and IHMA anthropogenic disturbance	Partially Revised-revised by state-specific

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the following criteria must all be met in the project screening and assessment process: a. The population trend for the GRSG within the associated Conservation Area is stable or increasing over a three-year period and the population levels are not currently engaging the adaptive management triggers (this applies strictly to new authorizations; renewals and amendments of existing authorizations will not be subject to this criteria when it can be shown that long-term impacts from those renewals or amendments will be substantially the same as the existing development); b. The development with associated mitigation will not result in a net loss of GRSG Key habitat and mitigation will provide a net conservation benefit to the respective PHMA; c. The project and associated impacts will not result in a net loss of GRSG Key habitat or habitat fragmentation or other impacts causing a decline in the population of the species within the relevant Conservation Area (the project will be outside Key habitat in areas not meeting desired habitat conditions or the project will provide a benefit to habitat areas that are functioning in a limited way as habitat); d. The development cannot be reasonably accomplished outside of the PHMA; or can be either: 1) developed pursuant to a valid existing authorization; or 2) is co-located within the footprint of existing infrastructure (proposed actions will not increase the 2011 authorized footprint and associated impacts more than 50 percent, depending on industry practice). e. Development will be implemented adhering to	development criteria (MD SSS 30), the BLM will ensure an applicant has worked with the State of Idaho to submit a proposal that meets the following criteria: a. The population trend for the Greater Sage-Grouse in the associated conservation area is stable or increasing over a 3-year period and the population levels are not currently engaging the adaptive management triggers (this applies strictly to new authorizations; renewals and amendments of existing authorizations will not be subject to this criteria when it can be shown that long-term impacts from those renewals or amendments will be substantially the same as the existing development). b. The development with associated design features, avoidance, minimization, or mitigation actions will not result in a net loss of Greater Sage-Grouse key habitat or of the respective PHMA. c. The project, its design features, avoidance and minimization actions, and associated impacts will not result in a net loss of Greater Sage-Grouse key habitat or habitat fragmentation or other impacts causing a decline in the population of the species in the relevant conservation area. d. The development cannot be reasonably accomplished outside of the PHMA or can be either developed pursuant to a valid existing authorization or collocated within the footprint of existing infrastructure. Proposed actions will not increase the 2011 authorized footprint and associated impacts more than 50 percent, depending on industry practice. e. Development will adhere to the RDFs described	

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the required design features (RDF) described in **Appendix C**; f. The project will not exceed the disturbance cap (MD SSS 27) g. The project has been reviewed by the State Implementation Team and recommended for consideration by the Idaho Governor.	in **Appendix C**. f. The project will not exceed the disturbance cap (MD SSS 27). g. Large-scale anthropogenic disturbances in PHMA will be reviewed by the technical and policy teams, as described in MD SSS 44. (See the glossary for definition of large-scale anthropogenic disturbances.)	
MD SSS 30: The following Anthropogenic Disturbance Development Criteria must be met in the screening and assessment process for proposals in PHMA and IHMA to discourage additional disturbance in PHMA and IHMA (as described in MD LR 2 and MD RE 1; applies to Idaho only): a. Through coordination with the USFWS and State of Idaho (as described in MD CC 1), it is determined that the project cannot be achieved, technically or economically, outside of this management area; and b. The project siting and/or design should best reduce cumulative impacts and/or impacts on GRSG and other high value natural, cultural, or societal resources; this may include co-location within the footprint for existing infrastructure, to the extent practicable; and c. The project results in a net conservation gain to GRSG Key habitat or with beneficial mitigation actions reduces habitat fragmentation or other threats within the Conservation Area; and d. The project design mitigates unavoidable impacts through appropriate compensatory mitigation; and e. Development will be implemented adhering to the RDFs described in **Appendix C**.	**MD SSS 30:** The applicant will work with the State of Idaho to submit a proposal that meets all of the following anthropogenic disturbance development criteria in the screening and assessment process for proposals in PHMA and IHMA. This is to discourage additional disturbance in PHMA and IHMA (as described in MD LR 2 and MD RE 1): a. Through coordination with the State of Idaho (as described in MD CC 1), it is determined that the project cannot be achieved, technically or economically, outside of this management area b. The project siting and/or design should best reduce cumulative impacts and/or impacts on Greater Sage-Grouse and other high value natural, cultural, or societal resources; this may include collocation in the footprint for existing infrastructure, to the extent practicable c. The State of Idaho determines in coordination with BLM the project results in no net loss to Greater Sage-Grouse key habitat or, with mitigation actions, reduces habitat fragmentation or other threats in the conservation area; d. Development will adhere to the RDFs described in **Appendix C** e. The project will not exceed the disturbance cap (MD SSS 27)	Partially Revised-revised by state-specific

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f. The project will not exceed the disturbance cap (MD SSS 27).	f. Large-scale anthropogenic disturbances in PHMA and IHMA will be reviewed by the technical and policy teams, as described in MD SSS 44.	
MD SSS 31: Co-locating new infrastructure within existing ROWs and maintaining and upgrading ROWs is preferred over the creation of new ROWs or the construction of new facilities in all management area. Colocation for various activities is defined as: • Communication Sites – The installation of new equipment/facilities on or within or adjacent to existing authorized equipment/facilities or within a communication site boundary as designated in the Communication Site Plan. • Electrical Lines – Installation of new ROWs adjacent to current ROWs boundaries, not necessarily placed on the same power poles. • Other Rights-of-Way – The installation of new ROWs within the existing footprint of an approved ROW boundary or adjacent to an approved ROW boundary. • Designated Corridors – The installation of new rights-of-way within the existing corridor or adjacent to the existing corridor.	No changes made.	No change (same as 2015)
MD SSS 32: Incorporate RDFs as described in **Appendix C** in the development of project or proposal implementation, reauthorizations or new authorizations and suppression activities, as conditions of approval (COAs) into any post-lease activities and as best management practices for locatable minerals activities, to the extent allowable by law, unless at least one of the following conditions can be demonstrated and documented in the NEPA analysis associated with the specific project:	**MD SSS 32:** In PHMA and IHMA, incorporate RDFs as described in **Appendix C**, in developing the project or proposal implementation, reauthorizations or new authorizations, as conditions of approval (COAs) into any post-lease activities and as BMPs for locatable minerals activities, to the extent allowable by law, unless at least one of the following conditions can be demonstrated and documented in the NEPA analysis associated with the specific project: a. A specific RDF is not applicable to the site-	Partially Revised by state-specific

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a. A specific RDF is not applicable to the site-specific conditions of the project or activity; b. A proposed design feature or BMP is determined to provide equal or better protection for GRSG or its habitat; or c. Analysis concludes that following a specific RDF will provide no more protection to GRSG or its habitat than not following it, for the project being proposed.	specific conditions of the project or activity; b. A proposed design feature or BMP is determined to provide equal or better protection for GRSG or its habitat; or c. Analysis concludes that following a specific RDF will provide no more protection to GRSG or its habitat than not following it, for the project being proposed. In GHMA, the RDFs are considered BMPs that should be considered and applied, unless the proponent can show that applying the BMP is technically or economically impracticable.	
MD SSS 33: Conduct implementation and project activities, including construction and short-term anthropogenic disturbances consistent with seasonal habitat restrictions described in **Appendix C**.	No changes made.	No change (same as 2015)
MD SSS 34: RDFs and seasonal habitat restrictions will not be required for emergency or short-term activities necessary to protect and preserve human life or property.	No changes made.	No change (same as 2015)
MD SSS 35: In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239) in accordance with **Appendix B**.	**MD SSS 35:** In undertaking BLM management actions in PHMA, IHMA, and GHMA, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances in accordance with **Appendix B**. The buffers do not apply to vegetation treatments specifically designed to improve or protect Greater Sage-Grouse habitat; however, impacts on leks should be analyzed and those impacts should be minimized to the extent practicable.	Partially Revised by state-specific Same buffer distances as 2015 with Alternative 5 definitions of leks

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MD SSS 36: Incorporate appropriate conservation measures for slickspot peppergrass (*Lepidium papilliferum*) as described in the 2014 Conservation Agreement (as updated, amended or reauthorized) into implementation and project design within slickspot peppergrass habitat in the Jarbidge and Four Rivers Field Offices to avoid and minimize impacts on slickspot peppergrass.	No changes made.	No change (same as 2015)
Monitoring	***Monitoring***	—
MD SSS 37: Once FIAT Assessments are complete, annually complete a review of FIAT Assessment implementation efforts within GRSG habitat with appropriate USFWS and state agency personnel.	No changes made.	No change (same as 2015)
MD SSS 38: Monitor the effectiveness of projects (e.g., fuel breaks. fuels treatments) until objectives have been met or until it is determined that objectives cannot be met, according to the monitoring schedule identified for project implementation.	No changes made.	No change (same as 2015)
MD SSS 39: Monitor invasive vegetation post vegetation management treatment.	No changes made.	No change (same as 2015)
MD SSS 40: Monitor project construction areas for noxious weed and invasive species for at least 3 years, unless control is achieved earlier.	No changes made.	No change (same as 2015)
MD SSS 41: Use lek, nesting and winter habitat maps and key habitat map (updates) to annually assess GRSG population and habitat status in the context of the adaptive management triggers.	No changes made.	Completely Revised-revised by state-specific
MD SSS 42: Continue to support updates to the Key Habitat map to track vegetation changes in relation to GRSG habitat on a yearly basis, until such a time this process is replaced. The process used to update the Key Habitat Map is described in Appendix F of the FEIS.	No changes made.	Completely Revised-revised by state-specific

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MD SSS 43: Monitor GRSG habitat as described in the monitoring framework plan (**Appendix D**) in coordination with IDFG.	No changes made.	No change (same as 2015)
—	**MD SSS 44:** In collaboration with the Idaho Governor's Office of Species Conservation, Idaho Department of Fish and Game, US Fish and Wildlife Service, and potentially other state and federal agencies, the BLM will form two teams (a technical team and a policy team) through a memorandum of understanding. These teams will be responsible for reviewing proposed infrastructure developments, exceptions, variances, adaptive management triggers and responses, habitat management area adjustments, and mitigation, as described in detail in **Appendix K**.	Partially Revised-revised by state-specific
VEGETATION (VEG)	***VEGETATION (VEG)***	—
Objectives:	**Objectives:**	—
Objective VEG 1: Reconnect and expand areas of higher native plant community integrity/rangeland health to increase the extent of high quality habitat and, where possible, to accommodate the future effects of climate change.	No changes made.	No change (same s 2015)
Objective VEG 2: Increase the amount and functionality of seasonal habitats by: a. Increasing or enhancing canopy cover and average patch size of sagebrush. b. Increasing the amount, condition and connectivity of seasonal habitats. c. Protecting or improving GRSG migration/movement corridors. d. Reducing conifer encroachment within GRSG seasonal habitats. e. Improving understory (grass, forb) and/or riparian condition within breeding and late brood- rearing habitats.	No changes made.	No change (same as 2015)

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f. Reducing the extent of annual grasslands within and adjacent to PHMA and IHMA. Decadal treatment objectives by population area are identified in **Table 2-3**, Estimated Acres of Treatment Needed within a 10-Year Period to Achieve Vegetation Objectives on BLM-Administered Lands1.		
Objective VEG 3: In all SFA and PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush canopy cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).	This decision has been deleted.	No change (same as 2019)
Management Decisions (MD):	**Management Decisions (MD):**	—
Sagebrush Steppe:	Sagebrush Steppe:	—
MD VEG 1: Implement habitat rehabilitation or restoration projects in areas that have potential to improve GRSG habitat using a full array of treatment activities as appropriate, including chemical, mechanical and seeding treatments.	No changes made.	No change (same as 2015)
MD VEG 2: Implement vegetation rehabilitation or manipulation projects to enhance sagebrush cover or to promote diverse and healthy grass and forb understory to achieve the greatest improvement in GRSG habitat based on FIAT Assessments, HAF assessments, other vegetative assessment data and local, site specific factors that indicate sagebrush canopy cover or herbaceous conditions do not meet habitat management objectives (i.e. is minimal or exceeds optimal characteristics). This may necessitate the use of prescribed fire as a site preparation technique to	No changes made.	No change (same as 2015)

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remove annual grass residual growth prior to the use of herbicides in the restoration of certain lower elevation sites (e.g., Wyoming big sagebrush) but such efforts will be carefully planned and coordinated to minimize impacts on GRSG seasonal habitats.		
MD VEG 3: Require use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success (Richards et al. 1998). Non-native seeds may be used as long as they support GRSG habitat objectives (Pyke 2011) to increase probability of success, when adapted seed availability is low or to compete with invasive species especially on harsher sites.	No changes made.	No change (same as 2015)
MD VEG 4: Implement management changes in restoration and rehabilitation areas, as necessary, to maintain suitable GRSG habitat, improve unsuitable GRSG habitat and to ensure long-term persistence of improved GRSG habitat (Eiswerth and Shonkwiler 2006). Management changes can be considered during livestock grazing permit renewals, travel management planning, and renewal or reauthorization of ROWs.	No changes made.	No change (same as 2015)
MD VEG 5: Consider establishing seed harvest areas that are managed for seed production (Armstrong 2007) to provide a reliable source of locally adapted seed to use during rehabilitation and restoration activities.	No changes made.	No change (same as 2015)
MD VEG 6: Allocate use of native seed to GRSG or ESA listed species habitat in years when preferred native seed is in short supply. This may require reallocation of native seed from ESR projects outside of PHMA or IHMA to those inside it. Where probability of success or native seed	No changes made.	No change (same as 2015)

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availability is low, nonnative seeds may be used as long as they meet GRSG habitat conservation objectives (Pyke 2011). Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, shall be the highest priority for rehabilitation efforts.		
MD VEG 7: During land health assessments, evaluate the relative value of existing nonnative seeding within GRSG habitat as: 1) a component of a grazing system allowing improvement of adjacent native vegetation, 2) development of a forage reserve, 3) incorporation into a fuel break system (Davies et al. 2011) or 4) restoration/diversification for GRSG habitat improvement. Where appropriate and feasible, diversify seedings, or restore to native vegetation when potential benefits to GRSG habitat outweigh the other potential uses of the non-native seeding, with emphasis on PHMA and IHMA. Allow recolonization of seedings by sagebrush and other native vegetation.	No changes made.	No change (same as 2015)
Conifer Encroachment:	Conifer Encroachment:	—
MD VEG 8: Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and tools like the FIAT report (Chambers et. al., 2014) will help refine the location for specific areas to be treated.	No changes made.	No change (same as 2015)
Invasive Species:	Invasive Species:	—
MD VEG 9: Incorporate results of the FIAT Assessments into projects and activities addressing invasive species as appropriate.	No changes made.	No change (same as 2015)

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MD VEG 10: Implement noxious weed and invasive species control using integrated vegetation management actions per national guidance and local weed management plans for Cooperative Weed Management Areas in cooperation with State and Federal agencies, affected counties, and adjoining private lands owners.	No changes made.	No change (same as 2015)
MD VEG 11: Conduct integrated weed management actions for noxious and invasive weed populations that are impacting or threatening GRSG habitat quality using a variety of eradication and control techniques including chemical, mechanical and other appropriate means.	No changes made.	No change (same as 2015)
MD VEG 12: Require project proponent (projects described in MD SSS 27 and which are included in the anthropogenic disturbance cap evaluation) to ensure that noxious weeds and invasive species caused as a result of the project are treated to eliminate establishment on the disturbed project construction areas for at least 3 years and monitored and treated during the life of the project.	No changes made.	No change (same as 2015)
MD VEG 13: Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species.	No changes made.	No change (same as 2015)
***FIRE AND FUELS MANAGEMENT* (FIRE)**	***FIRE AND FUELS MANAGEMENT* (FIRE)**	—
Objectives:	**Objectives:**	—
Objective FIRE 1: Design fuel treatments to restore, enhance, or maintain GRSG habitat.	No changes made.	No change (same as 2015)
Objective FIRE 2: Manage wildfires to minimize loss of sagebrush and protect GRSG habitat.	No changes made.	No change (same as 2015)

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Management Decisions:	**Management Decisions:**	—
Pre-Suppression:	Pre-Suppression:	—
MD FIRE 1: (Wildfire Preparedness): Support development and implementation of Rangeland Fire Protection Associations (RFPAs) in coordination with the State of Idaho.	No changes made.	No change (same as 2015)
MD FIRE 2: Develop a consistent approach to fire restrictions within GRSG habitat through the existing coordinated inter-agency approach to fire restrictions based upon National Fire Danger Rating System thresholds (fuel conditions, drought conditions, and predicted weather patterns).	No changes made.	No change (same as 2015)
MD FIRE 3: Annually incorporate into existing fire management plans results and updates from the Wildfire and Invasive Species Habitat Assessments (FIAT Assessments) described in **Appendix H**, to communicate/explain the resource value of GRSG habitat, including fire prevention messages and actions to reduce human-caused ignitions.	No changes made.	No change (same as 2015)
MD FIRE 4: Continue to participate with the Wildland Fire Leadership Council, a cooperative, interagency organization dedicated to achieving consistent implementation of the goals, actions, and policies in the National Fire Plan and the Federal Wildland Fire Management Policy.	No changes made.	No change (same as 2015)
MD FIRE 5: Continue annual coordination meetings held between cooperating agencies that have fire suppression responsibilities. Incorporate Rangeland Fire Protection Associations and other stakeholders into this coordination. Discuss priority suppression areas and distribute maps showing priority suppression areas at both the Conservation Area and the local office levels as based on the adaptive management strategy and FIAT Assessments.	No changes made.	No change (same as 2015)

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MD FIRE 6: Ensure firefighter personnel receive annual orientation regarding GRSG habitat and sagebrush management issues as related to wildfire suppression.	No changes made.	No change (same as 2015)
MD FIRE 7: As part of the FIAT Assessments, identify roads, trails, and recreational use areas with high frequency of human caused fires within or adjacent to the PHMA or IHMA. Consider these areas during annual fire restriction evaluations, and as appropriate, through site specific management.	No changes made.	No change (same as 2015)
MD FIRE 8: Coordinate with Federal, State and local jurisdictions on fire and litter prevention programs to reduce human caused ignitions.	No changes made.	No change (same as 2015)
MD FIRE 9: Implement activities identified within the FIAT Assessments.	No changes made.	No change (same as 2015)
Suppression:	Suppression:	—
MD FIRE 10: Complete Wildland Fire and Invasive Species Assessments (FIAT Assessments) as described within **Appendix H** and incorporate results into appropriate Fire Management Plans as they are completed. FIAT Assessments are interdisciplinary evaluations of the threats posed by wildfire and invasive species, as well as identification of focal and emphasis habitats/treatment opportunities for fuels management, fire management, and restoration. These FIAT Assessments identify focal and emphasis habitats and describe strategies for fuels management, suppression and restoration activities. Focal and Emphasis Habitats identified through the FIAT Assessment to further refine priority areas for treatments to reduce the threats posed by wildfire, invasive annual grass and conifer expansion.	No changes made.	No change (same as 2015)

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MD FIRE 11: As part of the FIAT Assessments incorporate a wildfire response time analysis focusing on response time to identified priority areas within PHMA and IHMA or on those fires that have the potential to impact PHMA and IHMA. Incorporate findings into Unit Initial Attack program that determines initial attack resources.	No changes made.	No change (same as 2015)
MD FIRE 12: As part of the FIAT Assessment incorporate a water capacity analysis for suppression purposes, including potential private water sources. Utilized the analysis to ensure water availability for response to fire in or threatening PHMA and IHMA during initial attack.	No changes made.	No change (same as 2015)
MD FIRE 13: During high fire danger conditions, stage initial attack and secure additional resources closer to priority areas identified in the FIAT Assessments, based on anticipated fires and weather conditions, with particular consideration of the West Owyhee, Southern and Desert Conservation Areas to ensure quicker response times in or near GRSG habitat after considerations and placement of resources to protect human life and property.	No changes made.	No change (same as 2015)
MD FIRE 14: Utilize a full range of fire management strategies and tactics through strategic wildfire suppression planning consistent with appropriate management response and within acceptable risk levels, to achieve resource objectives for GRSG habitat consistent with land use plan direction. Utilizing both direct and indirect attack as appropriate to limit the overall amount of GRSG habitat burned. This can include suppressing fires in intact sagebrush habitats; limiting fire growth in GHMA when suppression resources are available or managing wildfire for resource benefit	No changes made.	No change (same as 2015)

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in areas of conifer (juniper) encroachment.		
MD FIRE 15: Suppression priorities: The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. Maintaining GRSG habitat will be the highest natural resources priority immediately after human life and property, commensurate with threatened and endangered species habitat or other critical habitats to be protected.	No changes made.	No change (same as 2015)
MD FIRE 16: Ensure close coordination with federal and state firefighters including the Rangeland Fire Protection Associations during suppression activities.	No changes made.	No change (same as 2015)
Fuels Management:	Fuels Management:	—
MD FIRE 17: Design and implement fuels treatments that will reduce the potential start and spread of unwanted wildfires and provide anchor points or control lines for the containment of wildfires during suppression activities with an emphasis on maintaining, protecting, and expanding sagebrush ecosystems and successfully rehabilitated areas and strategically and effectively reduce wildfire threats in the greatest area.	No changes made.	No change (same as 2015)
MD FIRE 18: Enhance (or maintain/retain) sagebrush canopy cover and community structure to match expected potential for the ecological site and consistent with GRSG habitat objectives unless fuels management objectives requires additional reduction in sagebrush cover to meet strategic protection of GRSG habitat. Closely	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
evaluate the benefits of the fuel management treatments against the additional loss of sagebrush cover on the local landscape in the NEPA process.		
MD FIRE 19: Apply appropriate seasonal restrictions for implementing vegetation and fuels management treatments according to the type of seasonal habitats present. Allow no treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around and/or in the winter range and will protect, maintain, increase, or enhance winter range habitat quality. Ensure chemical applications are utilized where they will assist in success of fuels treatments. Strategically place treatments on a landscape scale to prevent fire from spreading into PHMA or WUI.	No changes made.	No change (same as 2015)
MD FIRE 20: Develop a fuels continuity and management strategy to expand, enhance, maintain and protect GRSG habitat informed by the FIAT Assessments completed as described in **Appendix H**.	No changes made.	No change (same as 2015)
MD FIRE 21: When developing the fuels management strategy as part of the FIAT Assessment described in **Appendix H** consider up-to-date fuels profiles; land use plan direction; current and potential habitat fragmentation; sagebrush and GRSG ecological factors; active vegetation management steps to provide critical breaks in fuel continuity where appropriate; incorporate a comparative risk analysis with regard to the risk of increased habitat fragmentation from a proposed action versus the risk of large scale fragmentation posed by wildfires if the action is not taken.	No changes made.	No change (same as 2015)

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MD FIRE 22: Fuel treatments will be designed through an interdisciplinary process to expand, enhance, maintain, and protect GRSG habitat which considers a full range of cost effective fuel reduction techniques, including: chemical, biological (including grazing and targeted grazing), mechanical and prescribed fire treatments.	No changes made.	No change (same as 2015)
MD FIRE 23: Existing and proposed linear ROWs can be considered for use and maintenance as vegetated fuel breaks in appropriate areas (this activity may or may not be part of the ROW permit or the responsibility of the permit holder, in cases where this activity is considered part of mitigation for project design then it will be appropriately included as part of the ROW permit and the responsibility of the permit holder for development and maintenance).	No changes made.	No change (same as 2015)
MD FIRE 24: Fuel breaks will incorporate existing vegetation treatments (seedings), rocky areas or other appropriate topography or features or be located adjacent to existing linear disturbance areas where appropriate. Fuel breaks should be placed in areas with the greatest likelihood of compartmentalizing a fire and/or to foster suppression options to protect existing intact habitat.	No changes made.	No change (same as 2015)
MD FIRE 25: Strategically pre-treat areas to reduce fine fuels consistent with areas and results identified within the Wildfire and Invasive Species Assessments.	No changes made.	No change (same as 2015)
MD FIRE 26: Protect vegetation restoration and rehabilitation efforts/projects from subsequent fire events.	No changes made.	No change (same as 2015)
MD FIRE 27: Targeted grazing as a fuels treatment to adjust the vegetation conditions to	No changes made.	No change (same as 2015)

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reduce the potential start and spread of wildfires may be implemented within existing grazing authorizations if feasible such as through temporary non-renewable authorizations, or through contracts, agreements or other appropriate means separate from existing grazing authorizations and permits.		
MD FIRE 28: Targeted grazing to achieve fuels management objectives should conform to the following criteria: a. Targeted grazing should be implemented strategically on the landscape, and directly involve the minimum footprint and grazing intensity required to meet fuels management objectives. b. Conform to the applicable Standards for Rangeland Health and Guidelines for Livestock Grazing Management at the assessment scale (pasture/watershed). c. Where feasible and applicable coordinate with the grazing permittee to strategically reduce fuels through livestock management within the Mandatory Terms and Conditions of the applicable grazing authorizations	No changes made.	No change (same as 2015)
MD FIRE 29: Prioritize the use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low or non-economical, nonnative seeds may be used to meet GRSG habitat objectives to trend toward restoring the fire regime. When reseeding, use fire resistant native and nonnative species, as appropriate, to provide for fuel breaks.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD FIRE 30: Maintain effectiveness of fuels projects, including fuel breaks, to ensure long-term success, including persistence of seeded species and/or other treatment components while maintaining the integrity of adjacent vegetation.	No changes made.	No change (same as 2015)
MD FIRE 31: If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address: • why alternative techniques were not selected as a viable options; • how GRSG goals and objectives will be met by its use; • how the COT Report objectives will be addressed and met; • a risk assessment to address how potential threats to GRSG habitat will be minimized. Allow prescribed fire as a vegetation or fuels treatment in Wyoming big sagebrush sites or other xeric sagebrush species sites, or in areas with a potential for post-fire exotic annual dominance only after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect Greater Sage-Grouse habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Allow prescribed fire in known sage-grouse winter range only after the NEPA analysis for the Burn	No changes made.	No change (same as 2015)

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Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.		
Post Fire Management:	Post Fire Management:	—
MD FIRE 32: Utilize the findings and Restoration/Rehabilitation Strategy developed as part of the FIAT Assessment process described in **Appendix H** to determine if GRSG rehabilitation actions are needed, based on ecological potential, and direct emergency stabilization and rehabilitation (ESR) (BLM) actions after fire.	No changes made.	No change (same as 2015)
MD FIRE 33: Incorporate GRSG Habitat Management Objectives into ESR/BAER plans based on site potential and in accordance with the Restoration/Rehabilitation Strategy developed as a result of the FIAT Assessments.	No changes made.	No change (same as 2015)
MD FIRE 34: Provide adequate rest from livestock grazing to allow natural recovery of existing vegetation and successful establishment of seeded species within burned/ESR areas. All new seedings of grasses and forbs should not be grazed until at least the end of the second growing season, and longer as needed to allow plants to mature and develop robust root systems which will stabilize the site, compete effectively against cheatgrass and other invasive annuals, and remain sustainable under long-term grazing management. Adjust other management activities, as appropriate, to meet ESR objectives.	No changes made.	No change (same as 2015)
MD FIRE 35: Adjust, as appropriate, livestock management on adjacent unburned areas to mitigate the effect of the burn on local GRSG populations.	No changes made.	No change (same as 2015)

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MD FIRE 36: Following seedling establishment, modify grazing management practices if needed to achieve long-term vegetation and habitat objectives.	No changes made.	No change (same as 2015)
LIVESTOCK GRAZING (LG)	***LIVESTOCK GRAZING (LG)***	—
Objectives:	**Objectives:**	—
Absent.	No changes made.	New: Objective RM-1 added
Management Decisions:	**Management Decisions:**	—
MD LG 1: Maintain existing areas designated as available or unavailable for livestock grazing. Existing active AUMs for livestock grazing within the planning area will not be changed at the broad scale, though the number of AUMs available on an allotment may be adjusted based on site-specific conditions to meet management objectives during term permit renewals, AMP development, or other appropriate implementation planning. Additionally, temporary adjustments can be made annually to livestock numbers, the number of AUMs, and season of use in accordance with applicable regulations.	No changes made.	Completely Revised- revised by rangewide
MD LG 2: Prioritize BLM land health assessments and processing of BLM grazing permits consistent with management area prioritization (MD SSS 4), unless other higher priority considerations exist (MD LG 15) or other factors such as threatened, endangered and proposed species habitat that livestock grazing can affect. Where possible, conduct land health assessments at the watershed, or other meaningful landscape-scale.	No changes made.	Completely Revised- revised by rangewide Mostly covered with BMPs, Appendix 15 (see section 15.1.2), bullet 1

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD LG 3: Where opportunities exist, coordinate with other land managers to encourage livestock operations that utilize mixed federal, private and/or state land to be managed at the landscape scale to benefit GRSG and their habitat across land ownerships.	No changes made.	Completely Revised- revised by rangewide Covered with Section 15.1.1, Appendix 15 (coordination)
MD LG 4: PHMA & IHMA: During the land health assessment process, identify the type(s) of seasonal habitat the assessed areas are capable of supporting. Utilize the habitat assessment framework, (Stiver et al. 2015) or other BLM approved methodology, in accordance with current policy and guidance to determine whether vegetation structure, condition and composition are meeting GRSG habitat objectives including riparian and lentic areas (Objective SSS 2; Table 2-2). Use appropriate Ecological Site Descriptions, reference sheets and state and transition models to inform desired habitat conditions and expected responses to management changes for the land unit being assessed.	No changes made.	Completely Revised- revised by rangewide
MD LG 5: When modifying grazing management, analyze indirect impacts on habitat, including changes in fuel loading and wildfire behavior.	No changes made.	Completely Revised- revised by rangewide
MD LG 6: When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperation and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications include, but are not limited to, changes in:	No changes made.	Completely Revised- revised by rangewide Covered with Allocation RM-1, MD RM-1, and with BMPs, Appendix 15 (see section 15.1.2), bullet 2

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• Season or timing of use; • Numbers of livestock; • Distribution of livestock use; • Duration and/or level of use; • Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); and • Grazing schedules (including rest or deferment). *Not in Priority Order		
MD LG 7: Where opportunities exist, establish forage reserves to facilitate restoration and rehabilitation efforts in GRSG habitat areas. A forage reserve is an area that is set aside for use as needed by various permittees who might be displaced by wildfire, ESR, restoration efforts, etc. rather than having a term permit issued for grazing like a regular allotment.	No changes made.	Completely Revised- revised by rangewide Covered with RM-6 and BMPs, Appendix 15 (see section 15.1.2), bullet 12 (rangewide)
MD LG 8: PHMA & IHMA - Where practical, design pasture rotations to utilize non-native perennial grass seedings and/or annual grasslands, during GRSG nesting season annually or periodically.	No changes made.	Completely Revised- revised by rangewide Covered with Allocation RM-1, MD RM-1, & with BMPs, Appendix 15 (see section 15.1.5), bullets 1 & 2 (rangewide)
MD LG 9: Evaluate the locations where salt/supplements are placed, coordinate salt/supplements placement to reduce impacts on GRSG habitat (e.g., existing disturbed areas).	No changes made.	Completely Revised- revised by rangewide Covered with BMPs, Appendix 15 (see section 15.1.2), bullets 3 & 4
MD LG 10: Incorporate RDFs into Terms and Conditions for crossing permits to limit disturbance of occupied leks when trailing livestock across BLM administered lands in the spring. Work with permittees in locating over-nighting, watering and bedding locations to minimize impacts on seasonal habitats.	No changes made.	Completely Revised- revised by rangewide Covered with BMPs, Appendix 15 (see section 15.1.2), bullets 5, 8, & 9

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD LG 11: Design any new structural range improvements, following appropriate cooperation, consultation and coordination, to minimize and/or mitigate impacts on GRSG habitat. Any new structural range improvements should be placed along existing disturbance corridors or in unsuitable habitat, to the extent practical, and are subject to RDFs (**Appendix C**). Structural range improvement in this context, include, but are not limited to: fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments.	No changes made.	Completely Revised- revised by rangewide Covered with MD RM-4 and BMPs, Appendix 15 (see section 15.1.3)
MD LG 12: During the land health assessment and grazing permit renewal process, evaluate existing livestock management range improvements with respect to their effect on GRSG habitat. Consider removal of projects that are not needed for effective livestock management, are no longer in working condition, and/or negatively affect GRSG habitat, with the exception of functional projects needed for management of habitat for other threatened, endangered or proposed species or other sensitive resources.	No changes made.	Completely Revised- revised by rangewide Covered with MDs RM-3, RM-5 and BMPs, Appendix 15 (see section 15.1.3), bullet 14
MD LG 13: Prioritize removal, modification or marking of fences or other structures in areas of high collision risk following appropriate cooperation, consultation and coordination to reduce the incidence of GRSG mortality due to fence strikes (Stevens et al. 2012).	No changes made.	Completely Revised- revised by rangewide Covered with MD RM-5 and BMPs, Appendix 15 (see section 15.1.3), bullet 10

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD LG 14: In response to weather conditions (i.e. drought) adjust grazing management (i.e., delay turnout, adjust pasture rotations, adjust the amount and/or duration of grazing) as appropriate to provide for adequate food and cover for GRSG.	No changes made.	Completely Revised- revised by rangewide Covered with BMPs, Appendix 15 (see section 15.1.4)
MD LG 15: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in Sagebrush Focal Areas (SFA) followed by PHMA outside of the SFA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFA followed by areas of PHMA outside SFA. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.	**MD LG 15:** Generally, the BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases based on land health conditions or concerns related to rangeland health standards. If similar issues are found in both PHMA and IHMA, then those in PHMA should be addressed first. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting land health standards and that have declining Greater Sage-Grouse populations, defined by a soft or hard population adaptive management trigger being engaged. Greater Sage-Grouse populations that are stable or trending upward will be a lower priority for permit renewal and the assessment process. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns, such as fire, and legal obligations.	Completely Revised- revised by rangewide Mostly covered with BMPs, Appendix 15 (see section 15.1.2), bullet 1
MD LG 16: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMA will include specific management thresholds, based on GRSG Habitat Objectives Table, Land Health Standards (43 CFR 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.	**MD LG 16:** Grazing in the PHMA and IHMA will be managed according to the process outlined in the text below, and the grazing permit renewal process will be managed according to 43 CFR 4100, Subpart 4180, and as outlined in the process below. Incorporate the Greater Sage-Grouse desired conditions in Table 2.2 [of the 2015 Final EIS] and management considerations as desired conditions, and manage livestock grazing, recognizing that these conditions may not be	Completely Revised- revised by rangewide Mostly covered with MD RM-1 & RM-2

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	achievable: (1) due to the existing ecological condition, ecological potential, or existing vegetation; or (2) due to causal events unrelated to existing livestock grazing; and 3) that they are not intended to be prescriptive at the allotment level. a. Conduct habitat assessments using appropriate monitoring methods. Where appropriate, make a determination of factors causing any failure to achieve the desired conditions in Table 2.2 [of the 2015 Final EIS]. The assessment will be conducted at a resolution and scale sufficient to document the habitat condition and will include local, spatial, and interannual variability. Any determination relative to the habitat characteristics (Table 2.2 [of the 2015 Final EIS]) will be based on existing ecological condition, ecological potential, and existing vegetation information. This is to ensure the assessment recognizes whether these habitat characteristics are achievable. b. The assessment will rely on published characteristics of Greater Sage-Grouse habitat and the ecological site descriptions, on Table 2.2 [of the 2015 Final EIS as amended], and where available and applicable, rangeland health determinations made in accordance with 43 CFR 4180.2(c). c. After conducting the assessment in (b), above, if the current grazing system achieves applicable Idaho rangeland health standards, absent substantial and compelling information, no further grazing management changes are necessary to achieve desired conditions for Greater Sage-Grouse habitat. d. If the process and conditions outlined in (b),	

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
	above demonstrate that livestock grazing is limiting achievement of the desired conditions (Table 2.2 [of the 2015 Final EIS]), renewed permits will include measures, including but not limited to the actions outlined in **Appendix C** to achieve desired habitat conditions. These measures must be tailored to address the specific management issues. e. Adaptive management changes related to existing grazing permits should be undertaken only where improper grazing is determined to be the causal factor in not meeting habitat characteristics, specific to site capability, based on monitoring, with appropriate spatial variability. See **Appendix C**. f. Where management changes are needed and necessary pursuant to (f), above, implement management actions that are narrowly tailored to address the specific habitat objective applied at the allotment or activity plan level, including the actions outlined in **Appendix C**, Grazing Section of BMPs. (The Governor's plan is attached as **Appendix 1** for references to this section.)	
MD LG 17: Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks can include monitoring for actual use, utilization, and use supervision. Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and	**MD LG 17:** Allotments within PHMA with declining Greater Sage-Grouse populations, defined by a soft or hard adaptive management trigger being engaged and/or with land health concerns, will be prioritized for field checks.	Completely Revised- revised by rangewide

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conservation actions first in SFA followed by areas of PHMA outside SFA.		
MD LG 18: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3.	No changes made.	Completely Revised- revised by rangewide
WILD HORSES AND BURROS (WHB)	***WILD HORSES AND BURROS (WHB)***	—
Management Decisions:	—	—
WHB-1: Manage herd management areas (HMAs) in GRSG habitat within established AML ranges to achieve and maintain GRSG habitat objectives (Table 2-2).	No changes made.	Completely revised – revised by rangewide.
WHB-2: Complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g. range, wildlife, and riparian). The priorities for conducting assessments are: 1) HMAs Containing SFA; 2) HMAs containing PHMA; 3) HMAs containing IHMA; 4) HMAs containing GHMA; 5) HMAs containing sagebrush habitat outside of PHMA, IHMA, and GHMA mapped habitat; 6) HMAs without GRSG Habitat.	**WHB-2**: Complete rangeland health assessments for herd management areas containing GRSG habitat using an interdisciplinary team of range, wildlife, and riparian specialists. The priority for conducting assessments is herd management areas with known land health issues and where local populations of GRSG are in decline according to the adaptive management trigger standards. When similar issues are found in multiple herd management areas, then the priority should be: 1) herd management areas containing PHMA; 2) herd management areas containing IHMA; 3) herd management areas containing GHMA; 4) herd management areas containing GRSG habitat outside of PHMA, IHMA, and GHMA mapped habitat; 6) herd management areas without GRSG Habitat.	No change (same as 2019)

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WHB-3: Prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts. Place higher priority on Herd Areas not allocated as HMAs and occupied by wild horses and burros in SFA followed by PHMA.	**WHB-3**: Prioritize gathers and population growth suppression techniques in herd management areas in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts. Place higher priority on Herd Areas not allocated as herd management areas and occupied by wild horses and burros in PHMA.	Completely revised – revised by rangewide.
WHB-4: In SFA and PHMA outside of SFA, assess and adjust AMLs through the NEPA process within HMAs when wild horses or burros are identified as a significant causal factor in not meeting land health standards, even if current AML is not being exceeded.	**WHB-4**: In PHMA, assess and adjust appropriate management levels (AMLs) through the NEPA process within herd management areas when wild horses or burros are identified as a significant causal factor in not meeting land health standards, even if current AML is not being exceeded.	Completely revised – revised by rangewide.
WHB-5: In SFA and PHMA outside of SFA, monitor the effects of wild horse and burro use in relation to GRSG seasonal habitat objectives on an annual basis to help determine future management actions.	**WHB-5:** In PHMA, monitor the effects of wild horse and burro use in relation to GRSG seasonal habitat objectives to help determine future management actions.	No change (same as 2019)
WHB-6: Develop or amend herd management area plans (HMAPs) to incorporate GRSG habitat objectives and management considerations for all HMAs within GRSG habitat, with emphasis placed on SFA and other PHMA.	**WHB-6**: Develop or amend herd management area plans to incorporate GRSG habitat objectives and management considerations for all herd management areas in GRSG habitat, with emphasis placed on PHMA.	No change (same as 2019)
WHB-7: Consider removals or exclusion of wild horse and burros during or immediately following emergency situations (such as fire, floods, and drought) to facilitate meeting GRSG habitat objectives where HMAs overlap with GRSG habitat.	No changes made.	No change (same as 2015)
WHB-8: When conducting NEPA analysis for wild horse and burro management activities, water developments, or other rangeland improvements for wild horses, address the direct and indirect impacts on GRSG populations and habitat.	No changes made.	No change (same as 2015)

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Implement any water developments or rangeland improvements using the criteria identified for domestic livestock.		
WHB-9: Coordinate with professionals from other federal and state agencies, researchers at universities, and others to utilize and evaluate new management tools (e.g., population growth suppression, inventory techniques, and telemetry) for implementing the wild horse and burro program.	No changes made.	No change (same as 2015)
MINERAL RESOURCES (MR)	***MINERAL RESOURCES (MR)***	—
Fluid Minerals	***Fluid Minerals***	—
Objective MR 1: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA, IHMA, and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA, IHMA, and GHMA, and subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 USC 226(p) and 43 CFR 3162.3-1(h).	No changes made.	Completely Revised (rangewide)
Objective MR 2: Where a proposed fluid mineral development project on an existing lease can adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, minimize and apply compensatory mitigation to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in	**Objective MR 2:** Where a proposed fluid mineral development project on an existing lease can adversely affect GRSG populations or habitat in PHMA, IHMA, and GHMA, the BLM will work with the lessees, operators, or other project proponents to avoid, minimize impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project	Partially Revised (rangewide) for PHMA and IHMA; no change for GHMA MD for 'Mgmt Action to Address Development in Areas Already Leased' mostly captures Objective MR 2 for PHMA and IHMA.

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developing an APD or Geothermal Drilling Permit (GDP) for the lease to avoid, minimize, and apply compensatory mitigation to impacts on GRSG or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such Federal leases.	proponent in developing an APD or Geothermal Drilling Permit (GDP) for the lease. This would be apply the mitigation hierarchy to impacts on GRSG or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such Federal leases.	
Management Decisions (MD):	**Management Decisions (MD):**	—
MD MR 1: Idaho and Montana: Areas within SFA will be open to fluid mineral leasing and development and geophysical exploration subject to NSO without waiver, exception, or modification. Areas within PHMA (outside SFA) and IHMA will be open to mineral leasing and development and geophysical exploration subject to NSO with a limited exception (MD MR 3). GHMA will be open to mineral leasing and development and geophysical exploration subject to CSU which includes buffers and standard stipulations.	**MD MR 1**: Areas within PHMA and IHMA will be open to mineral leasing and development and geophysical exploration subject to NSO with a limited exception (MD MR 3). GHMA will be open to mineral leasing and development and geophysical exploration subject to CSU which includes buffers and standard stipulations and best management practices as identified in Appendix C (Required Design Features).	No change (same as 2019)
MD MR 2: In Idaho, parcels nominated for lease in PHMA or IHMA will be evaluated prior to lease offering to determine if development is feasible. In GHMA, parcels will not be offered for lease if buffers and restrictions (including RDFs) preclude development in the leasing area.	**MD MR 2:** Parcels nominated for lease in PHMA, IHMA, or GHMA will be evaluated prior to lease offering to determine if development is feasible.	Completely revised (rangewide) Similar language excluded from the Proposed RMP Amendment, referring to SOP for minerals leasing protocol.
MD MR 3: PHMA and IHMA: No waivers or modifications to a fluid mineral lease NSO stipulation will be granted. The Authorized Officer may grant an exception to a fluid mineral lease NSO stipulation only where the proposed action: i. Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or, ii. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby	**MD MR 3:** PHMA and IHMA: No waivers or modifications to a fluid mineral lease NSO stipulation will be granted. The Authorized Officer may grant an exception to a fluid mineral lease NSO stipulation only where the proposed action: i. Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or, ii. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby	Completely Revised (rangewide and state-specific differences)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
parcel, and will provide a clear conservation gain to GRSG. Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP amendment. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publically available at least quarterly.	parcel, and would provide no net loss to GRSG. Exceptions based on no net loss (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP amendment. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director and in coordination with the Technical and Policy Team. Approved exceptions will be made publically available at least quarterly.	

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD MR 4: Incorporate required design features and best management practices appropriate to the management area as COAs when post leasing activity is proposed into any post-lease authorizations.	No changes made.	No change (same as 2015)
MD MR 6: Complete a Master Development Plan, consistent with plan development guide on leases where a producing field is proposed to be developed.	No changes made.	No change (same as 2015)
MD MR 7: Encourage unitization when deemed necessary for proper development and operation of an area (with strong oversight and monitoring). The unitization must be designed in a manner to minimize adverse impacts on GRSG according to the Federal Lease Form, 3100-11, Sections 4 and 6.	No changes made.	No change (same as 2015)
MD MR 8: Issue Written Orders of the Authorized Officer (43 CFR 3161.2) requiring reasonable protective measures consistent with the lease terms where necessary to avoid or minimize impacts on GRSG populations or habitat.	**MD MR 8:** Issue written orders of the authorized officer (43 CFR 3161.2) requiring reasonable protective measures consistent with the lease terms where necessary to avoid or minimize impacts on GRSG populations or habitat.	Completely Revised (rangewide)
Locatable Minerals	Locatable Minerals	—
MD MR 9: Apply reasonable and appropriate RDFs to locatable minerals, to the extent consistent with applicable law to prevent unnecessary or undue degradation of GRSG habitat when a Plan of Operations is submitted for BLM approval, in accordance with 43 CFR 3809.411(d)(2).	No changes made.	No change (same as 2015)
MD MR 10: Recommend SFA for withdrawal from the General Mining Act of 1872, as amended, subject to valid existing rights.	This decision has been deleted.	No change (same as 2019)
Salable Minerals	Salable Minerals	—
MD MR 11: Idaho: PHMA are closed to new mineral materials sales. However, these areas remain "open" to free use permits and the	**MD MR 11:** PHMA: All PHMA will be closed to new mineral materials development, but continued use of existing pits will be allowed. New free use	Completely Revised-revised by state-specific

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
expansion of existing active pits only if the following criteria are met: • the project area disturbance cap is not exceeded within a BSU; • the activity is subject to the provisions set forth in the mitigation framework [**Appendix F**]; • all applicable required design features are applied; and • the activity is permissible under the Idaho exception and development criteria (MD SSS 29 and MD SSS 30) • IHMA: All IHMA will be open to mineral materials development, consistent with the Idaho Anthropogenic Disturbance Criteria (MD SSS 30), and subject to RDFs, and buffers. Sales from existing community pits within IHMA will be subject to seasonal timing restrictions (**Appendix C**). • GHMA: All GHMA will be open to mineral materials development, subject to RDFs and buffers. Sales from existing community pits within GHMA will be subject to seasonal timing restrictions (**Appendix C**).	permits and the expansion of existing free use permits may be considered only if the following criteria are met: • the project area disturbance cap is not exceeded within a BSU; • the activity is subject to the provisions set forth in the mitigation framework [**Appendix F**]; • all applicable required design features are applied; and • the activity is permissible under the Idaho exception and development criteria (MD SSS 29 and MD SSS 30) • IHMA: All IHMA will be open to mineral materials development, consistent with the Idaho Anthropogenic Disturbance Criteria (MD SSS 30), and subject to RDFs, and buffers. • GHMA: All GHMA will be open to mineral materials development, subject to best management practices, as described in Appendix C.	
MD MR 12: Restore salable mineral pits no longer in use to meet GRSG habitat management objectives.	No changes made.	No change (same as 2015)
MD MR 13: Require reclamation bonding that will require restoration of GRSG habitat on new site authorizations for mineral material pits in IHMA (this will not apply to free use permits issued to a government entity such as a county road district, but will apply to non-profit entities).	No changes made.	No change (same as 2015)

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Nonenergy Leasable Minerals	Nonenergy Leasable Minerals	—
MD MR 15: PHMA are closed to leasing. IHMA and GHMA: Areas within Known Phosphate Leasing Areas (KPLAs) will remain open to leasing subject to standard stipulations. IHMA areas outside of KPLAs are open to prospecting and subsequent leasing provided the Anthropogenic Disturbance Development Criteria (MD SSS 30) and the anthropogenic disturbance cap (MD SSS 27) can be met. RDFs and buffers shall be applied to prospecting permits. GHMA: Lands outside KPLAs are available for prospecting and subsequent leasing and initial mine development subject to RDFs, buffers, and standard stipulations.	**MD MR 15:** PHMA are closed to leasing. IHMA and GHMA: Areas within Known Phosphate Leasing Areas (KPLAs) will remain open to leasing subject to standard stipulations. IHMA areas outside of KPLAs are open to prospecting and subsequent leasing provided the Anthropogenic Disturbance Development Criteria (MD SSS 30) and the anthropogenic disturbance cap (MD SSS 27) can be met. RDFs and buffers shall be applied to prospecting permits. GHMA: Lands outside KPLAs are available for prospecting and subsequent leasing and initial mine development subject to standard stipulations and best management practices as described in Appendix C.	Partially Revised (rangewide and state-specific) MD SSS 32 will retain RDFs in GHMA not BMPs
MD MR 16: Require seasonal and daily timing restrictions (**Appendix C**) in undeveloped nonenergy mineral leases when exploration activities or initial mine development is proposed (e.g. exploration drilling, timber removal, shrub clearing, etc.) as COAs.	No changes made.	No change (same as 2015)
MD MR 17: Include RDFs as COAs to mine plans in undeveloped non-energy mineral leases for exploration activities or initial mine development.	No changes made.	No change (same as 2015)
Mineral Split Estate	Mineral Split Estate	—
MD MR 19: BLM Owns Mineral Estate – non-federal surface owner: Where the federal government owns the mineral estate in PHMA, IHMA, and GHMA, and the surface is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
maximum extent permissible under existing authorities, and in coordination with the landowner.		
MD MR 20: BLM owns surface – non-federal mineral estate owner: Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMA, IHMA, and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.	No changes made.	No change (same 2015)
RENEWABLE ENERGY (WIND AND SOLAR) (RE)	***RENEWABLE ENERGY (WIND AND SOLAR) (RE)***	—
Management Decisions:	**Management Decisions:**	—
Industrial Solar, Wind, Nuclear, and Hydropower Development	Industrial Solar, Wind, Nuclear, and Hydropower Development	—
MD RE 1: PHMA: Designate and manage PHMA as exclusion areas for utility scale (20 MW) wind and solar testing and development, nuclear and hydropower energy development. IHMA: Designate and manage IHMA as avoidance areas for wind and solar testing and development, nuclear and hydropower development. GHMA **(Idaho)**: Designate and manage GHMA as open for wind and solar testing and development and nuclear and hydropower development subject to RDFs and buffers. GHMA **(Montana)**: Designate and manage GHMA as avoidance for wind and solar testing and development and nuclear and hydropower development.	**MD RE 1:** PHMA: Designate and manage PHMA as exclusion areas for utility scale (20 MW) wind and solar testing and development, nuclear and hydropower energy development. IHMA: Designate and manage IHMA as avoidance areas for wind and solar testing and development, nuclear and hydropower development. GHMA: Designate and manage GHMA as open for wind and solar testing and development and nuclear and hydropower development.	Completely Revised-revised by rangewide and state-specific

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LANDS AND REALTY (LR)	***LANDS AND REALTY (LR)***	—
Objectives:	**Objectives:**	—
Objectives LR 1: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available.	No changes made.	No change (same as 2015)
Management Decisions:	**Management Decisions:**	—
Utility Corridors and Communication Sites	Utility Corridors and Communication Sites	—
MD LR 1: Existing designated corridors, including Section 368 Corridors, will remain Open in all habitat management areas (subject to the ongoing settlement agreement). Also see **MD LR 10** and **MD SSS 31**	No changes made.	No change (same as 2015)
Land Use Authorizations	Land Use Authorizations	—
MD LR 2: PHMA: Designate and manage PHMA as ROW avoidance areas, consistent with MD SSS 29 and subject to RDFs and buffers (Appendices B and C). IHMA: Designate and manage IHMA as ROW avoidance areas, consistent with MD SSS 30 and subject to RDFs and buffers. GHMA **(Idaho and Montana)**: Designate and manage GHMA as open with proposals subject to RDFs and buffers.	**MD LR 2**: PHMA: Designate and manage PHMA as ROW avoidance areas, consistent with MD SSS 29 and subject to RDFs and buffers (Appendices B and C). IHMA: Designate and manage IHMA as ROW avoidance areas, consistent with MD SSS 30 and subject to RDFs and buffers. GHMA: Designate and manage GHMA as open with proposals subject to best management practices as described in Appendix C.	Completely Revised-revised by rangewide and state-specific
MD LR 3: PHMA: Development of commercial service airports and facilities (as defined by FAA 2014 – publically owned airports that have at least 2,500 passenger boardings each calendar year and receive scheduled passenger service) will not be allowed within PHMA. IHMA and GHMA are Avoidance and Open respectively for these types of ROW applications as described in MD LR 2.	No changes made.	No change (same as 2015)

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MD LR 4: PHMA: Development of new or expansion of existing landfills will not be allowed within PHMA. IHMA and GHMA are Avoidance and Open respectively for these types of ROW applications as described in MD LR 2.	No changes made.	No change (same as 2015)
MD LR 5: Consistent with MD LR 3, MD LR 4, and MD RE 1, Rights-of-way for development of new or amended ROWs and land use authorizations (including permits and leases) in PHMA will only be considered when consistent with the Anthropogenic Disturbance Screening Criteria (MD SSS 29); Rights-of-way for development of new or amended ROWs and land use authorizations (including permits and leases) in IHMA can be considered consistent with the IHMA Anthropogenic Disturbance Development Criteria (MD SSS 30). GHMA: New ROW and land use authorizations can be considered.	No changes made.	Partially Revised (State-specific) MD SSS 29 revised in Ch. 2, Table 2-7
MD LR 6: In PHMA, if a higher voltage transmission line is required adjacent to an existing line (i.e. the project is an incremental upgrade/capacity increase of existing development (i.e. power line capacity upgrade): • the existing transmission line must be removed and area rehabilitated within a specified amount of time after the new line is installed and energized; and • the new line must be constructed in the same alignment as the existing line unless an alternate route will benefit GRSG or GRSG habitat.	No changes made.	No change (same as 2015)

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MD LR 7: Process unauthorized use. If the unauthorized use is subsequently authorized, it will be authorized consistent with direction from this plan including RDFs and buffers. If the use is not subsequently authorized the site will be reclaimed by removing these unauthorized (trespass) features and rehabilitating the habitat.	No changes made.	No change (same as 2015)
MD LR 8: Land use authorizations that are temporary (less than 3 years) in nature and are not otherwise excluded or restricted will be subject to seasonal or timing restrictions (**Appendix C**) and mitigation requirements regarding habitat loss as needed.	No changes made.	No change (same as 2015)
MD LR 9: New ROW applications for water facilities (ditches, canals, pipelines), or amendments to existing water facilities which include additional structures to improve fish passage or benefits to fisheries (new diversions, fish screens) will be allowed on a case-by-case basis subject to RDFs to reduce impacts on GRSG habitat and mitigation requirements regarding GRSG habitat loss as needed.	No changes made.	No change (same as 2015)
MD LR 10: When a ROW grant expires and is not requested to be renewed, is relinquished, or terminated, the lease holder will be required to reclaim the site by removing overhead lines and other infrastructure and to eliminate avian predator nesting opportunities provided by anthropogenic development on public lands associated with the now void ROW grant (e.g., remove power line and communication facilities no longer in service).	No changes made.	No change (same as 2015)

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MD LR 11: As opportunities and priorities indicate work with existing ROW holders to retrofit existing towers and structures consistent with RDFs described in **Appendix C**.	No changes made.	No change (same as 2015)
MD LR 12: PHMA and IHMA are designated as avoidance areas for high voltage transmission line and large pipeline ROWs, except for Gateway West and Boardman to Hemingway Transmission Projects. All authorizations in these areas, other than the following identified projects, must comply with the conservation measures outlined in this proposed plan, including the RDFs and avoidance criteria presented in MD SSS 29 and MD SSS 30 of this document. The BLM is currently processing an application for Gateway West and Boardman to Hemingway Transmission Projects and the NEPA review for this project is well underway. Conservation measures for GRSG are being analyzed through the project's NEPA review process, which should achieve a net conservation benefit for the GRSG.	No changes made.	Completely Revised-revised by rangewide (major ROWs) and state-specific (as it applies to revised MD SSS 29 in Table 2-7)
MD LR 13: Consider the likelihood of development of not-yet-constructed surface disturbing activities – as defined in Table 2 of the Monitoring Framework (**Appendix D**) – under valid existing rights.	No changes made.	No change (same as 2015)
Land Tenure	Land Tenure	—
MD LR 14: Lands classified as PHMA, IHMA, and GHMA for GRSG will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the GRSG or (2) the agency can demonstrate that the disposal, including land exchanges, of the	**MD LR 14**: Lands classified as PHMA, IHMA, and GHMA for GRSG will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide no net loss to the GRSG or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will	No change (same as 2019)

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lands will have no direct or indirect adverse impact on conservation of the GRSG. Land tenure adjustments will be subject to the following disposal, exchange, and acquisition criteria, which include retaining lands with GRSG habitat. Retention of areas with GRSG will reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that will remove sagebrush habitat and potentially impact sensitive plants. Criteria: a. Acquire habitat within PHMA and IHMA, when possible (i.e. willing landowner), and retain ownership of habitat within all Areas, except if disposal will allow for additional or more contiguous federal ownership patterns. b. Lands within PHMA, IHMA and GHMA will be retained unless disposal of those lands will increase the extent or provide for connectivity of PHMA, IHMA or GHMA. c. Evaluate potential land exchanges containing historically low-quality GRSG habitat that may be too costly to restore in exchange for lands of higher quality habitat, lands that connect seasonal GRSG habitats or lands providing for threatened and endangered species. These potential exchanges should lead to an increase in the extent or continuity of or provide for improved connectivity of PHMA. Higher priority will be given to exchanges for those in-tact areas of sagebrush that will contribute to the expansion of sagebrush areas within PHMA currently in public ownership. Lower priority will be given to other lands that will promote enhancement in the PHMA and IHMA (i.e., areas with fragmented or less in-tact sagebrush).	have no direct or indirect adverse impact on conservation of the GRSG. Land tenure adjustments will be subject to the following disposal, exchange, and acquisition criteria, which include retaining lands with GRSG habitat. Retention of areas with GRSG will reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that will remove sagebrush habitat and potentially impact sensitive plants. Criteria: a. Retain lands within PHMA, IHMA and GHMA, unless disposal of those lands will increase the extent or provide for connectivity of PHMA, IHMA or GHMA. b. Evaluate potential land exchanges containing historically low-quality GRSG habitat that may be too costly to restore in exchange for lands of higher quality habitat, lands that connect seasonal GRSG habitats or lands providing for threatened and endangered species. These potential exchanges should lead to an increase in the extent or continuity of or provide for improved connectivity of PHMA. Higher priority will be given to exchanges for those in-tact areas of sagebrush that will contribute to the expansion of sagebrush areas within PHMA currently in public ownership. Lower priority will be given to other lands that will promote enhancement in the IHMA and GHMA (i.e., areas with fragmented or less in-tact sagebrush). c. Lands for acquisition increase the extent of or provide for connectivity of PHMA.	

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d. Identify lands for acquisition that increase the extent of or provide for connectivity of PHMA.		
Withdrawals	—	—
See **MD SS 10** regarding Sagebrush Focal Areas (SFA).	—	No change proposed (same as 2019).
RECREATION AND VISITOR SERVICES (REC)	***RECREATION AND VISITOR SERVICES (REC)***	—
Management Decisions:	**Management Decisions:**	—
REC-1: Manage existing recreation uses and sites to minimize adverse effects on GRSG or their habitat through incorporation of RDFs, buffers and seasonal restrictions.	No changes made.	No change (same as 2015)
REC-2: In PHMA and IHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the development will have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from critical areas, etc.), or unless the development is required for visitor health and safety or resource protection.	**REC-2**: In PHMA and IHMA, do not construct new recreation facilities (campgrounds, parking lots, trailheads, and staging areas) larger than 0.25 acres unless subject to appropriate buffers and RDFs and appropriate mitigation. Locate and design new facilities to avoid or minimize impacts on GRSG habitat. New trails in PHMA and IHMA should be designed to avoid or minimize impacts on GRSG habitat. New non-motorized trails would not be subject to buffers but may be subject to timing restrictions to avoid impacts on GRSG during the lekking/nesting season. Motorized trails would also be subject to buffers and seasonal timing restrictions.	No change (same as 2015)

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TRAVEL AND TRANSPORTATION (TMM)	***TRAVEL AND TRANSPORTATION (TMM)***	—
Management Decisions:	**Management Decisions:**	—
MD TTM 1: Limit off-highway vehicle travel within Idaho BLM Field Offices to existing roads, primitive roads, and trails in areas where travel management planning has not been completed or is in progress. This excludes areas previously designated as open through a land use plan decision or currently under review for designation as open, currently being analyzed in ongoing RMP revision efforts in the Four Rivers, Jarbidge and Upper Snake Field Offices.	No changes made.	No change (same as 2015)
MD TTM 2: In PHMA, IHMA, and GHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use) and other applicable law and policy.	No changes made.	No change (same as 2015)
MD TTM 3: Develop Travel Management Plans for each Field Office as described in the BLM Travel Management Handbook 8342.1 and according to the travel management planning guidelines (Appendix L of FEIS).	No changes made.	No change (same as 2015)
MD TTM 4: During subsequent travel management planning design and designate a travel system to minimize adverse effects on GRSG. Locate areas and trails to minimize disturbance of GRSG and/or to have a neural or positive effect on GRSG habitat and populations. Give special attention to protect endangered or threatened species and their habitats. Allow for route upgrade, closure of existing routes, timing restrictions, seasonal closures, and creation of new routes to	No changes made.	No change (same as 2015)

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help protect habitat and meet user group needs, thereby reducing the potential for pioneering unauthorized routes. The emphasis of the comprehensive travel and transportation planning within PHMA will be placed on having a neutral or positive effect on GRSG habitat. Individual route designations will occur during subsequent travel management planning efforts.		
MD TTM 5: Conduct road construction, upgrades, and maintenance activities to avoid disturbance during the lekking season – see **Appendix C**.	No changes made.	No change (same as 2015)
MITIGATION (IDAHO AND MONTANA)	***MITIGATION (MIT)***	—
(Also see **Appendix F** and **J**)	**See 2.12 Mitigation section below**	—
Absent.	No changes made.	New: Objective RM-1 added
Management Decisions:	**Management Decisions:**	
MD MIT 1: BLM will establish an inter-agency State GRSG Conservation Team at the state level to help guide conservation of GRSG through compensatory mitigation, within 90 days of the issuance of the Record of Decision.	No changes made.	No change (same as 2015)
MD MIT 2: The BLM, in coordination with the GRSG Conservation Team will develop a Mitigation Strategy within one year of the issuance of the Record of Decision. In Idaho this strategy will be consistent with the Idaho Mitigation Framework (**Appendix F**).	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD MIT 3: In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation (**Appendix E**, Table E-1), the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation.	**MD MIT 3**: In PHMA, IHMA, and GHMA, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation (**Appendix E**, Table E-1), the BLM will Achieve the planning-level GRSG management goals and objectives through implementation of mitigation and management actions. Under this Proposed Plan Amendment, the BLM's GRSG management would be consistent with the GRSG goals and objectives, and in conformance with BLM Manual 6840 – Special Status Species Management, undertake planning decisions, actions, and authorizations to "minimize or eliminate threats affecting the status of GRSG or to improve the condition of GRSG habitat" across the planning area. Further the BLM will require and ensure mitigation that provides no net loss to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by ensuring GRSG habitat impacts are addressed by implementing mitigating sections consistent with the State of Idaho and the Proposed Plan Amendment.	Completely Revised-revised by rangewide
MD MIT 4: Mitigate anthropogenic development (**Appendix E**, Table E-1) impacts on GRSG habitat through application of appropriate mitigation in accordance with the Mitigation Framework (**Appendix F** and **L**).	No changes made.	Completely Revised-revised by rangewide
MD MIT 5: Consistent with regulations for minerals activities, require a full reclamation bond specific to the site when surface disturbing activities are proposed. Ensure reclamation bonds are sufficient to cover costs to fully rehabilitate lost GRSG habitat. Base the reclamation costs on the	No changes made.	No change (same as 2015)

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assumption that contractors for the BLM will perform the work. Areas are considered fully rehabilitated when they meet the conditions described in Table 2-2.		
COORDINATION (CC)	***COORDINATION (CC)***	—
Management Decisions:	**Management Decisions:**	—
MD CC 1: Collaborate, coordinate and utilize cooperative planning efforts to implement and monitor activities to achieve desired conditions and to maximize the utilization of available funding opportunities. Coordination efforts can include: adjacent landowners, federal and state agencies, local governments, tribes, communities, other agencies, resource advisory groups, public lands permit holders and non- governmental organizations.	No changes made.	No change (same as 2015)
MD CC 2: Develop a cooperative MOU between the BLM, Forest Service and State of Idaho to establish the State of Idaho as a cooperating agency during implementation of the final decision. The MOU will identify responsibilities, role and interaction of the BLM, Forest Service and State of Idaho.	No changes made.	No change (same as 2015)
MD CC 3: The BLM will consider any recommendations from the Governor of Idaho as a result of evaluation completed by the Sage-Grouse Implementation Task Force.	No changes made.	No change (same as 2015)
MD CC 4: Idaho: The BLM will coordinate with the State of Idaho and the Idaho Sage-Grouse Implementation Task Force regarding proposed management changes, the implementation of conservation measures, mitigation, and site-specific monitoring, related to adaptive management, anthropogenic disturbance and livestock grazing.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD CC 6: Upon completion of the Record of Decision the BLM will develop an initial Implementation Guide for BLM District and Field Offices within a year of issuance of the Record of Decision. This Guide will define and describe consistent application of the allocations, management actions, required design features, and etc. that are contained within the final plan and will be updated and expanded as needed to respond to issues and concerns.	No changes made.	No change (same as 2015)
MD CC 7: At the state level, BLM will coordinate with IDFG, USFWS, and other conservation partners in collaborative efforts with adjacent states (Oregon, Nevada, Utah, Montana, Wyoming) in GRSG MZs IV and II to evaluate GRSG habitat and population status and trends and make appropriate regional recommendations for GRSG conservation at broader scales.	No changes made.	No change (same as 2015) Similar verbiage in rangewide but omits specifics about coordinating with adjacent states
MD CC 8: At the state level, BLM will coordinate with the appropriate WAFWA Sage-grouse Technical Committee to develop consistent population and habitat monitoring approaches that facilitate GRSG conservation at the MZ scale.	No changes made.	No change (same as 2015)
MD CC 9: All prescribed burning will be coordinated with state and local air quality agencies to ensure that local air quality is not significantly impacted by BLM activities.	No changes made.	No change (same as 2015)

Table 2: Habitat Objectives for GRSG, 2015 ARMPA

Attribute	Indicator	Desired Condition	Reference
LEK HABITAT (Seasonal Use Period March 1 – May 15)[1]			
Lek Security	Proximity of trees	Trees (i.e., mainly juniper, conifers, and does not include old- growth juniper, pinyon pine and mountain mahogany) absent or uncommon on shrub/grassland ecological sites within 1.86 miles (3 km) of occupied leks.	Baruch-Mordo et al. 2013[7] Stiver et al. 2015[13]
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek	Stiver et al. 2015[13]
NESTING/EARLY BROOD REARING [1,5,10,12,13,14] (Seasonal Use Period May 1 – June 30) [1]			
Cover and Food	Seasonal habitat extent (Percent of Seasonal Habitat Meeting Desired Conditions)	>80% of the nesting habitat meets the recommended vegetation characteristics, where appropriate (relative to ecological site potential, etc.).	Connelly et al. 2000[8]
	Sagebrush cover [2]	15-25%	Connelly et al. 2000[8] Connelly et al. 2003[9] Hagen et al. 2007[11]
	Sagebrush height Arid sites[3] Mesic sites[4]	 12-31 inches (30-80cm) 16-31 inches (40-80cm)	Connelly et al. 2000[8]
	Predominant sagebrush shape	Predominantly spreading shape[5]	Stiver et al. 2015[13]
	Perennial grass cover (such as native bunchgrasses) [2] Arid sites[3] Mesic sites[4]	 ≥10% ≥15%	Connelly et al. 2000[8] Stiver et al. 2015[13]
	Perennial grass (and forb) height (includes residual grasses)	≥ 7 inches	Connelly et al. 2000[8] Connelly et al. 2003[9] Hagen et al. 2007[11] Stiver et al. 2015[13]
	Perennial forb cover [2] Arid sites[3] Mesic sites[4]	 ≥5% ≥10%	Connelly et al. 2000[8]
	Perennial forb availability	Preferred forbs are common with several species present[6]	Stiver et al. 2015[13]

Attribute	Indicator	Desired Condition	Reference
LATE BROOD-REARING/SUMMER[1, 15] (July-October)[1] Late brood-rearing areas, such as riparian, meadows, springs, higher elevation mesic uplands, etc. may occur within other mapped seasonal habitat areas. Apply late brood rearing/summer habitat desired conditions locally as appropriate.			
Cover and Food	Seasonal habitat extent (Percent of Seasonal Habitat Meeting Desired Condition)	>40% of the summer/brood habitat meets recommended brood habitat characteristics where appropriate (relative to ecological site potential, etc.)	Connelly et al. 2000[8]
	Sagebrush cover[2]	Uplands 10-25% Riparian/Meadow: Sagebrush cover within 100 m	Connelly et al. 2000[8]
	Sagebrush height	16 to 32 inches (40-80cm)	Connelly et al. 2000[8]
	Perennial grass and forb cover [2]	>15%	—
	Upland and riparian perennial forb availability 2	Preferred forbs are common with appropriate numbers of species present[6]	Stiver et al. 2015[13]
	Riparian and/or meadow habitat condition	Proper Functioning Condition	Stiver et al. 2015[13]
WINTER[1] November-March[1] (Apply to areas of known or likely winter-use)			
Cover and Food	Seasonal habitat extent (Percent of Seasonal Habitat Meeting Desired Condition)	>80% of the wintering habitat meets winter habitat characteristics where appropriate (relative to ecological site, etc.).	Connelly et al. 2000[8]
	Sagebrush cover and height above snow[5]	Sagebrush is at least 10 inches (25 cm) above snow and ≥10% cover[16]	Connelly et al. 2000[8] Stiver et al. 2015[13]

Notes and references:

[1] Seasonal dates can be adjusted by local unit according to geographic region.

[2] Since plant species and/or life forms may overlap, total vegetative cover, inclusive of shrubs, forbs and grasses may exceed 100%.

[3] Arid corresponds to the 10 – 12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub- species for this type site (Stiver et al. 2015).

[4] Mesic corresponds to the ≥12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (Stiver et al. 2015).

[5] Collectively the indicators for sagebrush (cover, height, and shape), perennial grass and perennial forb (cover, height and/or availability) represent the desired condition range for nesting/early brood rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. *2015*. Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.

[6] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.

[7] Baruch-Mordo, S., J. S. Evans, J. P. Severson, D. E. Naugle, J. D. Maestas, J. M. Kiesecker, M. J. Falkowski, C. A. Hagen, and K. P. Reese. 2013. Saving sage-grouse from trees. Biological Conservation 167:233-241.

[8] Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.

[9] Connelly, J. W., K. P. Reese, and M. A. Schroeder. 2003. Monitoring of Greater sage-grouse habitats and populations. University of Idaho College of Natural Resources Experiment Station Bulletin 80. University of Idaho, Moscow, Idaho. [10] Doherty, K. 2008. Sage-grouse and Energy Development: Integrating Science with Conservation Planning to Reduce Impacts. Ph.D. Dissertation. University of Montana, Missoula, Montana.

[11] Hagen, C. A., J. W. Connelly, and M. A. Schroeder. 2007. A meta-analysis of greater sage-grouse *Centrocercus urophasianus* nesting and brood-rearing habitats. Wildlife Biology 13 (Supplement 1):42-50.
[12] Holloran, M. J., and S. H. Anderson. 2005. Spatial Distribution of Greater Sage-grouse nests in relatively contiguous sagebrush habitats. Condor 107:742-752.
[13] Stiver, S. J., E. T. Rinkes, D. E. Naugle, P. D. Makela, D. A. Nance, and J. W. Karl. 2015. Sage-Grouse Habitat Assessment Framework: A Multi-scale Habitat Assessment Tool. Bureau of Land Management and Western Association of Fish and Wildlife Agencies Technical Reference 6710-1. U.S. Bureau of Land Management, Denver, Colorado.
[14] Connelly, J.W., A. Moser, and D. Kemner. 2013. Greater Sage-Grouse breeding habitats: Landscape-based comparisons. Grouse News 45. Research Reports.
[15] Some late brood habitat occurs at higher elevations outside of mapped nesting habitat and some is embedded within nesting landscapes especially areas such as wet meadows, riparian areas, springs and seeps.
[16] Winter habitat metrics are a guideline but snow depths and habitat availability may vary widely depending on winter severity, topography and elevation.

Table 3: Desired Conditions for GRSG, 2019 ARMPA

Attribute	Indicator	Desired Condition	Reference
LEK HABITAT (Seasonal Use Period March 1 – May 15)[1]			
Lek Security	Proximity of trees	Trees (i.e., mainly juniper, conifers, and does not include old- growth juniper, pinyon pine and mountain mahogany) absent or uncommon on shrub/grassland ecological sites within 1.86 miles (3 km) of occupied leks.	Baruch-Mordo et al. 2013[7] Stiver et al. 2015[13]
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek	Stiver et al. 2015[13]
NESTING/EARLY BROOD REARING [1,5,10,12,13,14] (Seasonal Use Period May 1 – June 30) [1]			
Cover and Food	Seasonal habitat extent (Percent of Seasonal Habitat Meeting Desired Conditions)	>80% of the nesting habitat meets the recommended vegetation characteristics, where appropriate (relative to ecological site potential, etc.).	Connelly et al. 2000[8]
	Sagebrush cover [2]	15-25%	Connelly et al. 2000[8] Connelly et al. 2003[9] Hagen et al. 2007[11]
	Sagebrush height Arid sites[3] Mesic sites[4]	 12-31 inches (30-80cm) 16-31 inches (40-80cm)	Connelly et al. 2000[8]
	Predominant sagebrush shape	Predominantly spreading shape[5]	Stiver et al. 2015[13]
	Perennial grass cover (such as native bunchgrasses) [2] Arid sites[3] Mesic sites[4]	 ≥10% ≥15%	Connelly et al. 2000[8] Stiver et al. 2015[13]
	Perennial grass (and forb) height (includes residual grasses)	Adequate Nesting Cover	Connelly et al. 2000[8] Connelly et al. 2003[9] Hagen et al. 2007[11] Stiver et al. 2015[13] Hausleitner 2005; Holloran et al. 2005; Gibson et al. 2016; Smith et al. 2017; Smith et al. 2018
	Perennial forb cover [2] Arid sites[3] Mesic sites[4]	 ≥5% ≥10%	Connelly et al. 2000[8]
	Perennial forb availability	Preferred forbs are common with several species present[6]	Stiver et al. 2015[13]

Attribute	Indicator	Desired Condition	Reference
LATE BROOD-REARING/SUMMER[1, 15] (July-October)[1] Late brood-rearing areas, such as riparian, meadows, springs, higher elevation mesic uplands, etc. may occur within other mapped seasonal habitat areas. Apply late brood rearing/summer habitat desired conditions locally as appropriate.			
Cover and Food	Seasonal habitat extent (Percent of Seasonal Habitat Meeting Desired Condition)	>40% of the summer/brood habitat meets recommended brood habitat characteristics where appropriate (relative to ecological site potential, etc.)	Connelly et al. 2000[8]
	Sagebrush cover[2]	Uplands 10-25% Riparian/Meadow: Sagebrush cover within 100 m	Connelly et al. 2000[8]
	Sagebrush height	16 to 32 inches (40-80cm)	Connelly et al. 2000[8]
	Perennial grass and forb cover [2]	>15%	
	Upland and riparian perennial forb availability [2]	Preferred forbs are common with appropriate numbers of species present[6]	Stiver et al. 2015[13]
	Riparian and/or meadow habitat condition	Proper Functioning Condition	Stiver et al. 2015[13]
WINTER[1] November-March[1] (Apply to areas of known or likely winter-use)			
Cover and Food	Seasonal habitat extent (Percent of Seasonal Habitat Meeting Desired Condition)	>80% of the wintering habitat meets winter habitat characteristics where appropriate (relative to ecological site, etc.).	Connelly et al. 2000[8]
	Sagebrush cover and height above snow	Sagebrush is at least 10 inches (25 cm) above snow and ≥10% cover[16]	Connelly et al. 2000[8] Stiver et al. 2015[13]

Notes and references:

[1] Seasonal dates can be adjusted by local unit according to geographic region.

[2] Since plant species and/or life forms may overlap, total vegetative cover, inclusive of shrubs, forbs and grasses may exceed 100%.

[3] Arid corresponds to the 10 – 12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub- species for this type site (Stiver et al. 2015).

[4] Mesic corresponds to the ≥12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (Stiver et al. 2015).

[5] Collectively the indicators for sagebrush (cover, height, and shape), perennial grass and perennial forb (cover, height and/or availability) represent the desired condition range for nesting/early brood rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. *2015*. Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.

[6] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.

[7] Baruch-Mordo, S., J. S. Evans, J. P. Severson, D. E. Naugle, J. D. Maestas, J. M. Kiesecker, M. J. Falkowski, C. A. Hagen, and K. P. Reese. 2013. Saving sage-grouse from trees. Biological Conservation 167:233-241.

[8] Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. Guidelines to manage sage-grouse populations and their habitats. Wildlife Society Bulletin 28:967-985.

[9] Connelly, J. W., K. P. Reese, and M. A. Schroeder. 2003. Monitoring of Greater sage-grouse habitats and populations. University of Idaho College of Natural Resources Experiment Station Bulletin 80. University of Idaho, Moscow, Idaho.

[10] Doherty, K. 2008. Sage-grouse and Energy Development: Integrating Science with Conservation Planning to Reduce Impacts. Ph.D. Dissertation. University of Montana, Missoula, Montana.

[11] Hagen, C. A., J. W. Connelly, and M. A. Schroeder. 2007. A meta-analysis of greater sage-grouse *Centrocercus urophasianus*

nesting and brood-rearing habitats. Wildlife Biology 13 (Supplement 1):42-50.
[12] Holloran, M. J., and S. H. Anderson. 2005. Spatial Distribution of Greater Sage-grouse nests in relatively contiguous sagebrush habitats. Condor 107:742-752.
[13] Stiver, S. J., E. T. Rinkes, D. E. Naugle, P. D. Makela, D. A. Nance, and J. W. Karl. 2015. Sage-Grouse Habitat Assessment Framework: A Multi-scale Habitat Assessment Tool. Bureau of Land Management and Western Association of Fish and Wildlife Agencies Technical Reference 6710-1. U.S. Bureau of Land Management, Denver, Colorado.
[14] Connelly, J.W., A. Moser, and D. Kemner. 2013. Greater Sage-Grouse breeding habitats: Landscape-based comparisons. Grouse News 45. Research Reports.
[15] Some late brood habitat occurs at higher elevations outside of mapped nesting habitat and some is embedded within nesting landscapes especially areas such as wet meadows, riparian areas, springs and seeps.
[16] Winter habitat metrics are a guideline but snow depths and habitat availability may vary widely depending on winter severity, topography and elevation.

Table 8-1.B: Idaho GRSG Seasonal Habitat Indicators and Benchmarks, Proposed Plan

Attribute	Indicator	Desired Condition	Reference
LEK HABITAT (Seasonal Use Period March 1 – May 15)[1]			
Lek Security	Proximity of trees	Trees (i.e., mainly juniper, conifers, and does not include old- growth juniper, pinyon pine and mountain mahogany) absent or uncommon on shrub/grassland ecological sites within 1.86 miles (3 km) of occupied leks.	Baruch-Mordo et al. 2013 Stiver et al. 2015
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek	Stiver et al. 2015
NESTING/EARLY BROOD REARING [1,5] (Seasonal Use Period May 1 – June 30) [1]			
Cover and Food	Sagebrush cover [2]	15-25%	Connelly et al. 2000 Connelly et al. 2003 Hagen et al. 2007 Stevens et al. 2023
	Sagebrush height Arid sites [3] Mesic sites [4]	 12-31 inches (30-80cm) 16-31 inches (40-80cm)	Connelly et al. 2000
	Predominant sagebrush shape	Predominantly spreading shape [5]	Stiver et al. 2015
	Perennial grass cover (such as native bunchgrasses) [2] Arid sites [3] Mesic sites [4]	 ≥10% ≥15%	Connelly et al. 2000 Stiver et al. 2015
	Perennial grass (and forb) height (includes residual grasses)	≥ 7 inches (18 cm)	Connelly et al. 2000 Connelly et al. 2003 Hagen et al. 2007 Stiver et al. 2015
	Perennial forb cover [2] Arid sites [3] Mesic sites [4]	 ≥5% ≥10%	Connelly et al. 2000
	Perennial forb availability	Preferred forbs are common with several species present [6]	Stiver et al. 2015
	Invasive annual grass cover	<2% cover	BLM synthesis of research [9]
	Conifer	0 (Absence of conifer)	BLM synthesis of research [10]

Attribute	Indicator	Desired Condition	Reference
LATE BROOD-REARING/SUMMER[1, 7] (July-October)[1] Late brood-rearing areas, such as riparian, meadows, springs, higher elevation mesic uplands, etc. may occur within other mapped seasonal habitat areas. Apply late brood rearing/summer habitat desired conditions locally as appropriate.			
Cover and Food	Sagebrush cover [2]	Uplands 10-25% Riparian/Meadow: Sagebrush cover within 100 m	Connelly et al. 2000
	Sagebrush height	16 to 32 inches (40-80cm)	Connelly et al. 2000
	Perennial grass and forb cover [2]	>15%	
	Upland and riparian perennial forb availability [2]	Preferred forbs are common with appropriate numbers of species present [6]	Stiver et al. 2015
	Riparian and/or meadow habitat condition	Proper Functioning Condition	Stiver et al. 2015
	Invasive annual grass cover	<2% cover	BLM synthesis of research [9]
	Conifer	0 (Absence of conifer)	BLM synthesis of research [10]
WINTER[1] November-March[1] (Apply to areas of known or likely winter-use)			
Cover and Food	Sagebrush cover and height above snow[5]	Sagebrush is at least 10 inches (25 cm) above snow and ≥10% cover [8]	Connelly et al. 2000 Stiver et al. 2015
	Conifer	0 (Absence of conifer)	BLM synthesis of research [10]

Notes:

[1] Seasonal dates can be adjusted by local unit according to geographic region.

[2] Since plant species and/or life forms may overlap, total vegetative cover, inclusive of shrubs, forbs and grasses may exceed 100%. Note that sagebrush cover objectives may exceed 25% in some areas, for example in areas with higher precipitation, and/or where local science is available demonstrating sage-grouse use of areas with sagebrush cover > 25%.

[3] Arid corresponds to the 10 – 12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub- species for this type site (Stiver et al. 2015).

[4] Mesic corresponds to the ≥12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (Stiver et al. 2015).

[5] Collectively the indicators for sagebrush (cover, height, and shape), perennial grass and perennial forb (cover, height and/or availability) represent the desired condition range for nesting/early brood rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. *2015*. Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.

[6] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.
[7] Some late brood habitat occurs at higher elevations outside of mapped nesting habitat and some is embedded within nesting landscapes especially areas such as wet meadows, riparian areas, springs and seeps.
[8] Winter habitat metrics are a guideline but snow depths and habitat availability may vary widely depending on winter severity, topography and elevation.
[9] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[10] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

Table 4:* Estimated Acres of Treatment Needed within a 10-Year Period to Achieve Vegetation Objectives on BLM-Administered Lands[1]

Population Area	Mechanical[2]	Prescribed Fire (MD FIRE 31) [3]	Grass Restoration (MD VEG 2) [4]
Bear Lake Plateau	1,000	0	0
East Idaho Uplands	6,000	9,000	1,000
S Central Idaho/N Snake River and Mountain Valleys	18,000	11,000	162,000
Weiser	0	0	13,000
SW Idaho	52,000	10,000	444,000

Notes:
[1] These are estimates of treatments required to achieve and/or maintain desired habitat conditions over a period of ten years. There are many dynamic and highly variable disturbances that may happen over that period of time that can have a significant effect on the amount, type, and timing of treatment needed. Those disturbances are factored into the ten-year simulation using stochastic, not predictive, techniques. Probabilities of events such as large wildfires are used in the model to make the simulation as realistic as possible, given empirical data about such events in the past, but the results of the simulation cannot be used to predict the future occurrence of such events, including their timing, size, or location, which are essentially random.
[2] Removal of conifers that have invaded sagebrush including phase one juniper that is 10 percent or less and reducing sagebrush cover in areas over 30 percent canopy cover
[3] Acres are those that are greater than 30 percent sagebrush canopy cover and/or invaded by 10 percent or greater conifer.
[4] Acres presently dominated by annual grasses that can be improved by herbicide application and seeding of perennial vegetation.

*Table 2-3 (2015 GRSG Approved RMP Amendment)

Note there was no change to Table 2-3 in the 2019 GRSG Approved RMP Amendment.

2.2.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 plans have management direction that would change by the Proposed RMP Amendment. If 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The appendices can be found on the Idaho GRSG ePlanning website.

ARMPA Appendix Name	Year	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Approved RMP Amendment Maps	2015, 2019	Completely Revised-revised by rangewide
B: Buffers	2015, 2019	Completely Revised-revised by state-specific
C: Required Design Features	2015, 2019	Partially Revised- Applies rangewide livestock grazing BMPs
D: Monitoring Framework	2015	Completely Revised-revised by rangewide
E: Anthropogenic Disturbance and Adaptive Management	2015, 2019	Partially Revised- Applies rangewide disturbance cap approach
F: Mitigation	2015, 2019	Completely Revised-revised by rangewide
G: Fluid Mineral Lease Stipulations, Waivers, Modifications, and Exceptions	2015	Partially Revised- Applies rangewide exceptions, modifications, and waivers
H: Fire and Invasives Assessment Tool (FIAT)	2015	No change (same as 2015).
K: Technical and Policy Teams	2019	Partially Revised-revised by state-specific

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Appendix 2.3
Billings RMP

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2.3 BILLINGS RMP

This appendix presents the GRSG approved RMP language from the 2015 record of decision for the Billings RMP revision. The Billings RMP was not amended in 2019. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment (RMPA), either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMPA include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable 2015 appendices that are listed in **Section 2.3.2** of this appendix. For the additional state-specific Montana/Dakotas management direction for the Proposed RMPA, see Chapter 2, Table 2-7.

2.3.1 Billings RMP (Montana)

Table 1: Comparison of the Proposed RMP Amendment to Existing GRSG RMP Management Direction in Billings RMP

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Vegetation – Forests and Woodlands (Veg/F&W)	
MD Veg/F&W-8: Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied sage-grouse habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those included in the FIAT report (Chambers et. al., 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated.	Partially Revised - revised by state specific direction to clarify and remove FIAT reference.
Vegetation – Rangelands and Shrublands (Veg/R&S)	
Goal Veg/R&S 3: Maintain, improve, enhance, or restore habitat to facilitate the conservation, recovery, and maintenance of populations of native and desirable nonnative plant and animal species.	No change (same as 2015)
Goal Veg/R&S 4: Promote recovery and restoration of sagebrush communities after wildfire events.	No change (same as 2015)
MD Veg/R&S-1: Manage rangelands to meet health standards consistent with the Standards for Rangeland Health (Standards 1 and 5) and Guidelines for Livestock Grazing Management and apply appropriate guidelines where not meeting the standards.	No change (same as 2015)
MD Veg/R&S-3: Identify priority treatment areas for conifer encroachment, including big game winter range, WUIs, current and historic sagebrush habitat, forest meadows and bighorn sheep habitat.	No change (same as 2015)
MD Veg/R&S-6: Within Greater Sage-Grouse PHMA, only treatments that conserve, enhance, or restore Greater Sage-Grouse habitat will be allowed. Treatment methods, including prescribed burning and mechanical treatments will be used to eliminate conifer encroachment and stimulate vegetative re- growth in grassland/shrub land habitats; and to reduce fuels, thin under-stories, recycle nutrients, and create small openings in forested vegetation types.	Partially Revised - revised by state specific direction to add additional language for treatments in HMAs from state specific circumstances (VEG MA-X)

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD Veg/R&S-7: In all PHMA the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).	No change (same as 2015)
MD Veg/R&S-9: A target of eight percent of crested wheatgrass acres (approximately 2,378 acres) will be converted to native sagebrush/grassland over the life of the plan. Preferred treatment areas will be areas that are not currently being used in a grazing system to provide early spring grazing and reduce grazing pressure from other areas within a grazing allotment. Priority treatment areas will be in Greater Sage-Grouse PHMA, RHMAs, and GHMA.	Partially Revised - revised by state specific direction to clarify and remove RHMA.
New: state-specific vegetation direction	Added by state specific direction
Vegetation – Riparian and Wetlands (Veg/R&W)	
MD Veg/R&W-2: Manage riparian communities to meet Standards for Rangeland Health (Standard 2) to ensure riparian areas and wetlands are in Proper Functioning Condition (PFC). (Appendix Z)	No change (same as 2015)
MD Veg/R&W-4: Riparian areas will be monitored on a prioritized basis. High priority areas will include: • Riparian areas adjacent to fish bearing waters. • Riparian areas with existing cottonwood galleries or potential cottonwood gallery habitat • Riparian areas within Greater Sage-Grouse Priority Habitat	No change (same as 2015)
Vegetation – Invasive Species and Noxious Weeds (Veg/IS&NW)	
Goal Veg/IS&NW 1: Manage for healthy native plant communities and desirable nonnative plant communities by reducing, preventing expansion of, or eliminating the occurrence of undesirable invasive species, undesirable nonnative, or noxious weeds (predatory plant pests or disease) by implementing management actions consistent with national guidance, state, and local weed management plans.	No change (same as 2015)
Goal Veg/IS&NW 2: Use IPM to make progress towards a healthy plant community, while meeting multiple land use objectives and meeting Standards for Rangeland Health (Standards 1, 2, and 5).	No change (same as 2015)
MD Veg/IS&NW-14: Noxious and invasive weed control will not occur within ½ mile of nesting and brood rearing areas for special status species during the nesting and brood rearing season.	No change (same as 2015)
Wildlife Habitat and Special Status Species (Wildlife) (WLH & SSS)	
Objectives: Sagebrush, native grasslands, seasonal or crucial wildlife ranges, special status species habitat, fisheries, cottonwood galleries, and riparian/wetlands will be priority habitats. All wildlife habitats will be managed to meet Rangeland Health Standards (Standards 1 and 5). BLM is responsible for managing habitats, whereas state and federal wildlife management agencies (e.g., MT FWP, USFWS) oversee management of wildlife species. BLM will coordinate with and support the conservation plans of those agencies on BLM administered lands. Priority wildlife species for management are described in Chapter 3.	No change (same as 2015)

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
In 2010, the USFWS determined that the Greater Sage-Grouse is a Candidate species and Warranted, but precluded, by other priorities, for listing under the ESA. In 2009, the MT/DAKs BLM delineated three types of Greater Sage-Grouse habitat areas as part of the planning process (Map 2-1): • Greater Sage-Grouse Habitat - PHMA, • Greater Sage-Grouse Habitat - RHMA, and • Greater Sage-Grouse Habitat – GHMA Each area will have varying degrees of management in order to achieve the goals or objectives for each Greater Sage-Grouse habitat area. The Greater Sage-Grouse habitat delineations may be modified as needed as local site conditions change or as new information becomes available. Refer to the Glossary for definitions of the three Greater Sage-Grouse habitat areas, Appendix F for mitigation measures and conservation actions for Greater Sage-Grouse habitat, and Appendix D for monitoring of Greater Sage-Grouse and Sagebrush Habitats.	Completely Revised-revised by rangewide and state specific direction
Goal WLH & SSS 2: Manage for net conservation gain and connectivity of habitats on BLM-administered lands. The necessary habitat will be present to maintain, enhance, or restore threatened and endangered (T & E), special status, and priority native species populations. Sagebrush, native grasslands, seasonal or crucial wildlife ranges, special status species habitat, fisheries, cottonwood galleries, and riparian/wetlands will be priorities.	No change (same as 2015)
Goal WLH & SSS 3: Manage all BLM actions or authorized activities to sustain wildlife populations and their habitats and to avoid contributing to the listing of or jeopardizing the continued existence or recovery of special status species and their habitats.	No change (same as 2015)
Goal WLH & SSS 4: Manage or restore habitat on BLM-administered lands within the planning area to facilitate the conservation, recovery, and maintenance of populations of native, desirable non-native, and special status species consistent with appropriate local, state, and federal management plans.	No change (same as 2015)
Goal WLH & SSS 5: Manage habitats to support MT FWP in the attainment of objectives and well-distributed, healthy populations of wildlife species consistent with the MT FWP's Strategic Habitat Plan, Montana's Comprehensive Fish and Wildlife Conservation Strategy, and strategic population plans, and to achieve the stated purpose of designated State of Montana Wildlife Management Areas (WMA).	No change (same as 2015)
Goal WLH & SSS 8: Provide for the long-term conservation, enhancement, and restoration of the sagebrush steppe/mixed-grass prairie complex in a manner that supports sustainable Greater Sage-Grouse populations and a healthy diversity and abundance of wildlife species.	Partially Revised: Clarified to be more general. GRSG specific goal is part of rangewide direction.
MD WLH & SSS-6: Fences identified as barriers to wildlife movement on BLM-administered lands will be modified or removed to accommodate wildlife passage, unless the fences were built specifically to keep native ungulates out of an area. Fences will also be placed and marked, or modified, to reduce wildlife collisions or entanglements.	No change (same as 2015)

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD WLH & SSS-7: Conditions of Approval (COAs) will be applied to all Applications for Permit to Drill (APDs) for Special Status Species.	No change (same as 2015)
MD WLH & SSS-8: Utilize appropriate off-site compensatory mitigation to reduce impacts on wildlife habitat. This will be necessary if (1) all onsite mitigation has been accomplished and adverse effects have not been mitigated; or (2) if onsite mitigation is not feasible. Off –site mitigation will be applied as close to the affected area as possible and for the same or similar impacted species or habitats.	No change (same as 2015)
MD WLH & SSS-18: Areas that will be targeted for conversion from crested wheatgrass to native sagebrush/grasslands will be areas that have high wildlife habitat potential, particularly for Greater Sage- Grouse, big game, and other sagebrush obligate species, and are currently monocultures with little vegetation diversity.	No change (same as 2015)
MD WLH & SSS-27: Mitigation of surface-disturbing or disrupting activities (including operations and maintenance associated with fluid mineral development) will be applied where needed to minimize impacts of human activities on important seasonal wildlife habitats, consistent with the wildlife stipulations outlined in the Wildlife / Special Status Species and Fluid Minerals sections of Chapter 2. Mitigation measures will be applied during activity level planning if an on-site evaluation of the project area indicates the presence of important wildlife species. Exceptions may be granted by the AO, if an environmental review demonstrates that effects could be mitigated to an acceptable level, habitat for the species is not present in the area, or portions of the area can be occupied without affecting a particular species. Exceptions may also be granted where the short- term effects are mitigated by the long-term benefits (e.g., prescribed fire, wildlife monitoring, or forest health treatments). As defined in the Glossary, surface-disturbing and disruptive activities will not prohibit all activities or authorized uses. For example, emergency activities (e.g., fire suppression, search and rescue), rangeland monitoring, routine maintenance associated with an approved authorization, dispersed recreational activities (e.g., hunting, hiking), and livestock grazing are not considered surface-disturbing or disruptive activities.	Partially revised by rangewide and state specific direction (add reference to GRSG specific mitigation approach)
MD WLH & SSS-38: Crucial Winter Range - Surface occupancy and use for oil and gas exploration and development will be prohibited (NSO) in crucial winter range (antelope, elk, moose, bighorn sheep, mule deer, whitetail deer, and greater sage-grouse).	Partially Revised: New stipulation language applied for GRSG.
MD WLH & SSS-51: Special Status Species - Identify distribution, key habitat areas, and special management needs for development of management plans and conservation measures, consistent with restoration, conservation and recovery plans for threatened, endangered, and other special status species. Priority habitats are riparian/ wetland areas, native grasslands, sagebrush steppe, conifer forests, and seasonal ranges supporting life cycle requirements for wildlife (i.e., winter, breeding, parturition, etc.).	No change (same as 2015)
MD WLH & SSS-52: Special Status Species - Timing restrictions will be used in special status species habitat. Surface disturbing and disruptive activities that impact special status species habitats during their seasons of use, particularly during critical life cycles will be avoided or minimized.	No change (same as 2015)

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD WLH & SSS-53: Special Status Species - Assist in the restoration, reintroduction, augmentation, or re-establishment of T & E, special status, and priority species and other populations and (or) habitats in coordination with other agencies.	No change (same as 2015)
MD WLH & SSS-56: Special Status Species - Lease Notice: Oil and gas surface occupancy and use is subject to the following operating constraints: The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the ESA as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.	No change (same as 2015)
[Plan Maintenance Action in 2018 (February 2, 2018) clarified the use and application of the habitat objectives. Updated the language in MD WLH & SSS-73 and 74. These two MDs are deleted and replace with the text below.]	Completely Revised - revised by rangewide direction. Table 2-6 removed, indicators now in new appendix.
The habitat objectives for GRSG (Table 2-6) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site. The seasonal habitat descriptions in Table 2-6 vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sagegrouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics	Completely Revised - revised by rangewide direction

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
for a given area. The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards. The Habitat Objectives Tables are to be used: • To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments • To evaluate land use plan effectiveness for sage-grouse conservation, and • As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.	
MD WLH & SSS-75: Special Status Species: Greater Sage-Grouse – In addition to the references identified in the following table, the Conservation Plans developed for each of the Wyoming Local Sage-Grouse Working Groups will be consulted to identify specific habitat objectives appropriate for site- specific conditions. The Conservation Plans, updated in March 2014, are available on the Wyoming Game and Fish Department (WGFD) website at: https://wgfd.wyo.gov/web2011/wildlife-1000817.aspx.	Completely Revised - revised by rangewide direction
MD WLH & SSS-76: Special Status Species: Greater Sage-Grouse – All BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives. If monitoring data show the habitat objectives have not been met nor progress being made towards meeting them, there will be an evaluation and a determination made as to the cause. If it is determined that the authorized use is a cause, the use will be adjusted by the response specified in the instrument that authorized the use.	Completely Revised - revised by rangewide direction
MD WLH & SSS-9: The BLM will apply appropriate mitigation measures and conservation actions to BLM authorized activities to avoid, minimize, rectify, reduce, or compensate for impacts if an evaluation of the project area indicates the presence of important wildlife species, seasonal wildlife habitat, or other resource concern.	No change (same as 2015)
MD WLH & SSS-71: In all sage-grouse habitat, in undertaking BLM management actions, and consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Actions which result in habitat loss and degradation" include those identified as threats which contribute to	Completely Revised - revised by rangewide and state specific direction

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Greater Sage-Grouse disturbance as identified by the USFWS in its 2010 listing decision (75 FR 13910) and shown in Table 2 in the attached Monitoring Framework (Appendix D).	
MD WLH & SSS-77: Surface occupancy and use for oil and gas exploration and development will be prohibited within Greater Sage-Grouse crucial winter range (NSO).	Completely Revised - revised by rangewide and state specific direction
[Plan Maintenance Action in 2018 conducted to acknowledge adoption of the State of Montana Habitat Conservation Program Density Disturbance Calculation Tool, changed Montana BLM Field Offices to a 5% cap. See DOI-BLM-MT-2018-0005-CX.] MD WLH & SSS-78: Special Status Species – Greater Sage-Grouse – If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) or if anthropogenic disturbance and habitat loss associated with conversion to agricultural tillage or fire exceed 5% within a project analysis area in PHMA, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 Mining Law, valid existing rights, etc.) will be permitted by BLM within PHMA in a project analysis area until the disturbance has been reduced to less than the cap. If the BLM determines that the State of Montana has adopted a GRSG Habitat Conservation Program that contains comparable components to those found in the State of Wyoming's Core Area Strategy including an all lands approach for calculating anthropogenic disturbances, a clear methodology for measuring the density of operations, and a fully operational Density Disturbance Calculation Tool, the 3% disturbance cap will be converted to a 5% cap for all sources of habitat alteration within a project analysis area. If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG PHMA in any given BSU, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 hard rock mining law, valid existing rights, etc.) will be permitted by BLM within GRSG PHMA in any given BSU until the disturbance has been reduced to less than the cap. Within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location.	Completely Revised - revised by rangewide and state specific direction
MD WLH & SSS-81: In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239) in accordance with Appendix B.	Completely Revised - revised by state specific direction

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD WLH & SSS-83: Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in the PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is co-located into an existing disturbed area.	No change (same as 2015)
New: state-specific sensitive status species management	Added by state specific direction
New: rangewide predation management	Added by rangewide direction
GRSG PHMA	
Goal WLH & SSS 10: To maintain or improve Greater Sage-Grouse populations by maintaining Greater Sage- Grouse habitat in good condition.	No change (same as 2015)
MD WLH & SSS-79: Establish Greater Sage-Grouse PHMA (158,926 acres of BLM-administered lands and 205,254 acres of federal minerals). These PHMA are generally consistent with MTFWP Greater Sage-Grouse core area designations, with the exception of one small area in southern Carbon County near Elk Basin Oil field (Map 2-1).	Completely Revised - revised by rangewide direction
MD WLH & SSS-80: In all PHMA the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).	No change (same as 2015)
MD WLH & SSS-81: In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239) in accordance with Appendix B.	Completely Revised - revised by state specific direction
MD WLH & SSS-82: No waivers or modifications to a fluid mineral lease no-surface-occupancy stipulation will be granted. The AO may grant an exception to a fluid mineral lease no-surface-occupancy stipulation only where the proposed action: • Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or, • Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and will provide a clear conservation gain to GRSG. Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP revision. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts.	Completely Revised - revised by rangewide and state specific direction

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Any exceptions to this lease stipulation may be approved by the AO only with the concurrence of the State Director. The AO may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publically available at least quarterly.	
MD WLH & SSS-85: Open to fluid mineral leasing and development (including geophysical exploration). To protect Greater Sage-grouse, a priority species for management, surface occupancy and use for oil and gas exploration and development will be prohibited within Greater Sage-Grouse PHMA (NSO).	Completely Revised - revised by rangewide and state specific direction
MD WLH & SSS-86: Exclusion area for renewable and solar energy exploration and facility development.	Completely Revised - revised by rangewide direction
MD WLH & SSS-87: Avoidance area for major and minor ROWs. However ROWs will only be allowed in GRSG PHMA where habitat functionality will be maintained.	Completely Revised - revised by rangewide and state specific direction
GRSG RHMAs	
Goal WLH & SSS 11: In these areas, BLM will manage habitat so that Greater Sage-Grouse populations can be restored over the long-term. BLM will strive to restore historical Greater Sage-Grouse habitat functionality, or at a minimum, have no net loss of Greater Sage-Grouse habitat, to support Greater Sage-Grouse populations.	Completely Revised - revised by rangewide and state specific direction
MD WLH & SSS-88: Establish RHMAs (78,927 acres of BLM-administered lands and 88,642 acres of federal mineral estate). These areas will include one small polygon of core habitat in Carbon County near Elk Basin Oil Field, as well as other areas (Map 2-1).	Completely Revised - revised by rangewide and state specific direction
MD WLH & SSS-89: Surface occupancy and use for oil and gas exploration and development will be prohibited within 0.6 miles of Greater Sage-Grouse leks (NSO).	Completely Revised - revised by rangewide and state specific direction
MD WLH & SSS-90: Surface use for oil and gas exploration and development will be prohibited from March 1 to June 15 in Greater Sage-Grouse nesting habitat within 3 miles of a lek (TL).	Completely Revised - revised by rangewide and state specific direction
MD WLH & SSS-91: Surface occupancy and use for oil and gas exploration and development will be subject to the following special operating constraints that will maintain Greater Sage-Grouse habitat: surface disturbance density and mitigation plan (CSU).	Completely Revised - revised by rangewide and state specific direction
MD WLH & SSS-92: Geophysical exploration will be allowed on existing roads and trails with surface use prohibited from March 1 to June 15 within 4 miles of a lek (TL).	Completely Revised - revised by rangewide and state specific direction
MD WLH & SSS-93: GRSG RHMAs outside of Elk Basin will be avoidance areas for renewable and solar energy exploration, development and facilities with approved mitigation.	Completely Revised - revised by rangewide and state specific direction

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD WLH & SSS-94: The Elk Basin GRSG RHMA will be an exclusion area for renewable and solar energy exploration, development and facilities with approved mitigation.	Completely Revised - revised by rangewide and state specific direction
MD WLH & SSS-95: Avoidance area for major and minor ROWs. However ROWs will only be allowed in GRSG RHMAs where habitat functionality will be maintained.	Completely Revised - revised by rangewide and state specific direction
GRSG GHMA	
Goal WLH & SSS 12: BLM will maintain habitat for viable Greater Sage-Grouse populations to promote movement and genetic diversity. Maintain, restore or enhance Greater Sage-Grouse habitat and connectivity between sagebrush habitats, with emphasis on those habitats occupied by Greater Sage-Grouse.	No change (same as 2015)
MD WLH & SSS-96: Establish GHMA (176,734 acres of BLM-administered lands and 299,166 acres of federal mineral estate). These areas include a 3 mile buffer around Greater Sage-Grouse leks, outside of the PHMA and RHMA areas (Map 2-1).	Completely Revised - revised by rangewide and state specific direction
MD WLH & SSS-97: In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239) in accordance with Appendix B.	Completely Revised - revised by state specific direction
MD WLH & SSS-98: Surface occupancy and use for oil and gas exploration and development will be prohibited within 0.6 miles of the perimeter of Greater Sage-Grouse leks (NSO).	Completely Revised - revised by rangewide and state specific direction
MD WLH & SSS-99: To protect nesting Greater Sage-grouse, surface occupancy and use within 2 miles of a lek may be restricted or prohibited. Prior to such activities, a plan to mitigate impacts on nesting Greater Sage-grouse and Greater Sage-grouse nesting habitat will be prepared by the proponent and implemented upon approval by the AO (CSU).	Completely Revised - revised by state specific direction
MD WLH & SSS-100: Geophysical exploration will be allowed on existing roads and trails with surface use prohibited from March 1 to June 15 within 3 miles of a lek (TL).	No change (same as 2015)
MD WLH & SSS-101: Avoidance area for renewable and solar energy exploration, development and facilities with approved mitigation.	Completely Revised - revised by state specific direction
MD WLH & SSS-102: GRSG GHMA will be avoidance areas for major ROWs. GRSG GHMA will be open to minor ROWs. Utilities and similar facilities will be located adjacent to other facilities where practical and only when habitat can be maintained.	Completely Revised - revised by state specific direction
MD WLH & SSS-103: Consider the potential for the development of not-yet-constructed valid existing rights of surface disturbing activities as defined in Table 2 of the Monitoring Framework (Appendix D) prior to authorizing new projects in PHMA.	Partially Revised – Updated monitoring framework as part of rangewide direction, move to correct section.

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Fire Ecology and Management (Fire)	
Goal FIRE 1: Manage wildfire and fuels for the protection of public health, safety, property, and resource values. The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection.	No change (same as 2015)
Goal FIRE 3: Maintain desired mix of seral stages within vegetation communities, including desert shrublands, forest and woodlands, grasslands, mountain shrublands, sagebrush (all sub-species), riparian/wetlands and aspen.	No change (same as 2015)
Goal FIRE 6: Utilize an integrated management technique unless otherwise restricted (defined as prescribed fire, mechanical, chemical, or biological, followed by desired reseeding) to reduce fuels to protect high priority areas or resource values.	No change (same as 2015)
MD FIRE-4: Fuels treatments will be designed to protect or improve resource values	No change (same as 2015)
MD FIRE-7: Within the following areas work to restore or maintain approximately 14,000 acres available for restoring natural Fire Regime Condition Classes (FRCC) in Musselshell, Stillwater, Carbon, and Sweet Grass Counties, should resource management constraints and considerations (i.e. GRSG habitat, other identified T&E issues, and culturally sensitive areas) allow.	No change (same as 2015)
MD FIRE-8: If prescribed fire is used in Greater Sage-Grouse habitat, the NEPA analysis for the Burn Plan will address: • why alternative techniques were not selected as a viable options; • how Greater Sage-Grouse goals and objectives will be met by its use; • how the COT Report objectives will be addressed and met; • a risk assessment to address how potential threats to Greater Sage-Grouse habitat will be minimized. Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that will protect Greater Sage-Grouse habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality."	No change (same as 2015)

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD FIRE-11: Heavy equipment will not be used to construct fire lines in crucial winter range, habitat of candidate or special status species, riparian/wetlands or in areas of cultural resource sensitivity or other designated areas (e.g., ACECs, WSAs). Exceptions will be permitted for protection of human life, property and/or to protect resource values from further loss due to unwanted/unplanned natural or human caused wildland fires. Cultural Resource Specialists, Wildlife Biologists, or Resource Advisors will be consulted for locations of identified areas before use of or anticipated use of heavy equipment. If heavy equipment is used, rehabilitation work on lines will begin immediately after containment. Heavy equipment could be used in a WSA only if the exceptions in the non-impairment standards are met.	No change (same as 2015)
MD FIRE-14: Prescribed fire will be allowed on up to 5 percent of the percent of BLM administered acres within the planning area to achieve measurable landscape level objectives from (1) other resources, including, but not limited to, forestry, wildlife, range, vegetation, and watershed; (2) the reduction of hazardous fuels; and (3) the introduction of fire into fire-adapted ecosystems. Within Greater Sage-Grouse PHMA and RHMAs, only treatments that conserve, enhance, or restore Greater Sage-Grouse habitat will be allowed. Treatment methods, including prescribed burning and mechanical treatments will be used to eliminate conifer encroachment and stimulate vegetative re-growth in grassland/shrub land habitats; and to reduce fuels, thin under-stories, recycle nutrients, and create small openings in forested vegetation types. A fire risk assessment will be completed for implementation of prescribed fire in relation to GRSG goals and objectives. When prescribed fire is used for vegetation treatments, the burn plan will clearly indicate how COT objectives will be addressed and met by use of prescribed fire and why alternative techniques for vegetation treatment were not selected.	Partially Revised - revised by state specific direction to clarify and separate out GRSG management (only MD FIRE-8 needed)
Energy &Mineral Resources: Solid Leasables (including Coal) (SL-Coal)	
MD SL-COAL-4: Terms and conditions will be applied to mining activities to meet land health standards for uplands, riparian areas and wetlands, water quality, air quality, and native plant and animal species (see BMPs in Appendix H and Greater Sage-Grouse Required Design Features in Appendix C).	No change (same as 2015)
MD SL-COAL-6: At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part3461.5(o)(1).	Completely Revised - revised by rangewide direction

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD SL-COAL-8: Within Greater Sage-Grouse PHMA (Map 3-5) and RHMAs solid mineral leasing (coal) will only be allowed with the following lease stipulations: • Mining may only occur via subsurface methods • All mine related appurtenant facilities will be placed outside of the PHMA	Partially Revised: RHMA removed, PHMA updated.
MD SL-COAL-9: Remainder of Planning Area: Process lease by application (LBAs) for new coal leases by applying the coal screening process to the application. The coal screening process results will determine which lands may be available for further consideration for coal leasing and development. Appropriate NEPA analysis will be required prior to leasing. The existing RMP (BLM 1984) coal- screening management decisions are current and relevant to the application area. (See Appendix M)	No change (same as 2015)
Energy & Mineral Resources: Fluid Mineral Resources (FLUIDS)	
MD FLUIDS-15: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority will be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse (Map 2-4). The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 C.F.R. 3162.3-1(h).	Completely Revised - revised by rangewide direction
MD FLUIDS-16: Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts on sage-grouse or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such Federal leases.	Completely Revised - revised by rangewide direction
MD FLUIDS-17: Where the federal government owns the mineral estate in PHMA and GHMA, and the surface is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.	Partially Revised by state direction – Applies to all minerals and updated HMA language
MD FLUIDS-18: Where the federal government owns the surface and the mineral estate is in non- federal ownership in PHMA and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.	Partially Revised by state direction – Applies to all minerals and updated HMA language

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Energy & Mineral Resources: Locatable Minerals (LOC_MIN)	
Goal LOC_MIN 1: Encourage and facilitate development of locatable minerals in the manner to prevent unnecessary or undue degradation, as defined in 3809.5. Provide land use opportunities contributing to economic benefits while protecting or minimizing adverse impacts on other resources.	No change (same as 2015)
MD LOC_MIN-4: Terms and conditions will be applied to mining activities (within the constraints of the mining law) to meet land health standards for uplands, riparian and wetlands, water quality, air quality, and native plant and animal species (see Appendices B, C, D, E, F) for Greater Sage-Grouse specific measures). Note: All withdrawal actions (including mineral withdrawals) are processed in the Realty, Cadastral Survey, and Lands program. Restrictions applicable to locatable minerals are limited to the prevention of unnecessary or undue degradation, as defined in 43 CFR, Part3809.5.	No change (same as 2015)
Energy & Mineral Resources: Mineral Materials (Saleable) (SALE_MIN)	
Goal SALE_MIN 1: Provide land-use opportunities contributing to economic benefits and meet local infrastructure needs while protecting or minimizing adverse impacts on other resources and resource uses.	No change (same as 2015)
MD SALE_MIN-4: The following areas are closed to mineral material disposals (281,597 acres) (Maps 2-6 & 3-8): • Four Dances Natural Area **ACEC** • Petroglyph Canyon **ACEC** • Pompeys Pillar **ACEC** • Pryor Foothills RNA/ACEC • Stark Site **ACEC** • Weatherman Draw **ACEC** • Lands with wilderness characteristics (LWC) • Big Horn Tack-On **WSA** • Burnt Timber Canyon **WSA** • Pryor Mountain **WSA** • Twin Coulee WSA (If Twin Coulee WSA is released from further consideration, the area may be open to mineral material disposals.) • Greater Sage-Grouse PHMA - closed to new salable minerals sales; existing permits will be renewed with no increase in the permitted boundary. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are **met:** o the activity is within the BSU and project area disturbance **cap;** o the activity is subject to the provisions set forth in the mitigation framework (Appendix F); • all applicable required design features are applied; and [if applicable] the activity is permissible under the specific sub-regional screening criteria • Shepherd Ah-Nei Recreation **Area** • Acton Recreation **Area** • Asparagus Point	Partially Revised - revised by state specific direction [Amendment applies to GRSG Only]

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Energy & Mineral Resources: Non-Energy Leasable (LEAS_MIN)	
New: rangewide nonenergy minerals management	Added by rangewide direction
Realty, Cadastral Survey, and Lands: Land Tenure Adjustment and Access (R/LT)	
MD R/LT-14: Lands classified as priority habitat and general habitat (or habitat classification appropriate for the sub-region) for Greater Sage-Grouse will be retained in federal management unless: the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the Greater Sage-Grouse or the agency can demonstrate that the disposal of the lands, including land exchanges, will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse. (Map 2-11)	Partially Revised – Maintenance action to clarify applies to HMA
MD R/LT-18: Manage 353,829 acres in Category II (which includes GRSG habitat) - Retention/Limited Land Ownership Adjustment (no land disposals through direct sale). Land exchanges will be considered. (Map 3-9)	No change (same as 2015)
Realty, Cadastral Survey, and Lands: Rights-of-Way, Leases, and Permits (R/RLP)	
Goal R/RLP 4: Indirect effects of infrastructure will be minimized through time by siting informed by the best available science updated as monitoring information becomes available.	No change (same as 2015)
MD R/RLP-15: PHMA avoidance area for major and minor ROWs. (Maps 2-9 & 2-10) However ROWs will only be allowed in GRSG PHMA where habitat functionality will be maintained.	Completely Revised - revised by rangewide and state specific direction
MD R/RLP-16: RHMA avoidance area for major and minor ROWs. (Maps 2-9& 2-10) However ROWs will only be allowed in GRSG RHMAs where habitat functionality will be maintained.	Completely Revised - revised by rangewide and state specific direction
MD R/RLP-17: GHMA avoidance areas for major ROWs. (Maps 2-9 & 2-10) Utilities and similar facilities will be located adjacent to other facilities where practical and only when habitat can be maintained.	Completely Revised - revised by rangewide and state specific direction
MD R/RLP-18: GHMA open to minor ROWs. Utilities and similar facilities will be located adjacent to other facilities where practical and only when habitat can be maintained.	Completely Revised - revised by rangewide and state specific direction
MD R/RLP-21: Silver Tip Road in Carbon County will be designated as a ROW corridor (1,750 feet on either side of the center line of Silver Tip Road). This corridor will have a total width of 3,500 feet and 6 miles in length on public land, with the exception of the portion of this corridor occurring in the Elk Basin GRSG RHMA which will be 1,320 feet on either side of the center line of Silver Tip Road (total width of 2,640 feet) (Map 2-8).	Partially revised: no RHMA, now Elk Basin PHMA. Update Map ref.

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD R/RLP-23: ROW avoidance areas will include 378,958 acres (Maps 2-9, 2-10, 3-11): • Castle Butte **ACEC** • East Pryor **ACEC** • Four Dances Natural Area **ACEC** • Grove Creek **ACEC** • Pompeys Pillar ACEC (General Management Zone - restricts ROW to a 500' wide path paralleling the southern boundary of the public lands along Highway 312) • Pryor Foothills RNA/ACEC • Stark Site ACEC Weatherman Draw (expansion **area)** • Cave and karst areas will be managed as ROW avoidance areas. • L&CNHT and NPNHT corridors will managed as ROW avoidance areas • Asparagus Point, Steamboat Butte, portion of Acton, portion of Shepherd Ah-Nei, Bad Canyon, East and Red Pryor Mountains • Hoskins Basin Archeological District, Demi-John Flat Archeological District, Beartooth Mountain Front (2 mile strip bordering the eastern boundary of the Custer National Forest) • WSR eligible segments • Big Horn Sheep Winter Range • Big Game Winter **Range** • Greater Sage-Grouse **GHMA** • Greater Sage-Grouse PHMA and RHMAs will remain avoidance areas. However ROWs will only be allowed in Greater Sage-Grouse PHMA and RHMAs where habitat functionality will be maintained.	Partially Revised - revised by addition of rangewide and state specific GRSG direction [Amendment applies to GRSG only]
Realty, Cadastral Survey, and Lands – Withdrawals (R/WD)	
MD R/RWD-4: Withdrawal proposals will be evaluated at the project level and will not be approved unless the land management is consistent with maintaining and protecting BLM resource values (see (Appendix H, BMPs) and GRSG Appendices (Appendices B, C, D, E, F, G) as appropriate).	No change (same as 2015)
Livestock Grazing (LG)	
Goal LG 1: Provide opportunities for livestock grazing as a part of multiple-use in a manner that meets and/or exceeds rangeland health standards.	No change (same as 2015)
MD LG-9: In areas of resource conflicts, installation of structural range improvements will only be considered where grazing practices (change in season of use, reduction of AUMs, increased rest, etc.) are unable to resolve the resource concern. Structural range improvements could be considered where necessary to facilitate the change in grazing management practices. Existing range improvements will be evaluated and modified to address impacts on wildlife populations (e.g. Greater Sage-Grouse/fence conflicts).	Completely Revised - revised by rangewide direction
MD LG-11: All allotments wholly located in Greater Sage-Grouse PHMA will be considered for retirement, where the base property owner relinquishes their preference.	Completely Revised - revised by rangewide direction

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD LG-12: Site specific Greater Sage-Grouse habitat and management objectives will be developed for BLM land within Greater Sage-Grouse PHMA. These objectives will be incorporated into the respective allotment management plans (AMPs) or livestock grazing permits as appropriate. (Map 2-1)	Completely Revised - revised by rangewide direction
MD LG-13: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds based on GRSG Habitat Objectives Table (Table 2-6) and Land Health Standards (43 CFR, Part4180.2) and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.	Completely Revised - revised by rangewide direction
MD LG-14: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (ex., fire) and legal obligations.	Completely Revised - revised by rangewide direction
MD LG-15: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds based on GRSG Habitat Objectives Table (Table 2-6) and Land Health Standards (43 CFR, Part4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.	Completely Revised - revised by rangewide direction
MD LG-16: Allotments within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.	Completely Revised - revised by rangewide direction
MD LG-17: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part4110.2-3	Completely Revised - revised by rangewide direction
Recreation and Visitor Services (REC)	
MD REC-15: In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the development will have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from critical areas, etc.), or unless the development is required for visitor health and safety or resource protection.	Partially Revised - revised by state specific direction, see mitigation and SSS sections

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD REC-27: The BLM will issue special recreation use permits as appropriate for commercial, competitive, and special events subject to guidelines in BLM Handbook 2930, resource capabilities, social conflict concerns, professional qualifications, public safety, and public needs. SRPs will only be allowed in priority habitat if they are consistent with the goals and objectives for that habitat or species.	No change (same as 2015)
Trails and Travel Management (TTM)	
MD TTM-24: Site specific travel planning within Greater Sage-Grouse PHMA will be completed within a five (5) year period after the ROD is signed where it hasn't already been completed as part of this plan.	No change (same as 2015)
MD TTM-25: In PHMA and GHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6320 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use). Temporary closure or restriction orders under these authorities are enacted at the discretion of the AO to resolve management conflicts and protect persons, property, and public lands and resources. Where an AO determines that OHVs are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR, Part8341.2) A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.	No change (same as 2015)
<u>Gage Dome/Colony Road TMA</u> MD TTM-47: Management Objectives: reduce road density to minimize impacts on Greater Sage- Grouse habitat and other resource values. Manage the TMA to provide recreational opportunities and access while protecting Greater Sage-Grouse habitat	No change (same as 2015)
<u>Cottonwood/Weatherman Draw TMA</u> MD TTM-58: This area will be delineated into three sub-regions to address varying resource issues, access and recreational opportunities. Sub-Region I - Weatherman Draw/Castle Coulee. Management objectives: protect cultural values and resources within the ACEC. Minimize impacts on cultural values, fragile and erosive soils and other resources within the sub-region Sub-Region II - Hollenbeck. Management objectives: provide recreational opportunities with emphasis on minimizing impacts on Greater Sage-Grouse habitat, fragile and erosive soils, and other resource values Sub-Region III - Silver Tip. Management objectives: provide for motorized recreational opportunities with emphasis on minimizing impacts on fragile and erosive soils, and other resource values	No change (same as 2015)

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Warren TMA MD TTM-60: Management Objectives: to provide recreational opportunities with emphasis on protecting key Greater Sage-Grouse habitat while minimizing impacts on other resources values. Maintain current level of access.	No change (same as 2015)
Grove Creek TMA MD TTM-62: Management Objectives: to minimize impacts on geologic and visual resources, special status plants, and cultural and wildlife values, including Greater Sage-Grouse, while providing casual, non- commercial public recreational access.	No change (same as 2015)
Renewable Energy (Wind/Solar) (RE)	
MD RE-5: Manage 231,755 acres as exclusion areas (closed) to renewable energy authorizations, including: WSAs* • Big Horn Tack-On WSA • Burnt Timber Canyon WSA • Pryor Mountain WSA • Twin Coulee WSA *If released by an Act of Congress, lands within WSA boundaries will remain closed. National Historic Trails • Nez Perce NHT • Lewis & Clark NHT ACECs • Bridger Fossil Area ACEC • Castle Butte ACEC • East Pryor ACEC • Four Dances Natural Area ACEC • Grove Creek ACEC • Meeteetse Spires ACEC • Petroglyph Canyon ACEC • Pompeys Pillar ACEC • Pryor Foothills RNA ACEC • Stark Site ACEC • Weatherman Draw ACEC WSR Eligible/Suitable Segments • LWC • PMWHR Cultural Sites • Steamboat Butte • Bruder-Janich Site • Paul Duke Site • Demi-John Flat NR District • Bighorn Mouth North Cliffs Rock Art Site • Hoskins Basin Archaeological District VRM Class I areas GRSG PHMA Elk Basin GRSG RHMA	Partially Revised - revised by incorporation of rangewide GRSG direction [Amendment applies to GRSG Only]

GRSG Management from Billings RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD RE-6: Manage 200,278 acres as avoidance areas for renewable energy authorizations, subject to special stipulations and mitigation beyond standard stipulations and BMPs applied through site-specific analysis. Special stipulations and mitigation include provisions such as TLs, CSU, and other constraints/restrictions consistent with fluid minerals stipulations that will be applied to protect the following particular resources/habitats: • GRSG GHMA • GRSG RHMAs outside of Elk Basin • Bald/Golden Eagles • Ferruginous Hawks • Greater Sage-Grouse Winter Range • Big Game Winter Range • Big Game Parturition • Bighorn Sheep Habitat • Sharp-tailed grouse • Peregrine Falcon • Mountain Plover • Raptor Nests • Other avoidance areas include: • Asparagus Point, Steamboat Butte, Portion of Acton, Portion of Shepherd Ah-Nei, Bad Canyon, East and Red Pryor Mountains, • Cave and Karst areas • VRM Class II areas • Within ¼ mile of riparian areas and wetlands, designated 100 year flood plains and on water bodies and streams, unless activities are not in conflict with desired outcomes. • Surface disturbance on slopes >30%, soils with low reclamation potential, and highly erodible characteristics will be avoided whenever possible. If disturbance could not be avoided an approved mitigation and reclamation plan will be required prior to activities taking place. • TLs apply to development of facilities, but not to operation or maintenance.	Partially Revised - revised by addition of rangewide GRSG direction [Amendment applies to GRSG Only]

Table 2: Billings Habitat Objectives for GRSG

[Note: Table from 2015 Plan, see Appendix 8 for Indicator Tables for Proposed Plan]

Attribute	Indicator	Desired Condition	Reference
Breeding, Nesting, and Early Brood-Rearing (Seasonal Use Period: March 1 – June 15)			
Lek Security	Proximity of trees	.65-Km^2 (.388 miles) avoidance of coniferous habitats	Doherty 2008
	Collision Risks	Fences and other structures that pose a high collision risk are absent or mitigated with visual markers within 1.25 miles of leks active within 5 years.	Connelly et al. 2000 Stiver et al. 2015
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 100 m (328 ft.) of an active lek	Stiver et al. 2015
Cover	Sagebrush canopy cover	5-25%	Herman–Brunson 2007 Swanson 2009 Doherty et al. 2010 Hagen et al. 2007 Doherty et al. 2011 Foster et al. 2014 Wright et al. 2005
	Sagebrush height	6-31 inches (15-50cm)	Schroeder et al. 1999 Swanson 2009 Holloran et al. 2005 Doherty et al. 2011 Lane 2005
	Predominant sagebrush shape	Predominately spreading shape	Stiver et al. 2015
	Perennial grass cover (including bunchgrasses/important native grasses)	≥10%	Doherty et al. 2011 Holloran et al. 2005 Doherty et al. 2010 Hagen et al. 2007 Lane 2005
	Perennial grass and forb height (including residual grasses)	Adequate nest cover based on ecological site potential and seasonal precipitation; 4.4-11.3 inches (11.4-29 cm)	Doherty et al. 2014
	Perennial forb canopy cover	≥3%	Doherty et al. 2011 Holloran, et al. 2005 Doherty et al. 2010 Hagen et al. 2007

Attribute	Indicator	Desired Condition	Reference
Brood-Rearing/Summer 1 (Seasonal Use Period: June 16 – October 31)			
Cover	Sagebrush canopy cover	5-25%	Herman–Brunson 2007 Swanson 2009 Doherty et al. 2010 Doherty et al. 2011 Foster et al. 2014 Lane 2005
	Sagebrush height	6-31 inches (15-50cm)	Schroeder et al. 1999 Holloran et al. 2005 Doherty et al. 2011 Lane 2005
	Perennial grass and forb canopy cover	≥10%	Doherty et al. 2011 Holloran et al. 2010 Hagen et al. 2007
	Riparian areas/mesic meadows	Proper Functioning Condition	BLM 1997c Prichard et al. 1999 Prichard 1998
	Upland and riparian perennial forb availability	Preferred forbs are common with several preferred species present.	Stiver et al. 2015 Doherty et al. 2011
Winter 1 (Seasonal Use Period: November 1 – February 28)			
Cover and Food	Sagebrush canopy cover	≥10%	Schroeder et al. 1999 Swanson 2009 Foster et al. 2014
	Sagebrush height	≥25cm	Connelly et al. 2000

2.3.2 Relevant Appendices

The following table shows which appendices from the 2015 plan have management direction that may change through the Proposed RMPA. The appendices can be found on the Billings RMP ePlanning website.

ARMPA Appendix Name	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Approved RMP Maps	Completely Revised – See new maps in Appendix 1
B: Greater Sage-Grouse: Applying Lek Buffers	Completely revised – see state-specific language
C: Greater Sage-Grouse Required Design Features	Partially updated – see state-specific language
D: The Greater Sage-Grouse Monitoring Framework	Completely revised –see new rangewide management direction
E: Greater Sage-Grouse (GRSG) Disturbance Caps	Removed, see new rangewide management direction
F: Greater Sage-Grouse - Mitigation and Mitigation Measures	Removed, see new rangewide management direction
G: Adaptive Management Strategy for GRSG Habitat Management	Removed, see new rangewide management direction
H: Best Management Practices	Partially revised – addition of livestock grazing best management practices
I: Incorporating GRSG RMP Decisions into Grazing Authorizations	Partially revised – revised by rangewide and state-specific
J: Fluid Minerals: Procedures in Oil and Gas Recovery and Operations and Summary of the Billings Reasonably Foreseeable Development Scenario	No change (same as 2015)
K: Biological Opinion	No change (same as 2015)
L: Wildlife Resources	No change (same as 2015)
M: Coal Resources: Coal Development Potential and Unsuitability Criteria	No change (same as 2015)
N: SRMA and ERMA Tables	No change (same as 2015)
O: Visual Resource Management Program	No change (same as 2015)
P: Air Quality Resource Management Plan: Adaptive Management Strategy for Oil and Gas Resources	No change (same as 2015)
Q: Implementation and Monitoring	No change (same as 2015)
R: Bureau of Land Management Billings Field Office and Pompeys Pillar National Monument Sign Plan	No change (same as 2015)
S: Oil and Gas Lease Stipulations	Partial update, GRSG stipulations changed, see Appendix 16
T: Areas of Critical Environmental Concern	No change (same as 2015)
U: Cultural and Heritage Resources	No change (same as 2015)
V: Recreational Setting Characteristics	No change (same as 2015)
W: Realty, Cadastral Survey, and Lands	No change (same as 2015)
X: Lands with Wilderness Characteristics	No change (same as 2015)
Y: Screening Criteria Checklist for Ten Year Grazing Permit / Lease Renewal and Transfers	No change (same as 2015)
Z: PFC – Proper Functioning Condition	No change (same as 2015)
AA: 1975 Memorandum between Montana and Wyoming - Administration of the Pryor Mountain Wild Horse Range	No change (same as 2015)
AB: Summary of Eligibility, Suitability, and Tentative Classification Determinations for Rivers in the Billings Field Office	No change (same as 2015)
AC: Land Health Standards	No change (same as 2015)

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Appendix 2.4
Butte RMP

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2.4 BUTTE RMP

This appendix presents the approved RMP language from the 2009 record of decision for the Butte RMP that relate to GRSG management. The Butte RMP was not amended with GRSG decisions in 2015 or 2019. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment (RMPA), either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMPA include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable 2009 appendices that are listed in **Section 2.4.2** of this appendix. For the additional state-specific Montana/Dakotas management direction for the Proposed RMPA, see Chapter 2, Table 2-7.

2.4.1 Butte RMP (Montana)

Table 1. Comparison of the Proposed RMP Amendment to Existing GRSG RMP Management Direction in Butte RMP

GRSG Management from Butte RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Management Decisions: Vegetation Communities	
Wildlife. MA 27. Vegetation altering activities could occur in sage grouse habitat where they do not result in long-term loss of habitats or contribute to the need to federally list sage grouse. Sufficient sagebrush densities and cover will be retained in sage grouse habitat. (Goals WF5, WF7, SE4)	Completely Revised - revised by rangewide and state specific direction
Grassland and Shrubland Vegetation. MA 1: When necessary, sagebrush and grassland distribution and vigor will be restored through vegetative treatments such as reducing conifer encroachment, reducing noxious weeds, and ensuring proper grazing practices (season of use or intensity). (Goals GS1, LG2, FM2, NW1, WF1, WF2)	No change (same as 2009)
Grassland and Shrubland Vegetation. MA 2: Management of sagebrush habitats will be a priority based on concerns over the conservation status of sage grouse, pygmy rabbit, and other species associated with sagebrush and grassland habitats. (Goals GS1, GS2, WF1, WF2, WF5, WF7).	No change (same as 2009)
New: state-specific vegetation management	Added by state specific direction
Management Decisions: Terrestrial and Aquatic Wildlife Resources	
Wildlife. Goal WF7 – Protect, maintain, restore, and rehabilitate sagebrush habitat in occupied or historic sage grouse habitat (as mapped by MFWP).	Partially Revised - revised by state specific direction to clarify new mapping
Wildlife. MA 25. Sage grouse management activities will be designed and implemented to be consistent with adopted conservation strategies such as the Bureau of Land Management National Sage-Grouse Habitat Conservation Strategy (USDI-BLM 2004) and Management Plan and Conservation Strategies for Sage Grouse in Montana – Final (MSGWG 2005) and current, accepted science. (Goals WF6, WF7, GS1, GS2, SE4)	Completely Revised - revised by state specific direction

GRSG Management from Butte RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Grassland and Shrubland Vegetation. Goal 1: Management of sagebrush habitats will be a priority based on concerns over the conservation status of sage grouse, pygmy rabbit, and other species associated with sagebrush and grassland habitats. (Goals GS1, GS2, WF1, WF2, WF5, WF7)	No change (same as 2009)
Wildlife. MA 26. To the extent possible, BLM will: maintain large patches of high quality sagebrush in occupied or historic sage grouse habitat (as mapped by MFWP); maintain connections between sagebrush habitats; and enlarge the size of sagebrush patches in occupied or historic sage grouse habitat. (Goals GS2, WF2, WF5, WF6, WF7, SE4)	Partially Revised - revised by state specific direction to clarify new mapping
New: rangewide predation, adaptive management, mitigation, disturbance, HMA, and habitat objective management	Added by rangewide direction
New: state-specific sensitive status species, including HMA, management	Added by state specific direction
Management Decisions: Fluid Mineral Resources	
Fluid Leaseable Minerals Table 23 Lease Terms and Stipulations. Sage Grouse Strutting Grounds (leks) NSO ¼	Completely Revised - revised by rangewide and state specific direction
Fluid Leaseable Minerals Table 23 Lease Terms and Stipulations. Sage Grouse Winter/Spring Range TL 12/1-5/15	Completely Revised - revised by rangewide and state specific direction
New: state-specific and rangewide fluid mineral management, including geothermal	Added by rangewide and state specific direction
Management Decisions: Other Resources	
New: rangewide ROW, renewable energy, nonenergy minerals, mineral material, coal, locatable, and livestock grazing management	Added by rangewide direction
New: state-specific ROW, mineral material, and fire and fuels management	Added by state specific direction

Table 2. Dillon and Butte Habitat Objectives of GRSG

[Note: Table from 2015 Dillon Plan, see Appendix 8 for Indicator Tables for Proposed Plan]

Attribute	Indicator	Habitat Condition	Reference
LEK HABITAT (Seasonal Use Period March 1 – May 15)1			
Lek Security	Proximity of trees	Trees (i.e., in Idaho mainly juniper, conifers, and does not include old-growth juniper, pinyon pine and mountain mahogany; in Montana mainly Douglas-fir) absent or uncommon on shrub/grassland ecological sites within 1.86 miles (3 km) of occupied leks.	Baruch-Mordo et al.2013 Stiver et al. 2015
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek	Stiver et al. 2015

Attribute	Indicator	Habitat Condition	Reference
NESTING/EARLY BROOD REARING (Seasonal Use Period May 1 – June 30) 1			
Cover and Food	Sagebrush cover [2]	15-25%	Connelly et al. 2000 Connelly et al. 2003 Hagen et al. 2007
	Sagebrush height Arid sites[3] Mesic sites[4]	 12-31 inches (30-80cm) 16-31 inches (40-80cm)	Connelly et al. 2000
	Predominant sagebrush shape	Predominantly spreading shape[5]	Stiver et al. 2015
	Perennial grass cover (such as native bunchgrasses) [2] Arid sites[3] Mesic sites[4]	 >10% >15%	Connelly et al. 2000 Stiver et al. 2015
	Perennial grass (and forb) height (includes residual grasses)	≥ 7 inches	Connelly et al. 2000 Connelly et al. 2003 Hagen et al. 2007 Stiver et al. 2015
	Perennial forb cover [2] Arid sites[3] Mesic sites[4]	 >5% >10%	Connelly et al. 2000
	Perennial forb availability	Preferred forbs are common with several species present6	Stiver et al. 2015
LATE BROOD-REARING/SUMMER (July-October)1 Late brood-rearing areas, such as riparia			
Cover and Food	Sagebrush cover[2]	Uplands 10-25% Riparian/Meadow: Sagebrush cover within 100 m	Connelly et al. 2000
	Sagebrush height	16 to 32 inches (40-80cm)	Connelly et al. 2000
	Perennial grass and forb cover [2]	>15%	
	Upland and riparian perennial forb availability [2]	Preferred forbs are common with appropriate numbers of species present,6	Stiver et al. 2015
	Riparian and/or meadow habitat condition	Proper Functioning Condition	Stiver et al. 2015
WINTER November-March1 (Apply to areas of known or likely winter-use)			
Cover and Food	Sagebrush cover and height above snow,	Sagebrush is at least 10 inches (25 cm) above snow and ≥10% cover[16]	Connelly et al. 2000 Stiver et al. 2015

Notes:

[1] Seasonal dates can be adjusted by local unit according to geographic region.

[2] Since plant species and/or life forms may overlap, total vegetative cover, inclusive of shrubs, forbs and grasses may exceed 100%.

[3] Arid corresponds to the 10 – 12 inch precipitation zone; Artemisia tridentata wyomingensis is a common big sagebrush subspecies for this type site (Stiver et al. 2015).

[4] Mesic corresponds to the >12 inch precipitation zone; Artemisia tridentata vaseyana is a common big sagebrush sub-species for this type site (Stiver et al. 2015).

[5] Collectively the indicators for sagebrush (cover, height, and shape), perennial grass and perennial forb (cover, height and/or availability) represent the desired condition range for nesting/early brood rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. 2015. Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.

[6] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.
[15] Some late brood habitat occurs at higher elevations outside of mapped nesting habitat and some is embedded within nesting landscapes especially areas such as wet meadows, riparian areas, springs and seeps.
[16] Winter habitat metrics are a guideline but snow depths and habitat availability may vary widely depending on winter severity, topography and elevation.

2.4.2 Relevant Appendices

The following table shows which appendices from 2009 plan have management direction that may change through the Proposed RMPA. The appendices can be found on the Butte RMP ePlanning website.

ARMPA Appendix Name	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Travel Planning	No change (same as 2009)
C: Visual Resource Management (VRM)	No change (same as 2009)
D: SIMPPLLE Model	No change (same as 2009)
E: Best Management Practices	Partial revision – new BMPs to be added
F: Land Health Standards	No change (same as 2009)
G: Wildlife	No change (same as 2009)
H: Recreation Opportunity Spectrum (ROS)	No change (same as 2009)
I: Areas of Critical Environmental Concern (ACEC)	No change (same as 2009)
J: Wild and Scenic Rivers (WSR)	No change (same as 2009)
K: Cultural	No change (same as 2009)
L: Lands and Realty	No change (same as 2009)
M: Fluid Minerals	Partial revision – New GRSG stipulations to be added (see Appendix 16)
N: Implementation and Monitoring	No change (same as 2009)
NEW: Rangewide and State-Specific Appendices	New appendices added such as, RDF, Monitoring Framework, Habitat Objectives, and Maps

Appendix 2.5
Dillon RMP

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2.5 DILLON RMP

This appendix presents the GRSG approved RMP language from the 2015 record of decision amending the 2009 Dillon RMP. The Dillon RMP was not amended in 2019. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment (RMPA), either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMPA include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable 2015 appendices that are listed in **Section 2.5.2** of this appendix. For the additional state-specific Montana/Dakotas management direction for the Proposed RMPA, see Chapter 2, Table 2-7.

2.5.1 Dillon RMP (Montana)

Table 1. Comparison of the Proposed RMP Amendment to Existing GRSG RMP Management Direction in Dillion

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Special Status Species (SSS)	
Goal SSS 1: Maintain and/or increase the abundance, distribution and connectivity of GRSG by conserving, enhancing and restoring GRSG habitat to maintain resilient populations by reducing, eliminating or minimizing threats to GRSG habitats.	Completely Revised - revised by rangewide direction
Goal SSS 2: Provide for the needs of GRSG and their habitat while also providing for resource uses in accordance with BLM's direction for multiple use and sustained yield as described in FLPMA.	No change made (same as 2015)
Goal SSS 3: Manage anthropogenic development and human disturbance to minimize the likelihood of adverse population level effects on GRSG.	No change made (same as 2015)
Goal SSS 4: Reduce the risk of West Nile Virus or other disease outbreaks from BLM management actions.	Completely Revised - revised by state specific direction
Goal SSS 5: Conserve, enhance, and restore the sagebrush ecosystem upon which GRSG populations depend in an effort to maintain and/or increase their abundance and distribution, in cooperation with other conservation partners.	Completely Revised - revised by rangewide direction
Objective SSS 1: Maintain or make progress toward all lands within PHMA and IHMA (at least 70%) capable of producing sagebrush so there is a minimum of 15 percent sagebrush cover and conifers absent to uncommon within 1.86 miles of occupied leks.	Partially Revised - revised by state specific direction (clarity and consistency across Montana/Dakotas BLM)
[Plan Maintenance Action in 2018 (February 2, 2018) clarified the use and application of the habitat objectives. Updated the language in Objective SSS 2. This objective is deleted and replace with the text below.] The habitat objectives for GRSG (Table 2-2) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat	Completely Revised - revised by rangewide direction. Table 2-2 removed, see Appendix 8 for indicator table

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site. The seasonal habitat descriptions in Table 2-6 vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sagegrouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area. The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards. The Habitat Objectives Tables are to be used: ● To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments ● To evaluate land use plan effectiveness for sage-grouse conservation, and ● As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.	
New: rangewide predation management	Added by rangewide direction
Greater Sage-Grouse Management Areas	
Objective SSS 3: Maintain a resilient population of GRSG in Idaho and Southwestern Montana.	Completely Revised - revised by rangewide direction
Objective SSS 4: Designate GRSG management areas and associated management to maintain a resilient population and to designate strategically located adjacent areas to provide a buffer from unpredictable habitat loss such as wildfire to the resilient population areas.	Completely Revised - revised by rangewide direction
Objective SSS 5: Identify and strategically protect larger intact sagebrush areas and areas of lower fragmentation to maintain GRSG population persistence.	No change (same as 2015)

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD SSS-1: Designate five GRSG Conservation Areas (see Glossary) within the subregion to form the geographic basis for achieving population objectives; evaluating the disturbance density and adaptive regulatory triggers; and tailor adaptive management responses. These conservation areas are depicted in Figure 2-13. These areas are referred to as Mountain Valleys, Desert, West Owyhee, Southern and Southwestern Montana Conservation Areas. Conservation Area Description Mountain Valleys Conservation Area – generally located north of the Snake River Plain, including GRSG habitat in the Salmon and Challis areas, and habitat in west-central population area. It extends west from Rexburg, north and west of Highway 33 to Howe, north and west of Highway 33/22 to Arco, north and west of Highway 26/20/93 to Carey, north and west of Highway 20 west to Hill City, north and west of Highway 20 to the Dylan Karaus Road, west to Canyon Creek. Canyon Creek to the confluence with the Snake River form the western boundary. Desert Conservation Area – located north of the Snake River and south of the Mountain Valleys Conservation Area. It extends from the confluence of Canyon Creek and the Snake River, eastward to Idaho Falls. The Snake River and Henry's Fork form the eastern boundary. West Owyhee Conservation Area – located south of the Snake River and west of the Bruneau River. Southern Conservation Area – located south of the Snake River and east of the Bruneau River, including East Idaho uplands and Bear Lake Plateau, and the Utah portion of the Sawtooth National Forest in Box Elder County. Southwestern Montana – located in southwestern Montana - encompassing the Dillon Butte BLM Field Office and Beaverhead-Deerlodge National Forest boundaries (the Butte RMP is not being amended and since there are limited GRSG federal GHMA, management actions do not apply in the Butte Field Office). In general, GRSG habitats in the Desert and West Owyhee CAs are relatively contiguous, while those in the Mountain Valleys and Southern CAs tend to be more fragmented due to more complex topography, and elevational differences and/or effects from wildfires, agriculture, urbanization or other factors.	Completely Revised - revised by rangewide direction
MD SSS 2: Within each Conservation Area designate GRSG Habitat Management Areas: Priority, Important and General Habitat Management Areas (Figure 2-1). Priority Habitat Management Areas (PHMA) focus on conserving the two key meta-populations in the subregion. PHMA encompasses areas with the highest conservation value to GRSG, based on the presence of larger leks, habitat extent, important movement and connectivity corridors and winter habitat. PHMA include adequate area to accommodate continuation of existing land uses and landowner activities. Important Habitat Management Areas (IHMA) contain additional habitat and populations that provide a management buffer for the PHMA and to connect patches of PHMA. IHMA encompasses areas of generally moderate to high conservation value habitat and/or populations and in some Conservation Areas	Completely Revised - revised by rangewide direction

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
includes areas beyond those identified by USFWS as necessary to maintain redundant, representative and resilient populations (Priority Areas for Conservation (PACs)). IHMA are typically adjacent to PHMA but generally reflect somewhat lower GRSG population status and/or reduced habitat value due to disturbance, habitat fragmentation or other factors. There are no IHMA designated within the Southwestern Montana Conservation Area. General Habitat Management Areas (GHMA) encompass habitat that is outside of PHMA or IHMA. GHMA contain approximately 10 percent of the occupied leks that are also of relatively low male attendance compared to leks in PHMA or IHMA. GHMA are generally characterized by lower quality disturbed or patchy habitat of low lek connectivity.	
MD SSS 3: In Idaho, designate PHMA and IHMA to encompass 90 percent of the breeding males in Idaho. In Montana, designate PHMA to encompass Montana Fish, Wildlife, and Parks 2009 Greater Sage Grouse Core Area designations.	Completely Revised - revised by rangewide and state specific direction
MD SSS 4: Annually prioritize Conservation Areas at the state scale considering results of the annual adaptive regulatory trigger evaluations relative to implementation of restoration and mitigation activities.	Completely Revised - revised by rangewide and state specific direction
MD SSS 5: Prioritize activities and mitigation to conserve, enhance and restore GRSG habitats (i.e., fire suppression activities, fuels management activities, vegetation treatments, invasive species treatments etc.) first by Conservation Area, if appropriate (Conservation Area under adaptive management or at risk of meeting an adaptive management soft or hard trigger), followed by PHMA, then IHMA then GHMA within the Conservation Areas. Local priority areas within these areas will be further refined as a result of completing the GRSG Wildfire and Invasive Species Habitat Assessments as described in Appendix H. This can include projects outside GRSG habitat when those projects will provide a benefit to GRSG habitat.	Completely Revised - revised by rangewide and state specific direction
MD SSS 6: The management area map and Biologically Significant Unit (BSU) baseline map will be re- evaluated in conjunction with plan evaluation processes (i.e. approximately every 5 years). This re-evaluation can indicate the need to adjust PHMA, IHMA or GHMA or the habitat baseline. These adjustments can occur upon completion of the appropriate analysis and process (e.g., plan amendment) to review the allocation decisions based on the map. Results from the Wildfire and Invasive Species Assessments, such as identified focal or emphasis areas will also be used to help inform mapping adjustments during this evaluation.	Completely Revised - revised by rangewide and state specific direction
MD SSS 7: GRSG habitat within the project area will be assessed during project-level NEPA analysis within the management area designations (PHMA, IHMA, GHMA). Project proposals and their effects will be evaluated based on the habitat and values affected.	Completely Revised - revised by state specific direction

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD SSS 8: Idaho BLM will annually update the Key Habitat map, in order to reflect habitat changes resulting from wildfire, succession, and vegetation treatments that occurred or were observed since the last update. Key habitat includes areas of generally intact sagebrush that provide sage-grouse habitat during some portion of the year. This map also identifies potential restoration areas (perennial grassland annual grasslands, conifer encroachment and recent burns). This map a broad scale current vegetation map that changes as habitat is lost or restored. The Key Habitat Map is not an allocation decision such as PHMA, IHMA, and GHMA. Updates to the map will also occur if it is determined that mapping errors or omissions have occurred, or that radio-telemetry studies indicate that GRSG are consistently utilizing an area. Updates are also intended to capture recommendations by the field offices, GRSG Local Working Groups, or agency partners in GRSG conservation. Project-level evaluations of GRSG habitat during the NEPA process can also be used to inform the annual update.	Completely Revised - revised by state specific direction
MD SSS 9: Areas of habitat outside of delineated habitat management areas identified during the Key habitat update process will be evaluated during site specific NEPA for project level activities and GRSG required design features (Appendix C) and buffers (Appendix B) will be included as part of project design. These areas will be further evaluated during plan evaluation and the 5-year update to the management areas, to determine whether they should be included as PHMA, IHMA, or GHMA.	Completely Revised - revised by state specific direction
MD SSS 10: Designate Sagebrush Focal Areas (SFA) as shown on Figure 1-2. SFA will be managed as PHMA, with the following additional management: Recommended for withdrawal from the General Mining Act of 1872, as amended, subject to valid existing rights. Managed as NSO, without waiver, exception, or modification, for fluid mineral leasing. Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration (see specific management sections).	Completely Revised - revised by rangewide and state specific direction
Adaptive Management	
MD SSS 11: Idaho: Use hard and soft population and habitat triggers to determine an appropriate management response as described in MD SSS 16 to MD SSS 26. Hard and soft triggers responses are applied at the Conservation Area (MD SSS-1) scale (Appendix E).	Completely Revised - revised by rangewide direction
MD SSS 12: Utilize monitoring information collected through the Monitoring Framework (Appendix D) to determine when adaptive regulatory triggers have been met.	Completely Revised - revised by rangewide direction
MD SSS 13: Idaho: BLM will maintain GRSG habitat information, through use of the Key Habitat map or latest sagebrush/vegetation map, which will be used to track and identify habitat changes to assess the habitat trigger in the adaptive management approach. Key habitat map updates are made each winter by BLM in coordination with the Forest Service and IDFG, using the process described in Appendix F of the FEIS.	Completely Revised - revised by rangewide direction

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD SSS 14: Idaho: BLM will coordinate with the IDFG regarding population information collected and maintained by the IDFG to track and identify population changes to assess the population trigger in the adaptive management approach.	Completely Revised - revised by rangewide direction
MD SSS 15: Idaho: The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD, and twice each year thereafter the applicable monitoring information will be reviewed to determine if any adaptive management triggers have been met. Montana: The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter.	Completely Revised - revised by rangewide direction
MD SSS 16: Idaho: Adaptive habitat triggers will be individually calculated across all ownerships within the BSUs (Appendix E). The BSU is defined as the IDFG modeled nesting and wintering habitat (IDFG 2013, unpublished data) within PHMA and IHMA within a Conservation Area. The sagebrush component of the BSU is represented by the Key habitat within the BSU present during the 2011 baseline and as mapped during subsequent annual Key habitat map updates. Key habitat is defined as areas of generally intact sagebrush that provide GRSG habitat during some portion of the year (ISAC 2006).	Completely Revised - revised by rangewide direction
MD SSS 17: Habitat Hard Triggers are defined as: • A 20 percent loss of Key Habitat within the BSU of the PHMA of a Conservation Area when compared to the 2011 baseline, inclusive of all land ownerships or • A 20 percent loss of Key Habitat within the BSU of the IHMA of a Conservation Area when compared to the 2011 baseline.	Completely Revised - revised by rangewide direction
MD SSS 18: Habitat Soft Triggers are defined as: • A 10 percent loss of Key Habitat within the BSU of the PHMA of a Conservation Area when compared to the 2011 baseline; or • A 10 percent loss of Key Habitat within the BSU of the IHMA of a Conservation Area when compared to the 2011 baseline.	Completely Revised - revised by rangewide direction
MD SSS 19: Population Hard Triggers are defined as: • A 20 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change (λ) significantly below 1.0 within PHMA within a Conservation Area over the same 3-year period; or • A 20 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change (λ) significantly below 1.0 within IHMA within a Conservation Area over the same 3-year period. • Significance is defined by the 90 percent confidence interval around the current 3-year finite rate of change. If the 90 percent confidence interval is less than, and does not include 1.0, then the finite rate of change is considered significant. The finite rate of change and variance will be calculated following Garton et al. (2011).	Completely Revised - revised by rangewide direction

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD SSS 20: Population Soft Triggers are defined as: • A 10 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change (λ) below • within PHMA within a Conservation Area over the same 3-year period; or • A 10 percent decline in the current 3-year average of total maximum number of males counted compared to the 2011 maximum male baseline and a finite rate of change (λ) below • 1.0 within IHMA within a Conservation Area over the same 3-year period.	Completely Revised - revised by rangewide direction
MD SSS 21: When any of the Criteria for Soft Triggers have been met the Implementation Team will evaluate causal factors and recommend additional potential implementation level activities (Appendix E).	Completely Revised - revised by rangewide direction
MD SSS 22: When any of the Criteria for Hard Triggers have been met then all PHMA management actions will be applied to the IHMA within that Conservation Area and the Implementation Team will evaluate causal factors and recommend additional potential implementation level activities.	Completely Revised - revised by rangewide direction
MD SSS 23: If an adaptive regulatory trigger is tripped and livestock grazing is identified as a probable limiting factor then adjustments will follow the Adaptive Grazing Management Response described in Appendix E.	Completely Revised - revised by rangewide direction
MD SSS 24: Remove any adaptive management response when the habitat or maximum male population count (i.e., 3-year average) returns to or exceeds the 2011 baseline levels within the associated Conservation Area in accordance with the Adaptive Management Strategy (Appendix E). In such a case, changes in management allocations resulting from a tripped trigger will revert back to the original allocation (MD SSS 22).	Completely Revised - revised by rangewide direction
MD SSS 25: Montana: Follow the NPT Adaptive Management Guidance and Sideboards. When a hard trigger is hit in a BSU, the designated response will be put in place in that BSU. Triggers and responses have been developed with local state and USFWS experts (Appendix E).	Completely Revised - revised by rangewide direction
MD SSS 26: Idaho and Montana: When a hard trigger is hit in a BSU within a PAC that has multiple BSUs, including those that cross state lines, the WAFWA Management Zone Greater Sage-Grouse Conservation Team will convene to determine the causal factor, put project-level responses in place, as appropriate and discuss further appropriate actions to be applied. The team will also investigate the status of the hard triggers in other BSUs within the PAC and will invoke the appropriate plan response.	Completely Revised - revised by rangewide direction

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Anthropogenic Disturbance	
[Plan Maintenance Action in 2018 conducted to acknowledge adoption of the State of Montana Habitat Conservation Program Density Disturbance Calculation Tool, changed Montana BLM Field Offices to a 5% cap. See DOI-BLM-MT-2018-0005-CX.] MD SSS 27: For Idaho and Montana, if the 3 percent anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG PHMA (or IHMA in Idaho) Habitat Management Areas in any given BSU, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the General Mining Law of 1872, as amended, valid existing rights, etc.) will be permitted by BLM within GRSG PHMA and IHMA in any given BSU until the disturbance has been reduced to less than the cap, as measured according to the Disturbance and Adaptive Management Appendix (Appendix E) for the intermediate scale. For Idaho, if the 3 percent disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area (Appendix E) in a PHMA (or IHMA in Idaho), then no further anthropogenic disturbance will be permitted by BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap (subject to applicable laws and regulations, such as the General Mining Law of 1872, as amended, valid existing rights, etc.). For Montana, if the 3 percent disturbance cap is exceeded on lands (regardless of land ownership) or if anthropogenic disturbance and habitat loss associated with conversion to agricultural tillage or fire exceed 5% within a project analysis area in PHMA, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 Mining Law, valid existing rights, etc.) will be permitted by BLM within PHMA in a project analysis area until the disturbance has been reduced to less than the cap. If the BLM determines that the State of Montana has adopted a GRSG Habitat Conservation Program that contains comparable components to those found in the State of Wyoming's Core Area Strategy including an all lands approach for calculating anthropogenic disturbances, a clear methodology for measuring the density of operations, and a fully operational Density Disturbance Calculation Tool, the 3% disturbance cap will be converted to a 5% cap for all sources of habitat alteration within a project analysis area. In both Idaho and Montana, within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location. For Idaho the BSU (Figure 2-2) is defined as the currently mapped nesting and wintering habitat within PHMA and IHMA within a Conservation Area, inclusive of all ownerships. For Montana the BSU is defined as the PHMA in Montana. Anthropogenic disturbance excludes habitat	Completely Revised - revised by rangewide and state specific direction

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
disturbance from wildfire and fuels management activities and includes the following developments (see Appendix E for further details): • Oil and Gas Wells and Development Facilities • Coal Mines • Wind Towers • Solar Fields • Geothermal Development Facilities • Mining (Active Locatable, Non-Energy Leasable and Saleable Developments) • Roads • Railroads • Power lines • Communication Towers • Other Vertical Structures • Coal bed Methane Ponds • Meteorological Towers (e.g., wind energy testing) • Nuclear Energy Facilities • Airport Facilities and Infrastructure • Military Range Facilities and Infrastructure • Hydroelectric Plants • Recreation Areas Facilities and infrastructure For Idaho this disturbance is measured by direct footprint or by ROW width for linear features (power lines, pipelines and roads). For Montana disturbance is measured similar to the Wyoming Disturbance Density Calculation Tool process described in Appendix E.	
Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in the Priority Habitat Management Area within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is co-located into an existing disturbed area.	No change (same as 2015)
MD SSS 28: New anthropogenic disturbances within PHMA or IHMA within a Conservation Area where the disturbance cap is already exceeded from any source or where the proposed development will result in the cap being exceeded will not be allowed in within that Conservation Area until enough habitat has been restored within that Conservation Area to maintain the area under this cap (subject to valid existing rights).	Completely Revised - revised by rangewide and state specific direction
MD SSS 29: New anthropogenic disturbances within PHMA (Idaho only): Anthropogenic Disturbance Screening Criteria. In order to avoid surface-disturbing activities in PHMA, priority will be given to development (including ROWs, fluid minerals and other mineral resources subject to applicable stipulations) outside of PHMA. When authorizing development in PHMA, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. In addition to the PHMA	Completely Revised - revised by rangewide and state specific direction

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
and IHMA Anthropogenic Disturbance Development Criteria (MD SSS 30), the following criteria must all be met in the project screening and assessment process: a. The population trend for the GRSG within the associated Conservation Area is stable or increasing over a three-year period and the population levels are not currently engaging the adaptive management triggers (this applies strictly to new authorizations; renewals and amendments of existing authorizations will not be subject to this criteria when it can be shown that long-term impacts from those renewals or amendments will be substantially the same as the existing development); b. The development with associated mitigation will not result in a net loss of GRSG Key habitat and mitigation will provide a net conservation benefit to the respective PHMA; c. The project and associated impacts will not result in a net loss of GRSG Key habitat or habitat fragmentation or other impacts causing a decline in the population of the species within the relevant Conservation Area (the project will be outside Key habitat in areas not meeting desired habitat conditions or the project will provide a benefit to habitat areas that are functioning in a limited way as habitat); d. The development cannot be reasonably accomplished outside of the PHMA; or can be either: 1) developed pursuant to a valid existing authorization; or 2) is co-located within the footprint of existing infrastructure (proposed actions will not increase the 2011 authorized footprint and associated impacts more than 50 percent, depending on industry practice). e. Development will be implemented adhering to the required design features (RDF) described in Appendix C; f. The project will not exceed the disturbance cap (MD SSS 27) g. The project has been reviewed by the State Implementation Team and recommended for consideration by the Idaho Governor.	
MD SSS 30: The following Anthropogenic Disturbance Development Criteria must be met in the screening and assessment process for proposals in PHMA and IHMA to discourage additional disturbance in PHMA and IHMA (as described in MD LR 2 and MD RE 1; applies to Idaho only): a. Through coordination with the USFWS and State of Idaho (as described in MD CC 1), it is determined that the project cannot be achieved, technically or economically, outside of this management area; and b. The project siting and/or design should best reduce cumulative impacts and/or impacts on GRSG and other high value natural, cultural, or societal resources; this may include co- location within the footprint for existing infrastructure, to the extent practicable; and c. The project results in a net conservation gain to GRSG Key	Completely Revised - revised by rangewide and state specific direction

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
habitat or with beneficial mitigation actions reduces habitat fragmentation or other threats within the Conservation Area; and d. The project design mitigates unavoidable impacts through appropriate compensatory mitigation; and e. Development will be implemented adhering to the RDFs described in Appendix C. f. The project will not exceed the disturbance cap (MD SSS 27). In Montana, the BLM will apply the project/action screen and mitigation process (Appendix J)	
MD SSS 31: Co-locating new infrastructure within existing ROWs and maintaining and upgrading ROWs is preferred over the creation of new ROWs or the construction of new facilities in all management area. Colocation for various activities is defined as: • Communication Sites – The installation of new equipment/facilities on or within or adjacent to existing authorized equipment/facilities or within a communication site boundary as designated in the Communication Site Plan. • Electrical Lines – Installation of new ROWs adjacent to current ROWs boundaries, not necessarily placed on the same power poles. • Other Rights-of-Way – The installation of new ROWs within the existing footprint of an approved ROW boundary or adjacent to an approved ROW boundary. • Designated Corridors – The installation of new rights-of-way within the existing corridor or adjacent to the existing corridor.	Completely Revised – revised by rangewide direction
MD SSS 32: Incorporate RDFs as described in Appendix C in the development of project or proposal implementation, reauthorizations or new authorizations and suppression activities, as conditions of approval (COAs) into any post-lease activities and as best management practices for locatable minerals activities, to the extent allowable by law, unless at least one of the following conditions can be demonstrated and documented in the NEPA analysis associated with the specific project: A specific RDF is not applicable to the site-specific conditions of the project or activity; A proposed design feature or BMP is determined to provide equal or better protection for GRSG or its habitat; or Analysis concludes that following a specific RDF will provide no more protection to GRSG or its habitat than not following it, for the project being proposed.	Completely Revised - revised by state specific direction
MD SSS 33: Conduct implementation and project activities, including construction and short-term anthropogenic disturbances consistent with seasonal habitat restrictions described in Appendix C.	Completely Revised - revised by state specific direction
MD SSS 34: RDFs and seasonal habitat restrictions will not be required for emergency or short-term activities necessary to protect and preserve human life or property.	Completely Revised - revised by state specific direction

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MD SSS 35: In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239) in accordance with Appendix B.	Completely Revised - revised by state specific direction
MD SSS 36: Incorporate appropriate conservation measures for slickspot peppergrass (Lepidium papilliferum) as described in the 2014 Conservation Agreement (as updated, amended or reauthorized) into implementation and project design within slickspot peppergrass habitat in the Jarbidge and Four Rivers Field Offices to avoid and minimize impacts on slickspot peppergrass.	Completely Revised - revised by state specific direction
Monitoring	
MD SSS 37: Once FIAT Assessments are complete, annually complete a review of FIAT Assessment implementation efforts within GRSG habitat with appropriate USFWS and state agency personnel.	Completely Revised - revised by state specific direction
MD SSS 38: Monitor the effectiveness of projects (e.g., fuel breaks. fuels treatments) until objectives have been met or until it is determined that objectives cannot be met, according to the monitoring schedule identified for project implementation.	No change (same as 2015)
MD SSS 39: Monitor invasive vegetation post vegetation management treatment.	No change (same as 2015)
MD SSS 40: Monitor project construction areas for noxious weed and invasive species for at least 3 years, unless control is achieved earlier.	No change (same as 2015)
MD SSS 41: Use lek, nesting and winter habitat maps and key habitat map (updates) to annually assess GRSG population and habitat status in the context of the adaptive management triggers.	Completely Revised - revised by rangewide direction
MD SSS 42: Continue to support updates to the Key Habitat map to track vegetation changes in relation to GRSG habitat on a yearly basis, until such a time this process is replaced. The process used to update the Key Habitat Map is described in Appendix F of the FEIS.	Completely Revised - revised by state specific direction
MD SSS 43: Monitor GRSG habitat as described in the monitoring framework plan (Appendix D) in coordination with IDFG and Montana FWP.	Partially Revised – Updated monitoring framework as part of rangewide direction and clarify coordination aspect (covered in monitoring framework already)
Vegetation (VEG)	
Objective VEG 1: Reconnect and expand areas of higher native plant community integrity/rangeland health to increase the extent of high quality habitat and, where possible, to accommodate the future effects of climate change.	No change (same as 2015)
Objective VEG 2: Increase the amount and functionality of seasonal habitats by: a. Increasing or enhancing canopy cover and average patch size of sagebrush. b. Increasing the amount, condition and connectivity of seasonal habitats. c. Protecting or improving GRSG migration/movement corridors. d. Reducing conifer encroachment within GRSG seasonal habitats.	Partially Revised: Remove IHMA and decadal treatment table/language.

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e. Improving understory (grass, forb) and/or riparian condition within breeding and late brood- rearing habitats. f. Reducing the extent of annual grasslands within and adjacent to PHMA and IHMA. Decadal treatment objectives by population area are identified in Table 2-3, Estimated Acres of Treatment Needed within a 10-Year Period to Achieve Vegetation Objectives on BLM-Administered Lands1.	
Objective VEG 3: In all SFA and PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush canopy cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).	Partially Revised: Clarified with state specific direction, and Objective SSS 1 should be consistent with this one
Sagebrush Steppe	
MD VEG 1: Implement habitat rehabilitation or restoration projects in areas that have potential to improve GRSG habitat using a full array of treatment activities as appropriate, including chemical, mechanical and seeding treatments.	No change (same as 2015)
MD VEG 2: Implement vegetation rehabilitation or manipulation projects to enhance sagebrush cover or to promote diverse and healthy grass and forb understory to achieve the greatest improvement in GRSG habitat based on FIAT Assessments, HAF assessments, other vegetative assessment data and local, site specific factors that indicate sagebrush canopy cover or herbaceous conditions do not meet habitat management objectives (i.e. is minimal or exceeds optimal characteristics). This may necessitate the use of prescribed fire as a site preparation technique to remove annual grass residual growth prior to the use of herbicides in the restoration of certain lower elevation sites (e.g., Wyoming big sagebrush) but such efforts will be carefully planned and coordinated to minimize impacts on GRSG seasonal habitats.	Completely Revised - revised by state specific direction
MD VEG 3: Require use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success (Richards et al. 1998). Non-native seeds may be used as long as they support GRSG habitat objectives (Pyke 2011) to increase probability of success, when adapted seed availability is low or to compete with invasive species especially on harsher sites.	No change (same as 2015)
MD VEG 4: Implement management changes in restoration and rehabilitation areas, as necessary, to maintain suitable GRSG habitat, improve unsuitable GRSG habitat and to ensure long-term persistence of improved GRSG habitat (Eiswerth and Shonkwiler 2006). Management changes can be considered during livestock grazing permit renewals, travel management planning, and renewal or reauthorization of ROWs.	Completely Revised – revised by rangewide direction
MD VEG 5: Consider establishing seed harvest areas that are managed for seed production (Armstrong 2007) to provide a reliable source of locally adapted seed to use during rehabilitation and restoration activities.	No change (same as 2015)

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD VEG 6: Allocate use of native seed to GRSG or ESA listed species habitat in years when preferred native seed is in short supply. This may require reallocation of native seed from ESR projects outside of PHMA or IHMA to those inside it. Where probability of success or native seed availability is low, nonnative seeds may be used as long as they meet GRSG habitat conservation objectives (Pyke 2011). Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, shall be the highest priority for rehabilitation efforts.	Partially Revised: No IHMA for Dillon
MD VEG 7: During land health assessments, evaluate the relative value of existing nonnative seeding within GRSG habitat as: 1) a component of a grazing system allowing improvement of adjacent native vegetation, 2) development of a forage reserve, 3) incorporation into a fuel break system (Davies et al. 2011) or 4) restoration/diversification for GRSG habitat improvement. Where appropriate and feasible, diversify seedings, or restore to native vegetation when potential benefits to GRSG habitat outweigh the other potential uses of the non-native seeding, with emphasis on PHMA and IHMA. Allow recolonization of seedings by sagebrush and other native vegetation.	Partially Revised - revised by state specific direction to clarify and remove IHMA reference
Conifer Encroachment	
MD VEG 8: Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and tools like the FIAT report (Chambers et. al., 2014) will help refine the location for specific areas to be treated.	Partially Revised - revised by state specific direction to clarify and remove FIAT reference
Invasive Species	
MD VEG 9: Incorporate results of the FIAT Assessments into projects and activities addressing invasive species as appropriate.	Completely Revised - revised by state specific direction
MD VEG 10: Implement noxious weed and invasive species control using integrated vegetation management actions per national guidance and local weed management plans for Cooperative Weed Management Areas in cooperation with State and Federal agencies, affected counties, and adjoining private lands owners.	No change (same as 2015)
MD VEG 11: Conduct integrated weed management actions for noxious and invasive weed populations that are impacting or threatening GRSG habitat quality using a variety of eradication and control techniques including chemical, mechanical and other appropriate means.	No change (same as 2015)
MD VEG 12: Require project proponent (projects described in MD SSS 27 and which are included in the anthropogenic disturbance cap evaluation) to ensure that noxious weeds and invasive species caused as a result of the project are treated to eliminate establishment on the disturbed project construction areas for at least 3 years and monitored and treated during the life of the project.	Partially Revised - revised by rangewide, needs updating with new disturbance language or connection to Monitoring Framework (surface disturbing activities)
MD VEG 13: Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species.	No change (same as 2015)
Fire and Fuels Management (FIRE)	
Objective FIRE 1: Design fuel treatments to restore, enhance, or maintain GRSG habitat.	No change (same as 2015)

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Objective FIRE 2: Manage wildfires to minimize loss of sagebrush and protect GRSG habitat.	No change (same as 2015
Pre-Suppression	
MD FIRE 1: (Wildfire Preparedness): Support development and implementation of Rangeland Fire Protection Associations (RFPAs) in coordination with the State of Idaho.	No change (same as 2015)
MD FIRE 2: Develop a consistent approach to fire restrictions within GRSG habitat through the existing coordinated inter-agency approach to fire restrictions based upon National Fire Danger Rating System thresholds (fuel conditions, drought conditions, and predicted weather patterns).	No change (same as 2015)
MD FIRE 3: Annually incorporate into existing fire management plans results and updates from the Wildfire and Invasive Species Habitat Assessments (FIAT Assessments) described in Appendix H, to communicate/explain the resource value of GRSG habitat, including fire prevention messages and actions to reduce human-caused ignitions.	Completely Revised - revised by state specific directio
MD FIRE 4: Continue to participate with the Wildland Fire Leadership Council, a cooperative, interagency organization dedicated to achieving consistent implementation of the goals, actions, and policies in the National Fire Plan and the Federal Wildland Fire Management Policy.	No change (same as 2015)
MD FIRE 5: Continue annual coordination meetings held between cooperating agencies that have fire suppression responsibilities. Incorporate Rangeland Fire Protection Associations and other stakeholders into this coordination. Discuss priority suppression areas and distribute maps showing priority suppression areas at both the Conservation Area and the local office levels as based on the adaptive management strategy and FIAT Assessments.	Completely Revised - revised by state specific direction
MD FIRE 6: Ensure firefighter personnel receive annual orientation regarding GRSG habitat and sagebrush management issues as related to wildfire suppression.	No change (same as 2015)
MD FIRE 7: As part of the FIAT Assessments, identify roads, trails, and recreational use areas with high frequency of human caused fires within or adjacent to the PHMA or IHMA. Consider these areas during annual fire restriction evaluations, and as appropriate, through site specific management.	Completely Revised - revised by state specific direction
MD FIRE 8: Coordinate with Federal, State and local jurisdictions on fire and litter prevention programs to reduce human caused ignitions.	No change (same as 2015)
MD FIRE 9: Implement activities identified within the FIAT Assessments. Suppression	Completely Revised - revised by state specific direction
MD FIRE 10: Complete Wildland Fire and Invasive Species Assessments (FIAT Assessments) as described within Appendix H and incorporate results into appropriate Fire Management Plans as they are completed. FIAT Assessments are interdisciplinary evaluations of the threats posed by wildfire and invasive species, as well as identification of focal and emphasis habitats/treatment opportunities for fuels management, fire management, and restoration. These FIAT Assessments identify focal and emphasis habitats and describe strategies for fuels management, suppression and restoration activities. Focal and Emphasis Habitats identified through the FIAT Assessment to further refine priority areas	Completely Revised - revised by state specific direction

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for treatments to reduce the threats posed by wildfire, invasive annual grass and conifer expansion.	
MD FIRE 11: As part of the FIAT Assessments incorporate a wildfire response time analysis focusing on response time to identified priority areas within PHMA and IHMA or on those fires that have the potential to impact PHMA and IHMA. Incorporate findings into Unit Initial Attack program that determines initial attack resources.	Completely Revised - revised by state specific direction
MD FIRE 12: As part of the FIAT Assessment incorporate a water capacity analysis for suppression purposes, including potential private water sources. Utilized the analysis to ensure water availability for response to fire in or threatening PHMA and IHMA during initial attack.	Completely Revised - revised by state specific direction
MD FIRE 13: During high fire danger conditions, stage initial attack and secure additional resources closer to priority areas identified in the FIAT Assessments, based on anticipated fires and weather conditions, with particular consideration of the West Owyhee, Southern and Desert Conservation Areas to ensure quicker response times in or near GRSG habitat after considerations and placement of resources to protect human life and property.	Completely Revised - revised by state specific direction
MD FIRE 14: Utilize a full range of fire management strategies and tactics through strategic wildfire suppression planning consistent with appropriate management response and within acceptable risk levels, to achieve resource objectives for GRSG habitat consistent with land use plan direction. Utilizing both direct and indirect attack as appropriate to limit the overall amount of GRSG habitat burned. This can include suppressing fires in intact sagebrush habitats; limiting fire growth in GHMA when suppression resources are available or managing wildfire for resource benefit in areas of conifer (juniper) encroachment.	No change (same as 2015)
MD FIRE 15: Suppression priorities: The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. Maintaining GRSG habitat will be the highest natural resources priority immediately after human life and property, commensurate with threatened and endangered species habitat or other critical habitats to be protected.	No change (same as 2015)
MD FIRE 16: Ensure close coordination with federal and state firefighters including the Rangeland Fire Protection Associations during suppression activities.	No change (same as 2015)
Fuels Management	
MD FIRE 17: Design and implement fuels treatments that will reduce the potential start and spread of unwanted wildfires and provide anchor points or control lines for the containment of wildfires during suppression activities with an emphasis on maintaining, protecting, and expanding sagebrush ecosystems and successfully rehabilitated areas and strategically and effectively reduce wildfire threats in the greatest area.	No change (same as 2015)
MD FIRE 18: Enhance (or maintain/retain) sagebrush canopy cover and community structure to match expected potential for the ecological site and consistent with GRSG habitat objectives unless fuels management objectives requires additional reduction in sagebrush cover	No change (same as 2015)

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to meet strategic protection of GRSG habitat. Closely evaluate the benefits of the fuel management treatments against the additional loss of sagebrush cover on the local landscape in the NEPA process.	
MD FIRE 19: Apply appropriate seasonal restrictions for implementing vegetation and fuels management treatments according to the type of seasonal habitats present. Allow no treatments in known winter range unless the treatments are designed to strategically reduce wildfire risk around and/or in the winter range and will protect, maintain, increase, or enhance winter range habitat quality. Ensure chemical applications are utilized where they will assist in success of fuels treatments. Strategically place treatments on a landscape scale to prevent fire from spreading into PHMA or WUI.	No change (same as 2015)
MD FIRE 20: Develop a fuels continuity and management strategy to expand, enhance, maintain and protect GRSG habitat informed by the FIAT Assessments completed as described in Appendix H.	Completely Revised - revised by state specific directio
MD FIRE 21: When developing the fuels management strategy as part of the FIAT Assessment described in Appendix H consider up-to-date fuels profiles; land use plan direction; current and potential habitat fragmentation; sagebrush and GRSG ecological factors; active vegetation management steps to provide critical breaks in fuel continuity where appropriate; incorporate a comparative risk analysis with regard to the risk of increased habitat fragmentation from a proposed action versus the risk of large scale fragmentation posed by wildfires if the action is not taken.	Completely Revised - revised by state specific direction
MD FIRE 22: Fuel treatments will be designed through an interdisciplinary process to expand, enhance, maintain, and protect GRSG habitat which considers a full range of cost effective fuel reduction techniques, including: chemical, biological (including grazing and targeted grazing), mechanical and prescribed fire treatments.	No change (same as 2015)
MD FIRE 23: Existing and proposed linear ROWs can be considered for use and maintenance as vegetated fuel breaks in appropriate areas (this activity may or may not be part of the ROW permit or the responsibility of the permit holder, in cases where this activity is considered part of mitigation for project design then it will be appropriately included as part of the ROW permit and the responsibility of the permit holder for development and maintenance).	No change (same as 2015)
MD FIRE 24: Fuel breaks will incorporate existing vegetation treatments (seedings), rocky areas or other appropriate topography or features or be located adjacent to existing linear disturbance areas where appropriate. Fuel breaks should be placed in areas with the greatest likelihood of compartmentalizing a fire and/or to foster suppression options to protect existing intact habitat.	No change (same as 2015)
MD FIRE 25: Strategically pre-treat areas to reduce fine fuels consistent with areas and results identified within the Wildfire and Invasive Species Assessments.	Completely Revised - revised by state specific direction
MD FIRE 26: Protect vegetation restoration and rehabilitation efforts/projects from subsequent fire events.	No change (same as 2015)

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MD FIRE 27: Targeted grazing as a fuels treatment to adjust the vegetation conditions to reduce the potential start and spread of wildfires may be implemented within existing grazing authorizations if feasible such as through temporary non-renewable authorizations, or through contracts, agreements or other appropriate means separate from existing grazing authorizations and permits.	No change (same as 2015)
MD FIRE 28: Targeted grazing to achieve fuels management objectives should conform to the following criteria: a. Targeted grazing should be implemented strategically on the landscape, and directly involve the minimum footprint and grazing intensity required to meet fuels management objectives. b. Conform to the applicable Standards for Rangeland Health and Guidelines for Livestock Grazing Management (Idaho or Montana) at the assessment scale (pasture/watershed). Where feasible and applicable coordinate with the grazing permittee to strategically reduce fuels through livestock management within the Mandatory Terms and Conditions of the applicable grazing authorizations	No change (same as 2015)
MD FIRE 29: Prioritize the use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low or non-economical, nonnative seeds may be used to meet GRSG habitat objectives to trend toward restoring the fire regime. When reseeding, use fire resistant native and nonnative species, as appropriate, to provide for fuel breaks.	No change (same as 2015)
MD FIRE 30: Maintain effectiveness of fuels projects, including fuel breaks, to ensure long-term success, including persistence of seeded species and/or other treatment components while maintaining the integrity of adjacent vegetation.	No change (same as 2015)
MD FIRE 31: If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address: • why alternative techniques were not selected as a viable options; • how GRSG goals and objectives will be met by its use; • how the COT Report objectives will be addressed and met; • a risk assessment to address how potential threats to GRSG habitat will be minimized. Allow prescribed fire as a vegetation or fuels treatment in Wyoming big sagebrush sites or other xeric sagebrush species sites, or in areas with a potential for post-fire exotic annual dominance only after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect Greater Sage-Grouse habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).	Partially Revised - revised by state specific direction to clarify

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Allow prescribed fire in known sage-grouse winter range only after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.	
Post Fire Management	
MD FIRE 32: Utilize the findings and Restoration/Rehabilitation Strategy developed as part of the FIAT Assessment process described in Appendix H to determine if GRSG rehabilitation actions are needed, based on ecological potential, and direct emergency stabilization and rehabilitation (ESR) (BLM) actions after fire.	Completely Revised - revised by state specific direction
MD FIRE 33: Incorporate GRSG Habitat Management Objectives into ESR/BAER plans based on site potential and in accordance with the Restoration/Rehabilitation Strategy developed as a result of the FIAT Assessments.	Completely Revised - revised by state specific direction
MD FIRE 34: Provide adequate rest from livestock grazing to allow natural recovery of existing vegetation and successful establishment of seeded species within burned/ESR areas. All new seedings of grasses and forbs should not be grazed until at least the end of the second growing season, and longer as needed to allow plants to mature and develop robust root systems which will stabilize the site, compete effectively against cheatgrass and other invasive annuals, and remain sustainable under long-term grazing management. Adjust other management activities, as appropriate, to meet ESR objectives.	No change (same as 2015)
MD FIRE 35: Adjust, as appropriate, livestock management on adjacent unburned areas to mitigate the effect of the burn on local GRSG populations.	No change (same as 2015)
MD FIRE 36: Following seedling establishment, modify grazing management practices if needed to achieve long-term vegetation and habitat objectives.	No change (same as 2015)
Livestock Grazing (LG)	
MD LG 1: Maintain existing areas designated as available or unavailable for livestock grazing. Existing active AUMs for livestock grazing within the planning area will not be changed at the broad scale, though the number of AUMs available on an allotment may be adjusted based on site-specific conditions to meet management objectives during term permit renewals, AMP development, or other appropriate implementation planning. Additionally, temporary adjustments can be made annually to livestock numbers, the number of AUMs, and season of use in accordance with applicable regulations.	Completely Revised - revised by rangewide direction
MD LG 2: Prioritize BLM land health assessments and processing of BLM grazing permits consistent with management area prioritization (MD SSS 4), unless other higher priority considerations exist (MD LG 15) or other factors such as threatened, endangered and proposed species habitat that livestock grazing can affect. Where possible, conduct land health assessments at the watershed, or other meaningful landscape-scale.	Completely Revised - revised by rangewide direction

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MD LG 3: Where opportunities exist, coordinate with other land managers to encourage livestock operations that utilize mixed federal, private and/or state land to be managed at the landscape scale to benefit GRSG and their habitat across land ownerships.	Completely Revised - revised by rangewide direction
MD LG 4: PHMA & IHMA: During the land health assessment process, identify the type(s) of seasonal habitat the assessed areas are capable of supporting. Utilize the habitat assessment framework, (Stiver et al. 2015) or other BLM approved methodology, in accordance with current policy and guidance to determine whether vegetation structure, condition and composition are meeting GRSG habitat objectives including riparian and lentic areas (Objective SSS 2; Table 2-2). Use appropriate Ecological Site Descriptions, reference sheets and state and transition models to inform desired habitat conditions and expected responses to management changes for the land unit being assessed.	Completely Revised - revised by rangewide direction
MD LG 5: When modifying grazing management, analyze indirect impacts on habitat, including changes in fuel loading and wildfire behavior.	Completely Revised - revised by rangewide direction
MD LG 6: When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperation and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications include, but are not limited to, changes in: • Season or timing of use; • Numbers of livestock; • Distribution of livestock use; • Duration and/or level of use; • Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); and • Grazing schedules (including rest or deferment). *Not in Priority Order	Completely Revised - revised by rangewide direction
MD LG 7: Where opportunities exist, establish forage reserves to facilitate restoration and rehabilitation efforts in GRSG habitat areas. A forage reserve is an area that is set aside for use as needed by various permittees who might be displaced by wildfire, ESR, restoration efforts, etc. rather than having a term permit issued for grazing like a regular allotment.	Completely Revised - revised by rangewide direction
MD LG 8: PHMA & IHMA - Where practical, design pasture rotations to utilize non-native perennial grass seedings and/or annual grasslands, during GRSG nesting season annually or periodically.	Completely Revised - revised by rangewide direction
MD LG 9: Evaluate the locations where salt/supplements are placed, coordinate salt/supplements placement to reduce impacts on GRSG habitat (e.g., existing disturbed areas).	Completely Revised - revised by rangewide direction
MD LG 10: Incorporate RDFs into Terms and Conditions for crossing permits to limit disturbance of occupied leks when trailing livestock across BLM administered lands in the spring. Work with permittees in locating over-nighting, watering and bedding locations to minimize impacts on seasonal habitats.	Completely Revised - revised by rangewide direction

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MD LG 11: Design any new structural range improvements, following appropriate cooperation, consultation and coordination, to minimize and/or mitigate impacts on GRSG habitat. Any new structural range improvements should be placed along existing disturbance corridors or in unsuitable habitat, to the extent practical, and are subject to RDFs (Appendix C). Structural range improvement in this context, include, but are not limited to: fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments.	Completely Revised - revised by rangewide direction
MD LG 12: During the land health assessment and grazing permit renewal process, evaluate existing livestock management range improvements with respect to their effect on GRSG habitat. Consider removal of projects that are not needed for effective livestock management, are no longer in working condition, and/or negatively affect GRSG habitat, with the exception of functional projects needed for management of habitat for other threatened, endangered or proposed species or other sensitive resources.	Completely Revised - revised by rangewide direction
MD LG 13: Prioritize removal, modification or marking of fences or other structures in areas of high collision risk following appropriate cooperation, consultation and coordination to reduce the incidence of GRSG mortality due to fence strikes (Stevens et al. 2012).	Completely Revised - revised by rangewide direction
MD LG 14: In response to weather conditions (i.e. drought) adjust grazing management (i.e., delay turnout, adjust pasture rotations, adjust the amount and/or duration of grazing) as appropriate to provide for adequate food and cover for GRSG.	Completely Revised - revised by rangewide direction
MD LG 15: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in Sagebrush Focal Areas (SFA) followed by PHMA outside of the SFA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFA followed by areas of PHMA outside SFA. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.	Completely Revised - revised by rangewide direction
MD LG 16: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMA will include specific management thresholds, based on GRSG Habitat Objectives Table, Land Health Standards (43 CFR 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.	Completely Revised - revised by rangewide direction

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MD LG 17: Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks can include monitoring for actual use, utilization, and use supervision. Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFA followed by areas of PHMA outside SFA.	Completely Revised - revised by rangewide direction
MD LG 18: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3.	Completely Revised - revised by rangewide direction
Wild Horses and Burros (WHB)	
WHB-1: Manage herd management areas (HMAs) in GRSG habitat within established AML ranges to achieve and maintain GRSG habitat objectives (Table 2-2).	Completely revised: Removed with state specific circumstances (not applicable to Dillon).
WHB-2: Complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g. range, wildlife, and riparian). The priorities for conducting assessments are: 1) HMAs Containing SFA; 2) HMAs containing PHMA; 3) HMAs containing IHMA; 4) HMAs containing GHMA; 5) HMAs containing sagebrush habitat outside of PHMA, IHMA, and GHMA mapped habitat; 6) HMAs without GRSG Habitat.	Completely revised: Removed with state specific circumstances (not applicable to Dillon).
WHB-3: Prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts. Place higher priority on Herd Areas not allocated as HMAs and occupied by wild horses and burros in SFA followed by PHMA.	Completely revised: Removed with state specific circumstances (not applicable to Dillon).
WHB-4: In SFA and PHMA outside of SFA, assess and adjust AMLs through the NEPA process within HMAs when wild horses or burros are identified as a significant causal factor in not meeting land health standards, even if current AML is not being exceeded.	Completely revised: Removed with state specific circumstances (not applicable to Dillon).
WHB-5: In SFA and PHMA outside of SFA, monitor the effects of wild horse and burro use in relation to GRSG seasonal habitat objectives on an annual basis to help determine future management actions.	Completely revised: Removed with state specific circumstances (not applicable to Dillon).
WHB-6: Develop or amend herd management area plans (HMAPs) to incorporate GRSG habitat objectives and management considerations for all HMAs within GRSG habitat, with emphasis placed on SFA and other PHMA.	Completely revised: Removed with state specific circumstances (not applicable to Dillon).
WHB-7: Consider removals or exclusion of wild horse and burros during or immediately following emergency situations (such as fire, floods, and drought) to facilitate meeting GRSG habitat objectives where HMAs overlap with GRSG habitat.	Completely revised: Removed with state specific circumstances (not applicable to Dillon).

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
WHB-8: When conducting NEPA analysis for wild horse and burro management activities, water developments, or other rangeland improvements for wild horses, address the direct and indirect impacts on GRSG populations and habitat. Implement any water developments or rangeland improvements using the criteria identified for domestic livestock.	Completely revised: Removed with state specific circumstances (not applicable to Dillon).
WHB-9: Coordinate with professionals from other federal and state agencies, researchers at universities, and others to utilize and evaluate new management tools (e.g., population growth suppression, inventory techniques, and telemetry) for implementing the wild horse and burro program.	Completely revised: Removed with state specific circumstances (not applicable to Dillon).
Mineral Resources (MR)	
Fluid Minerals	
Objective MR 1: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA, IHMA, and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA, IHMA, and GHMA, and subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 USC 226(p) and 43 CFR 3162.3-1(h).	Completely Revised - revised by rangewide direction
Objective MR 2: Where a proposed fluid mineral development project on an existing lease can adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, minimize and apply compensatory mitigation to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD or Geothermal Drilling Permit (GDP) for the lease to avoid, minimize, and apply compensatory mitigation to impacts on GRSG or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such Federal leases.	Completely Revised - revised by rangewide direction
MD MR 1: Idaho and Montana: Areas within SFA will be open to fluid mineral leasing and development and geophysical exploration subject to NSO without waiver, exception, or modification. Areas within PHMA (outside SFA) and IHMA will be open to mineral leasing and development and geophysical exploration subject to NSO with a limited exception (MD MR 3). GHMA will be open to mineral leasing and development and geophysical exploration subject to CSU which includes buffers and standard stipulations.	Completely Revised - revised by rangewide and state specific direction
MD MR 2: In Idaho, parcels nominated for lease in PHMA or IHMA will be evaluated prior to lease offering to determine if development is feasible. In GHMA, parcels will not be offered for lease if buffers and restrictions (including RDFs) preclude development in the leasing area.	Completely Revised - revised by rangewide and state specific direction

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD MR 3: PHMA and IHMA: No waivers or modifications to a fluid mineral lease NSO stipulation will be granted. The Authorized Officer may grant an exception to a fluid mineral lease NSO stipulation only where the proposed action: Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or, Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and will provide a clear conservation gain to GRSG. Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP amendment. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publically available at least quarterly.	Completely Revised - revised by rangewide and state specific direction
MD MR 4: Incorporate required design features and best management practices appropriate to the management area as COAs when post leasing activity is proposed into any post-lease authorizations.	Completely Revised - revised by rangewide and state specific direction
MD MR 5: In Montana, prior to leasing conduct a Master Leasing Plan process when all four of the following criteria are met: A substantial portion of the area to be analyzed in the MLP is not currently leased. There is a majority Federal mineral interest. The oil and gas industry has expressed a specific interest in leasing, and there is a moderate or high potential for oil and gas confirmed by the discovery of oil and gas in the general area. Additional analysis or information is needed to address likely resource or cumulative impacts if oil and gas development were to occur where there are: multiple-use or natural/cultural resource conflicts; impacts on air quality; impacts on the resources or values of any unit of the National Park System, national wildlife refuge, or National Forest wilderness area, as determined after consultation or coordination with the NPS, the USFWS, or the Forest Service; or	Completely Revised - revised by rangewide and state specific direction for consistency

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
impacts on other specially designated areas. – analyzing likely development scenarios and varying mitigation levels.	
MD MR 6: In Idaho, complete a Master Development Plan, consistent with plan development guide on leases where a producing field is proposed to be developed.	Completely Revised - revised by rangewide and state specific direction
MD MR 7: Encourage unitization when deemed necessary for proper development and operation of an area (with strong oversight and monitoring). The unitization must be designed in a manner to minimize adverse impacts on GRSG according to the Federal Lease Form, 3100-11, Sections 4 and 6.	No change (same as 2015)
MD MR 8: Issue Written Orders of the Authorized Officer (43 CFR 3161.2) requiring reasonable protective measures consistent with the lease terms where necessary to avoid or minimize impacts on GRSG populations or habitat.	No change (same as 2015)
Locatable Minerals	
MD MR 9: Apply reasonable and appropriate RDFs to locatable minerals, to the extent consistent with applicable law to prevent unnecessary or undue degradation of GRSG habitat when a Plan of Operations is submitted for BLM approval, in accordance with 43 CFR 3809.411(d)(2).	No change (same as 2015)
MD MR 10: Recommend SFA for withdrawal from the General Mining Act of 1872, as amended, subject to valid existing rights.	Completely Revised - revised by rangewide direction
Salable Minerals	
MD MR 11: PHMA: All PHMA will be closed to mineral materials development. However, existing free use permits and the expansion of existing free use permits may be considered only if the following criteria are met: • the project area disturbance cap is not exceeded within a BSU; • the activity is subject to the provisions set forth in the mitigation framework [Appendix F]; • all applicable required design features are applied; and the activity is permissible under the Idaho exception and development criteria (MD SSS 29 and MD SSS 30) IHMA: All IHMA will be open to mineral materials development, consistent with the Idaho Anthropogenic Disturbance Criteria (MD SSS 30), and subject to RDFs, and buffers. Sales from existing community pits within IHMA will be subject to seasonal timing restrictions (Appendix C).	Completely Revised - revised by state specific direction
GHMA: All GHMA will be open to mineral materials development, subject to RDFs and buffers. Sales from existing community pits within GHMA will be subject to seasonal timing restrictions (Appendix C).	Completely Revised - revised by state specific direction
MD MR 12: Restore salable mineral pits no longer in use to meet GRSG habitat management objectives.	No change (same as 2015)
MD MR 13: Require reclamation bonding that will require restoration of GRSG habitat on new site authorizations for mineral material pits in IHMA (this will not apply to free use permits issued to a government entity such as a county road district, but will apply to non-profit entities).	Completely Revised - revised by state specific direction

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD MR 14: Montana: PHMA are closed to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met: • the activity is within the BSU and project area disturbance cap; • the activity is subject to the provisions set forth in the mitigation framework [Appendix F]; • all applicable required design features are applied; and • the activity is permissible under the Montana screening criteria (MD SSS 30) Appendix J.	Completely Revised - revised by state specific direction
Nonenergy Leasable Minerals	
MD MR 15: PHMA are closed to leasing. IHMA and GHMA: Areas within Known Phosphate Leasing Areas (KPLAs) will remain open to leasing subject to standard stipulations. IHMA areas outside of KPLAs are open to prospecting and subsequent leasing provided the Anthropogenic Disturbance Development Criteria (MD SSS 30) and the anthropogenic disturbance cap (MD SSS 27) can be met. RDFs and buffers shall be applied to prospecting permits. GHMA: Lands outside KPLAs are available for prospecting and subsequent leasing and initial mine development subject to RDFs, buffers, and standard stipulations.	Completely Revised - revised by rangewide and state specific direction
MD MR 16: Require seasonal and daily timing restrictions (Appendix C) in undeveloped nonenergy mineral leases when exploration activities or initial mine development is proposed (e.g. exploration drilling, timber removal, shrub clearing, etc.) as COAs.	Completely Revised - revised by rangewide and state specific direction
MD MR 17: Include RDFs as COAs to mine plans in undeveloped non-energy mineral leases for exploration activities or initial mine development.	Completely Revised - revised by rangewide and state specific direction
Coal (Montana)	
MD MR 18: At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1).	Completely Revised - revised by rangewide direction
Mineral Split Estate	
MD MR 19: BLM Owns Mineral Estate – non-federal surface owner: Where the federal government owns the mineral estate in PHMA, IHMA, and GHMA, and the surface is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.	Partially Revised: Remove IHMA, see State Specific Table
MD MR 20: BLM owns surface – non-federal mineral estate owner: Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMA, IHMA, and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.	Partially Revised: Remove IHMA, see State Specific Table

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Renewable Energy (Wind and Solar) (RE)	
MD RE 1: PHMA: Designate and manage PHMA as exclusion areas for utility scale (20 MW) wind and solar testing and development, nuclear and hydropower energy development. IHMA: Designate and manage IHMA as avoidance areas for wind and solar testing and development, nuclear and hydropower development. GHMA (Idaho): Designate and manage GHMA as open for wind and solar testing and development and nuclear and hydropower development subject to RDFs and buffers. GHMA (Montana): Designate and manage GHMA as avoidance for wind and solar testing and development and nuclear and hydropower development.	Completely Revised - revised by rangewide and state specific direction
Lands and Realty (LR)	
Objectives LR 1: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available.	No change (same as 2015)
Utility Corridors and Communication Sites	
MD LR 1: Existing designated corridors, including Section 368 Corridors, will remain Open in all habitat management areas (subject to the ongoing settlement agreement).	Completely Revised – revised by rangewide direction
Also see MD LR 10 and MD SSS 31	Completely Revised – revised by rangewide direction
Land Use Authorizations	
MD LR 2: PHMA: Designate and manage PHMA as ROW avoidance areas, consistent with MD SSS 29 and subject to RDFs and buffers (Appendices B and C). IHMA: Designate and manage IHMA as ROW avoidance areas, consistent with MD SSS 30 and subject to RDFs and buffers. GHMA (Idaho and Montana): Designate and manage GHMA as open with proposals subject to RDFs and buffers.	Completely Revised - revised by rangewide and state specific direction
MD LR 3: PHMA: Development of commercial service airports and facilities (as defined by FAA 2014 – publically owned airports that have at least 2,500 passenger boardings each calendar year and receive scheduled passenger service) will not be allowed within PHMA. IHMA and GHMA are Avoidance and Open respectively for these types of ROW applications as described in MD LR 2.	Completely Revised - revised by rangewide and state specific direction
MD LR 4: PHMA: Development of new or expansion of existing landfills will not be allowed within PHMA. IHMA and GHMA are Avoidance and Open respectively for these types of ROW applications as described in MD LR 2.	Completely Revised - revised by rangewide and state specific direction
MD LR 5: Consistent with MD LR 3, MD LR 4, and MD RE 1, Rights-of-way for development of new or amended ROWs and land use authorizations (including permits and leases) in PHMA will only be considered when consistent with the Anthropogenic Disturbance Screening Criteria (MD SSS 29); Rights-of-way for development of new or amended ROWs and land use authorizations (including permits and leases) in IHMA can be considered consistent with the IHMA Anthropogenic Disturbance Development Criteria (MD SSS 30). GHMA: New ROW and land use authorizations can be considered.	Completely Revised - revised by rangewide and state specific direction

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD LR 6: In PHMA, if a higher voltage transmission line is required adjacent to an existing line (i.e. the project is an incremental upgrade/capacity increase of existing development (i.e. power line capacity upgrade): • the existing transmission line must be removed and area rehabilitated within a specified amount of time after the new line is installed and energized; and • the new line must be constructed in the same alignment as the existing line unless an alternate route will benefit GRSG or GRSG habitat.	Completely Revised – revised by rangewide direction
MD LR 7: Process unauthorized use. If the unauthorized use is subsequently authorized, it will be authorized consistent with direction from this plan including RDFs and buffers. If the use is not subsequently authorized the site will be reclaimed by removing these unauthorized (trespass) features and rehabilitating the habitat.	No change (same as 2015)
MD LR 8: Land use authorizations that are temporary (less than 3 years) in nature and are not otherwise excluded or restricted will be subject to seasonal or timing restrictions (Appendix C) and mitigation requirements regarding habitat loss as needed.	Completely Revised – revised by rangewide direction
MD LR 9: New ROW applications for water facilities (ditches, canals, pipelines), or amendments to existing water facilities which include additional structures to improve fish passage or benefits to fisheries (new diversions, fish screens) will be allowed on a case-by-case basis subject to RDFs to reduce impacts on GRSG habitat and mitigation requirements regarding GRSG habitat loss as needed.	Completely Revised – revised by rangewide direction
MD LR 10: When a ROW grant expires and is not requested to be renewed, is relinquished, or terminated, the lease holder will be required to reclaim the site by removing overhead lines and other infrastructure and to eliminate avian predator nesting opportunities provided by anthropogenic development on public lands associated with the now void ROW grant (e.g., remove power line and communication facilities no longer in service).	No change (same as 2015)
MD LR 11: As opportunities and priorities indicate work with existing ROW holders to retrofit existing towers and structures consistent with RDFs described in Appendix C.	No change (same as 2015)
MD LR 12: PHMA (Idaho and Montana) and IHMA (Idaho), and GHMA (Montana only) are designated as avoidance areas for high voltage transmission line and large pipeline ROWs, except for Gateway West and Boardman to Hemingway Transmission Projects. All authorizations in these areas, other than the following identified projects, must comply with the conservation measures outlined in this proposed plan, including the RDFs and avoidance criteria presented in MD SSS 29 and MD SSS 30 of this document. The BLM is currently processing an application for Gateway West and Boardman to Hemingway Transmission Projects and the NEPA review for this project is well underway. Conservation measures for GRSG are being analyzed through the project's NEPA review process, which should achieve a net conservation benefit for the GRSG.	Completely Revised – revised by rangewide direction

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD LR 13: Consider the likelihood of development of not-yet-constructed surface disturbing activities – as defined in Table 2 of the Monitoring Framework (Appendix D) – under valid existing rights.	Partially Revised – Updated monitoring framework as part of rangewide direction
Land Tenure	
MD LR 14: Lands classified as PHMA, IHMA, and GHMA for GRSG will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the GRSG or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the GRSG. Land tenure adjustments will be subject to the following disposal, exchange, and acquisition criteria, which include retaining lands with GRSG habitat. Retention of areas with GRSG will reduce the likelihood of habitat conversion to agriculture, urbanization, or other uses that will remove sagebrush habitat and potentially impact sensitive plants. Criteria: Acquire habitat within PHMA and IHMA, when possible (i.e. willing landowner), and retain ownership of habitat within all Areas, except if disposal will allow for additional or more contiguous federal ownership patterns. Lands within PHMA, IHMA and GHMA will be retained unless disposal of those lands will increase the extent or provide for connectivity of PHMA, IHMA or GHMA. Evaluate potential land exchanges containing historically low-quality GRSG habitat that may be too costly to restore in exchange for lands of higher quality habitat, lands that connect seasonal GRSG habitats or lands providing for threatened and endangered species. These potential exchanges should lead to an increase in the extent or continuity of or provide for improved connectivity of PHMA. Higher priority will be given to exchanges for those in-tact areas of sagebrush that will contribute to the expansion of sagebrush areas within PHMA currently in public ownership. Lower priority will be given to other lands that will promote enhancement in the PHMA and IHMA (i.e., areas with fragmented or less in-tact sagebrush). Identify lands for acquisition that increase the extent of or provide for connectivity of PHMA.	Partially Revised: Update HMA types, i.e., Remove IHMA for clarity
Withdrawals	
See MD SS 10 regarding Sagebrush Focal Areas (SFA).	Completely Revised - revised by rangewide direction
Recreation and Visitor Services (REC)	
REC-1: Manage existing recreation uses and sites to minimize adverse effects on GRSG or their habitat through incorporation of RDFs, buffers and seasonal restrictions.	No change (same as 2015)
REC-2: In PHMA and IHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the development will have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from critical areas, etc.), or unless the development is required for visitor health and safety or resource protection.	Partially Revised: Remove IHMA and clarify mitigation standard

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Travel and Transportation (TTM)	
MD TTM 1: Limit off-highway vehicle travel within Idaho BLM Field Offices to existing roads, primitive roads, and trails in areas where travel management planning has not been completed or is in progress. This excludes areas previously designated as open through a land use plan decision or currently under review for designation as open, currently being analyzed in ongoing RMP revision efforts in the Four Rivers, Jarbidge and Upper Snake Field Offices.	Completely Revised - revised by state specific direction
MD TTM 2: In PHMA, IHMA, and GHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use) and other applicable law and policy.	Partially Revised: Remove IHMA
MD TTM 3: Develop Travel Management Plans for each Field Office as described in the BLM Travel Management Handbook 8342.1 and according to the travel management planning guidelines (Appendix L of FEIS).	Partially Revised: Remove App Ref
MD TTM 4: During subsequent travel management planning design and designate a travel system to minimize adverse effects on GRSG. Locate areas and trails to minimize disturbance of GRSG and/or to have a neural or positive effect on GRSG habitat and populations. Give special attention to protect endangered or threatened species and their habitats. Allow for route upgrade, closure of existing routes, timing restrictions, seasonal closures, and creation of new routes to help protect habitat and meet user group needs, thereby reducing the potential for pioneering unauthorized routes. The emphasis of the comprehensive travel and transportation planning within PHMA will be placed on having a neutral or positive effect on GRSG habitat. Individual route designations will occur during subsequent travel management planning efforts.	No change (same as 2015)
MD TTM 5: Conduct road construction, upgrades, and maintenance activities to avoid disturbance during the lekking season – see Appendix C.	Partially Revised
Mitigation (Montana)	
(Also see Appendix F and J)	Completely Revised - revised by rangewide and state specific direction
Montana 1: BLM will establish an inter-agency State GRSG Conservation Team at the state level (both Idaho and Montana) to help guide conservation of GRSG through compensatory mitigation, within 90 days of the issuance of the Record of Decision.	Completely Revised - revised by rangewide and state specific direction
Montana 2: The BLM, in coordination with the GRSG Conservation Team will develop a Mitigation Strategy within one year of the issuance of the Record of Decision. In Idaho this strategy will be consistent with the Idaho Mitigation Framework (Appendix F).	Completely Revised - revised by rangewide and state specific direction

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Montana 3: In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation (Appendix E, Table E-1), the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions.	Completely Revised - revised by rangewide and state specific direction
Montana 4: Mitigate anthropogenic development (Appendix E, Table E-1) impacts on GRSG habitat through application of appropriate mitigation in accordance with the Mitigation Framework (Appendix F and L).	Completely Revised - revised by rangewide and state specific direction
Montana 5: Consistent with regulations for minerals activities, require a full reclamation bond specific to the site when surface disturbing activities are proposed. Ensure reclamation bonds are sufficient to cover costs to fully rehabilitate lost GRSG habitat. Base the reclamation costs on the assumption that contractors for the BLM will perform the work. Areas are considered fully rehabilitated when they meet the conditions described in Table 2-2.	Partially Revised – Update Table 2.2 reference to habitat objectives.
Coordination (CC)	
MD CC 1: Collaborate, coordinate and utilize cooperative planning efforts to implement and monitor activities to achieve desired conditions and to maximize the utilization of available funding opportunities. Coordination efforts can include: adjacent landowners, federal and state agencies, local governments, tribes, communities, other agencies, resource advisory groups, public lands permit holders and non- governmental organizations.	Completely Revised - revised by state specific direction
MD CC 2: Develop a cooperative MOU between the BLM, Forest Service and State of Idaho to establish the State of Idaho as a cooperating agency during implementation of the final decision. The MOU will identify responsibilities, role and interaction of the BLM, Forest Service and State of Idaho. Montana BLM will participate as appropriate on Montana's Sage-grouse Oversight Team to facilitate coordination and implementation of BLM's final decision and Montana's Executive Order No. 10-2014.	Completely Revised - revised by state specific direction
MD CC 3: The BLM will consider any recommendations from the Governor of Idaho as a result of evaluation completed by the Sage-Grouse Implementation Task Force.	Completely Revised - revised by state specific direction
MD CC 4: Idaho: The BLM will coordinate with the State of Idaho and the Idaho Sage-Grouse Implementation Task Force regarding proposed management changes, the implementation of conservation measures, mitigation, and site-specific monitoring, related to adaptive management, anthropogenic disturbance and livestock grazing.	Completely Revised - revised by state specific direction
MD CC 5: Montana: The BLM will coordinate with the State of Montana and the Montana Sage-grouse Oversight Team regarding proposed management changes, the implementation of conservation measures, mitigation, and site-specific monitoring, related to adaptive management and anthropogenic disturbance.	Completely Revised - revised by state specific direction

GRSG Management from Dillon RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MD CC 6: Upon completion of the Record of Decision the BLM will develop an initial Implementation Guide for BLM District and Field Offices within a year of issuance of the Record of Decision. This Guide will define and describe consistent application of the allocations, management actions, required design features, and etc. that are contained within the final plan and will be updated and expanded as needed to respond to issues and concerns.	Completely Revised - revised by state specific direction
MD CC 7: At the state level, BLM will coordinate with IDFG, MFWP, USFWS, and other conservation partners in collaborative efforts with adjacent states (Oregon, Nevada, Utah, Montana, Wyoming) in GRSG MZs IV and II to evaluate GRSG habitat and population status and trends and make appropriate regional recommendations for GRSG conservation at broader scales.	Completely Revised - revised by state specific direction
MD CC 8: At the state level, BLM will coordinate with the appropriate WAFWA Sage-grouse Technical Committee to develop consistent population and habitat monitoring approaches that facilitate GRSG conservation at the MZ scale.	Completely Revised - revised by state specific direction
MD CC 9: All prescribed burning will be coordinated with state and local air quality agencies to ensure that local air quality is not significantly impacted by BLM activities.	Completely Revised - revised by state specific direction
RDFs Defined	
RDFs are means, measures, or practices intended to reduce or avoid adverse environmental impacts. This LUPA/EIS proposes a suite of design features that will establish the minimum specifications for water developments, certain mineral development, and fire and fuels management and will mitigate adverse impacts. These design features will be required to provide a greater level of regulatory certainty than through implementing BMPs. In general, the design features are accepted practices that are known to be effective when implemented properly at the project level. However, their applicability and overall effectiveness cannot be fully assessed except at the project-specific level when the project location and design are known. Because of site-specific circumstances, some features may not apply to some projects (e.g., when a resource is not present on a given site) or may require slight variations from what is described in the LUPA/EIS (e.g., a larger or smaller protective area). All variations in design features will require appropriate analysis and disclosure as part of future project authorizations. Additional mitigation measures may be identified and required during individual project development and environmental review. The proposed RDFs are presented in Appendix C.	Completely Revised - revised by rangewide and state specific direction

Table 2-2: Dillon Habitat Objectives for GRSG

[Note: Table from 2015 Plan, see Appendix 8 for Indicator Tables for Proposed Plan]

Attribute	Indicator	Desired Conditions	Reference
LEK HABITAT (Seasonal Use Period March 1 – May 15)1			
Lek Security	Proximity of trees	Trees (i.e., in Idaho mainly juniper, conifers, and does not include old-growth juniper, pinyon pine and mountain mahogany; in Montana mainly Douglas-fir) absent or uncommon on shrub/grassland ecological sites within 1.86 miles (3 km) of occupied leks.	Baruch-Mordo et al.2013 Stiver et al. 2015
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek	Stiver et al. 2015
NESTING/EARLY BROOD REARING (Seasonal Use Period May 1 – June 30) 1			
Cover and Food	Sagebrush cover [2]	15-25%	Connelly et al. 2000 Connelly et al. 2003 Hagen et al. 2007
	Sagebrush height Arid sites[3] Mesic sites[4]	 12-31 inches (30-80cm) 16-31 inches (40-80cm)	Connelly et al. 2000
	Predominant sagebrush shape	Predominantly spreading shape[5]	Stiver et al. 2015
	Perennial grass cover (such as native bunchgrasses) [2] Arid sites[3] Mesic sites[4]	 >10% >15%	Connelly et al. 2000 Stiver et al. 2015
	Perennial grass (and forb) height (includes residual grasses)	≥ 7 inches	Connelly et al. 2000 Connelly et al. 2003 Hagen et al. 2007 Stiver et al. 2015
	Perennial forb cover [2] Arid sites[3] Mesic sites[4]	 >5% >10%	Connelly et al. 2000
	Perennial forb availability	Preferred forbs are common with several species present6	Stiver et al. 2015
LATE BROOD-REARING/SUMMER (July-October)1 Late brood-rearing areas, such as riparia			
Cover and Food	Sagebrush cover[2]	Uplands 10-25% Riparian/Meadow: Sagebrush cover within 100 m	Connelly et al. 2000
	Sagebrush height	16 to 32 inches (40-80cm)	Connelly et al. 2000
	Perennial grass and forb cover [2]	>15%	
	Upland and riparian perennial forb availability [2]	Preferred forbs are common with appropriate numbers of species present,6	Stiver et al. 2015
	Riparian and/or meadow habitat condition	Proper Functioning Condition	Stiver et al. 2015
WINTER November-March1 (Apply to areas of known or likely winter-use)			
Cover and Food	Sagebrush cover and height above snow,	Sagebrush is at least 10 inches (25 cm) above snow and ≥10% cover[16]	Connelly et al. 2000 Stiver et al. 2015

Notes:

[1] Seasonal dates can be adjusted by local unit according to geographic region.

[2] Since plant species and/or life forms may overlap, total vegetative cover, inclusive of shrubs, forbs and grasses may exceed 100%.
[3] Arid corresponds to the 10 – 12 inch precipitation zone; Artemisia tridentata wyomingensis is a common big sagebrush subspecies for this type site (Stiver et al. 2015).
[4] Mesic corresponds to the >12 inch precipitation zone; Artemisia tridentata vaseyana is a common big sagebrush sub-species for this type site (Stiver et al. 2015).
[5] Collectively the indicators for sagebrush (cover, height, and shape), perennial grass and perennial forb (cover, height and/or availability) represent the desired condition range for nesting/early brood rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. 2015. Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.
[6] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.
[15] Some late brood habitat occurs at higher elevations outside of mapped nesting habitat and some is embedded within nesting landscapes especially areas such as wet meadows, riparian areas, springs and seeps.
[16] Winter habitat metrics are a guideline but snow depths and habitat availability may vary widely depending on winter severity, topography and elevation.

2.5.2 Relevant Appendices

The following table shows which appendices from the 2015 plan have management direction that may change through the Proposed RMPA. The appendices can be found on the Idaho and Southwestern Montana GRSG ePlanning website.

ARMPA Appendix Name	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Approved RMP Amendment Maps	Completely Revised – See new maps in Appendix 1
B: Buffers	Completely revised – see state-specific language
C: Required Design Features	Partially updated – see state-specific language
D: Monitoring Framework	Completely revised –see new rangewide management direction
E: Anthropogenic Disturbance and Adaptive Management	Removed, see new rangewide management direction
F: Greater Sage-Grouse - Mitigation	Removed, see new rangewide management direction
G: Fluid Mineral Lease Stipulations, Waivers, Modifications, and Exceptions	Completely revised, see rangewide and state-specific language for GRSG stipulations (see Appendix 16)
H: Fire and Invasives Assessment Tool (FIAT)	Removed
J: Montana Action Screen and Mitigation Process	Removed

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Appendix 2.6
HiLine RMP

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2.6 HILINE RMP

This appendix presents the approved RMP revision language from the record of decision for the 2015 HiLine RMP that relate to GRSG management. The HiLine RMP was not amended in 2019. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment (RMPA), either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMPA include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable RMP appendices that are listed in **Section 2.6.2** of this appendix. For the additional state-specific Montana/Dakotas management direction for the Proposed RMPA, see Chapter 2, Table 2-7.

2.6.1 HiLine RMP (Montana)

Table 1. Comparison of the Proposed RMP Amendment to Existing GRSG RMP Management Direction in HiLine RMP

GRSG Management from HiLine RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Fire Management and Ecology	
The BLM will protect sensitive status species habitat (such as sage-grouse) during suppression and prescribed fire activities as described in this document and consistent with BLM Policy. Fire management-related activities, including prescribed fire, should preserve or enhance the habitat quality for sage-grouse and other sensitive status species, especially in priority habitat areas. Where applicable, the BLM will use BMPs (Appendix H) to design fuels treatment objectives to protect existing sagebrush ecosystems, modify fire behavior, restore native plants, and create landscape patterns which benefit sage-grouse habitat (Appendix I). The use of heavy equipment during wildfire suppression and rehabilitation is allowable in sage-grouse habitat although cross-country travel should be limited through these areas. Wildfire suppression facilities shall be located to the extent possible in areas that minimize disturbance to high quality sage-grouse habitat.	No change (same as 2015)
If prescribed fire is used in Greater Sage-Grouse habitat, the NEPA analysis for the Burn Plan will address: • why alternative techniques were not selected as viable options; • how Greater Sage-Grouse goals and objectives would be met by its use; • how the COT Report objectives would be addressed and met; • a risk assessment to address how potential threats to Greater Sage-Grouse habitat would be minimized. Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect Greater Sage-Grouse habitat in PHMA (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities).	No change (same as 2015)

GRSG Management from HiLine RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat would need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.	
Fluid Minerals (oil, gas and geothermal)	
Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority will be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 C.F.R. 3162.3-1(h).	Completely Revised – revised by rangewide direction
Where a proposed fluid mineral development project on an existing lease could adversely affect Greater Sage-Grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, minimize and apply compensatory mitigation to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an application for permit to drill (APD) for the lease to avoid and minimize impacts on sage- grouse or its habitat and will ensure that the best information about the Greater Sage- Grouse and its habitat informs and helps to guide development of such federal leases.	Completely Revised – revised by rangewide direction
Where the federal government owns the mineral estate in PHMA and GHMA, and the surface is in non-federal ownership, apply the same stipulations, conditions of approval (COA), and/or conservation measures and RDFs (Appendix C) applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.	Partially Revised - revised by state specific direction to clarify HMA language.
Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMA and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.	Partially Revised - revised by state specific direction to clarify HMA language.

GRSG Management from HiLine RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
No waivers or modifications to a fluid mineral lease NSO stipulation will be granted in PHMA. The authorized officer may grant an exception to a fluid mineral lease NSO stipulation only where the proposed action: • would not have direct, indirect, or cumulative effects on Greater Sage-Grouse or its habitat; or • is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to Greater Sage-Grouse. Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid federal fluid mineral lease existing as of the date of this RMP revision. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. Any exceptions to this lease stipulation may be approved by the authorized officer only with the concurrence of the State Director. The authorized officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other Greater Sage-Grouse expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publically available at least quarterly.	Completely Revised - revised by rangewide and state specific direction
The SFA are open to leasing with NSO with no waivers, exceptions, or modifications (WEMs).	Completely Revised – revised by rangewide direction
Lands and Realty	
Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available.	No change (same as 2015)
Land Tenure	
Lands classified as priority habitat and general habitat (or habitat classification appropriate for the sub-region) for Greater Sage-Grouse will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the Greater Sage-Grouse; or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse.	No change (same as 2015)
Solar and Wind	
PHMA will be exclusion areas for solar and wind energy rights-of-way. GHMA will be avoidance areas for solar and wind energy rights-of-way.	Completely Revised - revised by rangewide and state specific direction

GRSG Management from HiLine RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Livestock Grazing	
If monitoring data demonstrate that livestock use on an allotment in a priority Greater Sage- Grouse area is adversely affecting Greater Sage-Grouse or their habitat, the terms and conditions of grazing permits may be modified, or changes in active use could be considered in order to meet the standards for rangeland health as described in 43 CFR, Part 4180 and the Standards for Rangeland Health and Guidelines for Livestock Grazing Management (Appendix L) or to otherwise manage, maintain, or improve sage-grouse habitat.	Completely Revised – revised by rangewide direction
Appropriate indicators and measurements specific to habitat for Greater Sage-Grouse, or any other wildlife species of concern, will be evaluated as part of standards and guidelines assessment and any necessary and appropriate habitat objectives specific to meeting the wildlife health standard for the site will be identified and incorporated into allotment management plans (AMPs) or the terms and conditions of livestock grazing permits	Completely Revised – revised by rangewide direction
Processing Grazing Permits/Leases: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in SFA followed by PHMA outside of the SFA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.	Completely Revised – revised by rangewide direction
The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMA will include specific management thresholds based on the Greater Sage-Grouse habitat objectives Table 2.2, Desired Conditions for Greater Sage-Grouse Habitat, Land Health Standards (43 CFR, Part 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.	Completely Revised – revised by rangewide direction
Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.	Completely Revised – revised by rangewide direction
At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3.	Completely Revised – revised by rangewide direction

GRSG Management from HiLine RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Off-Highway Vehicle Use and Travel and Transportation Management	
The BLM will pursue opportunities to conduct restoration of roads, primitive roads and trails not designated during travel management planning, with priority given to areas with special management concerns. This includes primitive routes that have not been designated as "primitive routes" within wilderness study areas (WSAs) and those that have been closed within areas that are being managed to protect or enhance wilderness characteristics or special status species such as the Greater Sage-Grouse. Restoration activities will be done in accordance with guidelines described in Appendix M, Reclamation. Applicable requirements such as specific seed mixes or transplanting recommendations will also be applied where special status species or issues are a concern (e.g., mitigation for Greater Sage-Grouse).	No change (same as 2015)
In PHMA and GHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use).	No change (same as 2015)
Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that off- highway vehicles (OHV) are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence (43 CFR, Part 8341.2). A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.	No change (same as 2015)
Recreation and Visitor Services	
In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the development would have a net conservation gain to Greater Sage- Grouse habitat (such as concentrating recreation, diverting use away from sensitive areas, etc.), or unless the development is required for visitor health and safety or resource protection.	Partially Revised - revised by state specific direction, see mitigation and SSS sections.
Salable (Mineral Materials)	
PHMA are closed to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met: • the activity is within the BSU and project area disturbance cap; • the activity is subject to the provisions set forth in the mitigation framework (Appendix F); and • all applicable RDFs are applied and the activity is permissible under the specific subregional screening criteria (Appendix C).	Completely Revised - revised by rangewide and state specific direction

GRSG Management from HiLine RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Solid Minerals – Leasable	
At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining Greater Sage-Grouse for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1).	Completely Revised – revised by rangewide direction
Solid Minerals – Locatable	
Within the limits of the Mining Laws, the BLM will apply COAs (Appendix I) to Plans of Operations to prevent undue and unnecessary degradation to Greater Sage-Grouse habitat.	No change (same as 2015)
A recommended withdrawal for 927,074 acres from locatable mineral entry to protect the SFA.	Completely Revised – revised by rangewide direction
Vegetation – Rangeland	
In all SFA and PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (such as big sagebrush) (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).	No change (same as 2015)
The BLM will consult with MFWP and seek concurrence regarding the anticipated benefits and/or impacts of any vegetation treatments that may impact wildlife habitat including priority sage-grouse habitat.	No change (same as 2015)
Quantifiable vegetation objectives for sage-grouse habitat are presented in Table 2.3-2. The actions needed to meet or progress toward meeting these objectives will be incorporated into the respective AMPs or livestock grazing permits as appropriate.	Completely Revised – revised by rangewide direction
Water developments will be installed and/or maintained to facilitate control of livestock use of vegetation, support other uses, and protect resource values. In order to minimize surface disturbance, have reliable water of better quality and not alter normal surface flow of water, alternative water developments will be emphasized before constructing new pits and reservoirs. The BLM will manage water developments within Greater Sage-Grouse habitat to reduce the spread of West Nile virus (Appendix I).	Partially Revised - revised by rangewide and state specific direction to clarify
The BLM will use land treatments to achieve and maintain fire regimes, and watershed, grazing management, and wildlife objectives. Within the Greater Sage-Grouse PHMA and the Grassland Bird/Greater Sage-Grouse PHMA, treatments that conserve, enhance or restore Greater Sage-Grouse habitat will be allowed as well as treatments that benefit other resources and do not adversely affect sage-grouse or their habitat.	No change (same as 2015)
Rangeland health monitoring and assessments will be conducted within current staffing capabilities. The allotments within the Greater Sage-Grouse PHMA and the Grassland Bird/Greater Sage-Grouse PHMA will be high priority for reassessment of land health standards and processing grazing permits as detailed in Appendix I. Rangeland health monitoring plans will be developed and implemented at the field office level.	Completely Revised – revised by rangewide direction

GRSG Management from HiLine RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Conifers encroaching into sagebrush habitats will be removed, in a manner that considers tribal cultural values. Treatments will be prioritized closest to occupied sage-grouse habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site- specific analysis and principles like those included in the Fire and Invasives Assessment Tool (FIAT) report (Chambers, et al. 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated.	Completely Revised - revised by state specific direction
Vegetation – Riparian and Wetland	
The BLM will enhance or restore riparian composition and structure beyond proper functioning condition (PFC) in riparian areas where and when appropriate for other resource values.	No change (same as 2015)
Riparian areas with unique values (e.g., where water quality habitat for special status species is an issue) will be treated as avoidance areas for rights-of-way (installation of infrastructure that requires surface disturbance and/or permanent surface occupancy).	No change (same as 2015)
Grazing techniques and practices detailed in Appendix I will be implemented to reduce hot season (summer) grazing on riparian and meadow complexes within the PHMA. Alternative water facilities will be installed to relieve grazing impacts on riparian areas inside of priority sage-grouse habitat.	Partially Revised - revised by rangewide and state specific direction to clarify
Wildlife	
Identify, conserve, enhance and monitor rare, vulnerable, and representative habitats, communities, and ecosystems to ensure self-sustaining persistence of special status species.	No change (same as 2015)
Ensure that proposed land uses initiated or authorized by the BLM minimize damage to wildlife habitat and populations of special status species.	No change (same as 2015)
Maintain and/or increase Greater Sage-Grouse abundance and distribution by conserving, enhancing or restoring the sagebrush ecosystem upon which populations depend in cooperation with other conservation partners.	Completely Revised – revised by rangewide direction
Manage priority wildlife habitat, special status species habitat, and populations using multi- scale assessments to identify current conditions, risks, and opportunities.	No change (same as 2015)
Maintain, enhance, or restore habitat availability and condition for special status species, and minimize habitat loss.	No change (same as 2015)
Protect priority Greater Sage-Grouse habitats from anthropogenic disturbances that would reduce distribution or abundance of sage-grouse.	No change (same as 2015)
Minimize fragmentation of large intact blocks of important wildlife habitat, particularly habitat areas for Greater Sage-Grouse and grassland birds. The BLM will initiate proactive conservation measures that reduce or eliminate threats to Bureau sensitive species to minimize the likelihood of and need for listing of these species under the Endangered Species Act (ESA).	No change (same as 2015)
The BLM will ensure habitat is provided for special status species (BLM 2015, Tables 3.58 and 3.59). Proposed actions will not jeopardize the continued existence of a threatened or endangered species, or cause its habitat to be adversely modified or destroyed.	No change (same as 2015)
The BLM will continue cooperative participation in recovery plans, management plans and conservation strategies for special status species.	No change (same as 2015)

GRSG Management from HiLine RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Fragmentation of large intact blocks of important wildlife habitat will be minimized, particularly in PHMA for Greater Sage-Grouse and grassland birds.	No change (same as 2015)
Consider the likelihood of development of not-yet-constructed surface-disturbing activities−as defined in Table 2 of the Monitoring Framework (Appendix D)−under valid existing rights prior to authorizing new projects in PHMA.	Partially Revised – updated Appendix Reference as needed
New: rangewide predation management	Added by rangewide direction
New: state-specific sensitive status species, including HMA, management	Added by state specific direction
Greater Sage-Grouse Priority Habitat Management Areas	
The area will include a NSO stipulation, without modifications or waivers, for oil and gas leasing unless there is a more restrictive stipulation in place to protect other resource values (e.g., no lease in the Mountain Plover ACEC).	Completely Revised - revised by rangewide and state specific direction
Exploration and development activities for existing oil and gas leases will be managed according to BMPs (Appendix N), or other mitigation measures, through COA in authorizing APDs or plans of development. Consistent with surface use rights granted, the existing lease may be subject to "restrictions deriving from specific, nondiscretionary statutes; and such reasonable measures as may be required by the authorized officer to minimize adverse impacts on other resource values, land uses or users not addressed in the lease stipulations at the time operations are proposed" (43 CFR, Part 3101.1-2). Overall consideration shall be given to minimizing the impact on sage-grouse through a project design that avoids, minimizes, and applies compensatory mitigation for direct and indirect impacts on sage-grouse habitat or use and includes applicable and technically feasible COA (Appendix I). Selection and application of these measures shall be based on current science and research on the impacts on important breeding, nesting, brood-rearing, and wintering areas.	Completely Revised – revised by rangewide direction
The area will be an avoidance area for the issuance of rights-of-way except within designated corridors. Rights-of-way and similar facilities will be located adjacent to other facilities in a corridor where practical. The BLM will consider opportunities to remove, bury, or modify existing power lines (e.g., burying, anti-perching devices or line location).	Completely Revised - revised by rangewide and state specific direction
Where leases or rights-of-way have some level of development (e.g., road, fence, well, etc.) that are no longer in use, the site will be reclaimed by removing the features and restoring the habitat. Upon project completion or right-of-way (ROW) expiration, roads built and maintained for commercial use across BLM land will be reclaimed, unless based on site-specific analysis, the route provides specific benefits to the public and the continued public use does not contribute to resource conflicts.	No change (same as 2015)
The area will remain available for livestock grazing. Site-specific Greater Sage-Grouse habitat and management objectives will be developed for BLM land and incorporated into the respective AMPs or livestock grazing permits as appropriate. Third order (fine-scale) and fourth order (site-scale) habitat indicators and characteristics for sage-grouse habitat seasonal use areas as described in the Sage-Grouse Habitat Assessment Framework (Stiver, et al. 2015) will be used to quantify habitat objectives.	Completely Revised - revised by rangewide and state specific direction
Existing range improvements, including the location of supplements, will be evaluated and if necessary modified to conserve, enhance or restore sage-grouse habitat.	Completely Revised - revised by rangewide and state specific direction

GRSG Management from HiLine RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
If prescribed fire is to be used for vegetation treatments, the burn plan will clearly indicate how COT objectives will be addressed and met by its use, and why alternative techniques were not selected. A Fire Risk Assessment will be completed for implementation of prescribed fire in relation to sage-grouse goals and objectives.	Completely Revised - revised by state specific direction
The area will be an exclusion area for solar and wind energy rights-of-way.	Completely Revised – revised by rangewide direction
The area will be closed to solid leasable minerals, including non-energy leasable minerals.	Completely Revised – revised by rangewide direction
PHMA are closed to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met: • the activity is within the BSU and project area disturbance cap; • the activity is subject to the provisions set forth in the mitigation framework (Appendix I); and • all applicable RDFs are applied (Appendix C).	Completely Revised - revised by rangewide and state specific direction
New road construction will be limited to realignments of existing roads, if that realignment has a minimal impact on Greater Sage-Grouse habitat, eliminates the need to construct a new road, or is necessary for public safety. New road construction will include appropriate BMPs and mitigation (Appendices H and I).	Partially Revised - revised by rangewide and state specific direction to clarify (new mitigation guidance)
Existing roads, or realignments, will be used to access valid existing rights. If valid existing rights cannot be accessed via existing roads, then any new road would be constructed to the absolute minimum standard necessary with appropriate BMPs and mitigation (Appendices H and I).	Partially Revised - revised by rangewide and state specific direction to clarify
Greater Sage-Grouse General Habitat Management Areas	
Sagebrush habitats will be managed so that mid-scale (i.e. landscape level) shrub cover should include a mix of height classes with herbaceous understory adequate for meeting Greater Sage-Grouse requirements as well as habitat requirements for other sage- associated species such as mule deer and pronghorn.	No change (same as 2015)
Consideration will be given to incorporating fine-scale and site-specific Greater Sage-Grouse habitat and management objectives as appropriate to the area into AMPs or livestock grazing permits.	Completely Revised – revised by rangewide direction
GHMA will be an avoidance area for solar and wind energy rights-of-way.	Completely Revised - revised by rangewide and state specific direction
GHMA are open to minor ROWs and avoidance for major ROWs (high voltage transmission lines of 100 kilovolts or greater and pipelines 24 inches or greater in diameter).	Completely Revised - revised by rangewide and state specific direction
GHMA are open to fluid mineral leasing with moderate and standard constraints.	Completely Revised - revised by rangewide and state specific direction
Greater Sage-Grouse habitat suitability determinations will be based upon existing guidelines modified with data from recent habitat inventories and assessments in the planning area. Relevant range-wide research findings will also be included in habitat suitability determinations.	Completely Revised – revised by rangewide direction
The BLM will emphasize restoration and rehabilitation of sagebrush in areas that are capable of, but no longer support sagebrush to contribute to the distribution and connectivity of habitat patches.	No change (same as 2015)

GRSG Management from HiLine RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Greater Sage-Grouse habitats associated with silver sagebrush north of the Milk River will be enhanced to improve habitat conditions for nesting and brood rearing. Specific management actions will be derived from the results of ongoing research and best available science.	No change (same as 2015)
New distribution power lines on BLM land within 1 mile of Greater Sage-Grouse leks will be buried.	No change (same as 2015)
Fragmentation of large intact blocks of habitat for special status species will be minimized, particularly in habitat protection areas for Greater Sage-Grouse and grassland birds.	No change (same as 2015)
Adaptive Management Strategy for Greater Sage-Grouse Management	
Follow the adaptive management strategy outlined in Appendix J.	Completely Revised – revised by rangewide direction
Mitigation	
Mitigation measures for all resources are included in Appendices H and I. The BLM may add additional mitigation measures as deemed necessary by further environmental analysis and as developed through consultation with other federal, state, and local regulatory and resource agencies.	Completely Revised - revised by rangewide and state specific direction
In all sage-grouse habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions.	Completely Revised - revised by rangewide and state specific direction
Application of Lek Buffers	
In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the U.S. Geological Survey (USGS) Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239) in accordance with Appendix B.	Completely Revised - revised by state specific direction
Development in Highly Important Landscapes	
The BLM will designate SFA as shown in Figure 2.3-1 (927,074 acres). All BLM-administered lands within the SFA boundary will be managed as PHMA with the following additional management:	Completely Revised – revised by rangewide direction
Recommended for withdrawal from the General Mining Act of 1872, subject to valid existing rights.	Completely Revised – revised by rangewide direction
Managed as NSO, without WEMs, for fluid mineral leasing.	Completely Revised – revised by rangewide direction
Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, review of livestock grazing permits/leases, and habitat restoration (see specific management sections).	Completely Revised – revised by rangewide direction

GRSG Management from HiLine RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Disturbance	
[Plan Maintenance Action in 2018 conducted to acknowledge adoption of the State of Montana Habitat Conservation Program Density Disturbance Calculation Tool, changed Montana BLM Field Offices to a 5% cap. See DOI-BLM-MT-2018-0005-CX.] The Montana/Dakotas BLM will use a 3% disturbance cap at the BSU and project scale, until the State strategy, similar to Wyoming's Core Strategy of 5% for all lands and all disturbances, is fully implemented. The density calculation (an average of 1 facility per 640 acres) applies to energy and mining facilities. The disturbance cap will not be applied to foreclose development of locatable minerals on unpatented claims located under the General Mining Act of 1872; the disturbance from locatable mining will be accounted for in determining the percent disturbance and whether the cap has been exceeded.	Completely Revised - revised by rangewide and state specific direction Density cap retained.
If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of landownership) or if anthropogenic disturbance and habitat loss associated with conversion to agricultural tillage or fire exceed 5% within a project analysis area, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the General Mining Act of 1872, valid existing rights, etc.) will be permitted by the BLM within a project analysis area until the disturbance has been reduced to less than the cap. Within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site-specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location. If the BLM determines that the State of Montana has adopted a Greater Sage-Grouse Habitat Conservation Program that contains comparable components to those found in the State of Wyoming's Core Area Strategy including an all lands approach for calculating anthropogenic disturbances, a clear methodology for measuring the density of operations, and a fully operational density disturbance calculation tool, the 3% disturbance cap will be converted to a 5% cap for all sources of habitat alteration within a project analysis area.	Completely Revised - revised by rangewide and state specific direction
Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of landownership) in the PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is co-located into an existing disturbed area.	Completely Revised - revised by rangewide and state specific direction

GRSG Management from HiLine RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Greater Sage-Grouse	
[Plan Maintenance Action in 2018 (February 2, 2018) clarified the use and application of the habitat objectives. Deleted habitat objective language and replace with the text below.] The habitat objectives for GRSG (Table 2.3-2) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site. The seasonal habitat descriptions in Table 2-6 vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sagegrouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area. The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards. The Habitat Objectives Tables are to be used: ● To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments ● To evaluate land use plan effectiveness for sage-grouse conservation, and ● As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.	Completely Revised – revised by rangewide direction. Table 2.3-2 removed, see Appendix 8 for Habitat Indicators

Table 2. HiLine Habitat Objectives for GRSG

[Note: Table from 2015 Plan, see Appendix 8 for Indicator Tables for Proposed Plan]

Habitat Indicators	Dominant Sagebrush, Soil Type and/or Ecological Site				
	Sagebrush on Saline and/or Sodic Soils	**Sagebrush on Acid Shale Parent Materials**	**Silver Sagebrush on Overflow Sites**	**Silver Sagebrush on All Other Soils/Sites**	**Wyoming Big Sagebrush on All Other Soils/Sites Sage-Grouse Breeding Habitat**
Sagebrush Canopy Cover	> 5%	> 5%	10-25%	> 2%	15-25%
Sagebrush Height	> 6 inches	> 6 inches	> 12 inches	> 12 inches	> 12 inches
Perennial Grass Heights (includes residual grasses)	> 5 inches	> 7 inches	> 7 inches	> 7 inches	> 7 inches
Perennial Grass Canopy Cover (such as green needlegrass)	> 10%	> 10%	> 15%	> 15%	> 10%
Perennial Forb Canopy Cover	> 3%	> 3%	> 10%	> 5%	> 5%
Perennial Forb Availability	> 3 species	> 3 species	> 5 species	> 5 species	> 5 species
Riparian Areas & Wet Meadows	Proper Functioning Condition				
Lek Security	Rocky Mountain juniper and/or Ponderosa pine with less than 1% canopy cover on shrub/grassland ecological sites within 3 kilometers (1.86 miles) of occupied leks Sage-Grouse				
Winter Habitat					
Sagebrush Availability	>10% canopy and >10 inches visible above snow				

2.6.2 Relevant Appendices

The following table shows which appendices from the 2015 plan have management direction that may change through the Proposed RMPA. The appendices can be found on the HiLine RMP ePlanning website.

ARMPA Appendix Name	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Approved RMP Amendment Maps	Completely Revised – Update maps in Appendix 1
B: Applying Lek Buffer Distances when Approving Actions in Greater Sage-Grouse Habitat Management Areas	Completely revised – see state-specific
C: Required Design Features for Greater Sage-Grouse Habitat	Partially updated – see state specific language
D: The Greater Sage-Grouse Monitoring Framework	Completely revised –see new rangewide management direction
E: Greater Sage-Grouse Disturbance Caps	Removed, see new rangewide management direction
F: Greater Sage-Grouse Mitigation	Removed, see new rangewide management direction
G: Oil and Gas Lease Stipulations and Exception, Modification, and Waiver Criteria	Partially revised, revised by rangewide and state-specific, see Appendix 16
H: Best Management Practices	Partially revised – addition of livestock grazing best management practices
I: Mitigation Measures and Conservation Actions for Greater Sage-Grouse Habitat	Removed, see new rangewide management direction
J: Adaptive Management Strategy for Greater Sage-Grouse Habitat Management	Removed, see new rangewide management direction
L: Standards for Rangeland Health and Guidelines for Livestock Grazing Management	No change (same as 2015)
M: Reclamation	No change (same as 2015)
N: Oil and Gas Best Management Practices (General Conditions of Approval)	No change (same as 2015)
O: Fire and Emergency Stabilization and Rehabilitation	No change (same as 2015)
P: Recreation Sites and Management Areas	No change (same as 2015)

Appendix 2.7
Lewistown RMP

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2.7 LEWISTOWN RMP

This appendix presents the approved RMP language from the record of decision for the 2015 Lewistown RMP amendment and the 2021 Lewistown RMP revision (which brought forward much of the 2015 language) that related to GRSG management. The Lewistown RMP was not part of a 2019 GRSG amendment. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment (RMPA), either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMPA include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable 2015 or 2021 RMP appendices that are listed in **Section 2.7.2** of this appendix. For the additional state-specific Montana/Dakotas management direction for the Proposed RMPA, see Chapter 2, Table 2-7.

2.7.1 Lewistown RMP (Montana)

Table 1. Comparison of the Proposed RMP Amendment to Existing GRSG RMP Management Direction in Lewistown RMP

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Special Status Species (SSS)	
Goal SSS-1: Goal SS-1. Maintain and/or increase GRSG abundance and distribution by conserving, enhancing, or restoring the sagebrush ecosystem upon which populations depend, in cooperation with other conservation partners.	Completely Revised - revised by rangewide direction
Objective SSS-1.1: Protect PHMA from anthropogenic disturbances that will reduce distribution or abundance of GRSG.	No change (same as 2015)
Objective SSS-1.2: Habitat Delineation: Delineate PHMA to encompass the 75% breeding bird density map: 233,219 BLM surface acres (19% of total PHMA acres). See Figure 2-1, Lewistown Habitat Management Areas (Appendix A, Approved RMP Amendment Maps).	Completely Revised - revised by rangewide direction
Objective SSS-1.3: Habitat Delineation: Delineate GHMA to encompass the remainder of the habitat presented in the 100% breeding bird density map: 112,341 BLM surface acres (11% of total GHMA acres). See Figure 2-1, (Appendix A).	Completely Revised - revised by rangewide direction
[Plan Maintenance Action in 2018 (February 2, 2018) clarified the use and application of the habitat objectives. Updated the language Objective SSS-1.4. This objective is deleted and replace with the text below.] The habitat objectives for GRSG (Table 2-2) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site. The seasonal habitat descriptions in Table 2-2 vary across the range of sage-	Completely Revised - revised by rangewide direction. Table 2-2 removed, indicators now in new appendix.

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sagegrouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area. The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards. The Habitat Objectives Tables are to be used: ● To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments ● To evaluate land use plan effectiveness for sage-grouse conservation, and ● As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.	
Action SSS-1.1: In undertaking BLM management actions in PHMA and GHMA, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the US Geological Survey Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239) in accordance with Appendix B, Applying Lek Buffer Distances When Approving Actions.	Completely Revised - revised by rangewide and state specific direction
[Plan Maintenance Action in 2018 conducted to acknowledge adoption of the State of Montana Habitat Conservation Program Density Disturbance Calculation Tool, changed Montana BLM Field Offices to a 5% cap. See DOI-BLM-MT-2018-0005-CX.] Action SSS-1.2: Disturbance: If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG PHMA in any given BSU (see Figure 2-2, Lewistown GRSG Biologically Significant Units and Priority Habitat Management Areas [PHMA] [Appendix A]), then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 hard rock mining law, valid existing rights, etc.) will be permitted by BLM within GRSG PHMA in any given BSU until the disturbance has been reduced to less than the cap. (BSU for this RMPA is the summary of all the PHMA within a GRSG	Completely Revised - revised by rangewide and state specific direction

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
population as delineated in the COT report.) If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership), or if anthropogenic disturbance and habitat loss associated with conversion to agricultural tillage or fire exceed 5% within a project analysis area in PHMA, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 Mining Law, as amended, valid existing rights, etc.) will be permitted by BLM within a project analysis area until the disturbance has been reduced to less than the cap. Action SSS-1.4: Disturbance: Protect PHMA from anthropogenic disturbances that will reduce distribution or abundance of GRSG. See Appendix E, Greater Sage-Grouse Disturbance Caps. If the BLM determines that the State of Montana has adopted a GRSG Habitat Conservation Program that contains comparable components to those found in the State of Wyoming's Core Area Strategy including an all lands approach for calculating anthropogenic disturbances, a clear methodology for measuring the density of operations, and a fully operational density and (DDCT, the 3% disturbance cap will be converted to a 5% cap for all sources of habitat alteration within a project analysis area.	
Action SSS-1.3: Development Density: Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in the PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is co-located into an existing disturbed area.	No change (same as 2015)
Action SSS-1.5: Designate SFA as shown on Figure 2-1 (Appendix A) (53,440 acres). SFA will be managed as PHMA, with the following additional management: Recommended for withdrawal from the General Mining Act of 1872 (as amended), subject to valid existing rights. Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration (see specific management sections).	Completely Revised - revised by rangewide direction
Action SSS-1.6: Implement Adaptive Management Plan (Appendix I).	Completely Revised - revised by rangewide direction
Action SSS-1.7: Implement Regional Mitigation Strategy (Appendix F).	Completely Revised - revised by rangewide and state specific direction
New Objectives and Management Actions such as SSS direction, surface disturbing activity guidance, predation, and non-habitat criteria.	New: Added by rangewide and state specific direction
Habitat Restoration/Vegetation Management (VEG)	
Objective VEG-1.1: In all SFA and PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).	No change (same as 2015)

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Objective VEG-1.2: Within the analysis area, vegetation treatments can continue to be used to meet or support resource management objectives, given special consideration for the protection and maintenance of sagebrush ecosystems is incorporated into the design and implementation of treatments. The BLM will continue to cooperate with the Montana Fish, Wildlife, and Parks (MFWP) to determine wildlife habitat needs.	No change (same as 2015)
Action VEG-1.1: In PHMA, prioritize implementation of restoration projects based on environmental variables that improve chances for project success in areas most likely to benefit GRSG.	No change (same as 2015)
Action VEG-1.2: In PHMA and GHMA, prioritize restoration in seasonal habitats that are thought to be limiting GRSG distribution or abundance.	No change (same as 2015)
Action VEG-1.3: In PHMA and GHMA, consideration for other threatened, endangered, or sensitive species will be evaluated in addition to GRSG when prioritizing restoration projects.	No change (same as 2015)
Action VEG-1.4: Manage for suitable GRSG habitat within PHMA.	No change (same as 2015)
Action VEG-1.5: In PHMA, require use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success. Nonnative species will be considered when determined to be necessary for emergency stabilization and where required to facilitate natural succession of desired native vegetative communities.	No change (same as 2015)
Action VEG-1.6: In PHMA, design post-restoration management to ensure long-term persistence. This can include changes in current resource management to achieve and maintain the desired condition of the restoration that benefits GRSG. Modifications to livestock grazing will be made in accordance with BLM grazing regulation 43 CFR, Part 4130.3-3, and after consultation, cooperation, and coordination with owners or lessees having lands or managing resources within the affected allotment(s), affected cooperative state grazing districts and the interested public, if the grazing permit is being modified to make these adjustments. Temporary or long-term adjustments in post-restoration livestock use will be implemented by documented agreement or by the decision of the authorized officer in accordance with BLM grazing regulation 43 CFR, Part 4160.	Partially Revised - revised by rangewide state specific direction to clarify and be consistent with rangeland management section
Action VEG-1.7: In PHMA, consider potential changes in climate when proposing restoration seeding of native plants. Consider collection from the warmer component of the species' current range when selecting native seed.	No change (same as 2015)
Action VEG-1.8: Choose appropriate seed mix for the location.	No change (same as 2015)
Action VEG-1.9: In PHMA, restore native (or desirable) plants and create landscape patterns that most benefit GRSG. Consideration for other threatened, endangered, or sensitive species will be evaluated, in addition to GRSG, when creating landscape habitat patterns.	No change (same as 2015)
Action VEG-1.10: Make reestablishment of suitable GRSG habitat a high priority for restoration. Other restoration efforts within the field office may take precedence over sagebrush habitat projects, based on future threatened and endangered species listing decisions, funding sources and requirements, access to sites, landowner, and other agency cooperation, potential project success, as well as others. Decisions regarding restoration of habitats within the field office will remain at the discretion of the authorized officer.	No change (same as 2015)

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Action VEG-1.11: In PHMA with higher fire frequency, where sagebrush seed is required for GRSG habitat restoration, consider establishing seed harvest areas that are managed for seed production that receive a priority for protection from outside disturbances.	No change (same as 2015)
Action VG-1.12: Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those included in the FIAT report (Chambers et. al., 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated.	Partially Revised - revised by state specific direction to clarify and remove FIAT reference.
Fire and Fuels Management (FIRE)	
Fuels Management	
Objective FIRE-1.1: Design fuel treatments to protect, restore, enhance, or maintain GRSG habitat, consistent with vegetation and wildlife habitat objectives.	No change (same as 2015)
Action FIRE-1.1: If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plans will address: • why alternative techniques were not selected as a viable options; • how GRSG goals and objectives will be met by its use; • how the COT report objectives will be addressed and met; and • a risk assessment to address how potential threats to GRSG habitat will be minimized. Prescribed fire as vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect GRSG habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.	No change (same as 2015)
Action FIRE-1.2: Design fuels management projects in PHMA to strategically and effectively reduce wildfire threats in the greatest area. This may require fuels treatments implemented in a more linear versus block design.	No change (same as 2015)
Action FIRE-1.3: During fuels management project design, consider the utility of using livestock to strategically reduce fine fuels and implement grazing management that will accomplish this. Consult with an interdisciplinary team of resource specialists, as appropriate, to minimize impacts on native perennial grasses.	No change (same as 2015)
Action FIRE-1.4: Follow the most current RDFs for fire and fuels (Appendix C, Required Design Features).	No change (same as 2015)

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Action FIRE-1.5: If prescribed fire is used, the burn plan will clearly indicate how COT objectives will be addressed and met, and why alternative techniques are not applicable. A fire risk assessment will be completed for implementation of prescribed fire used to meet the GRSG goals and objectives in PHMA (see Appendix H, GRSG Wildfire and Invasive Species Habitat Assessment).	Completely Revised – revised by state specific direction
Fire Operations	
Objective FIRE-1.2: Manage wildfires to minimize loss of sage-brush and protect GRSG habitat.	No change (same as 2015)
Action FIRE-1.6: The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. In PHMA, prioritize suppression, after life and property, to conserve the habitat. See Appendix H, which will be completed to help further refine fire management actions once this plan is completed.	Partially Revised - revised by state specific direction
Action FIRE-1.7: In GHMA, prioritize suppression where wildfires threaten PHMA. Action FIRE-1.8: Follow the most current RDFs for fire and fuels (Appendix C). *Emergency Stabilization and Rehabilitation*	No change (same as 2015)
Action FIRE-1.9: In PHMA, prioritize native seed allocation for use in GRSG habitat in years when preferred native seed is in short supply. This may require reallocating native seed from emergency stabilization and rehabilitation (ES&R) projects outside of PHMA to those inside it. Use of native plant seeds for ES&R seedings is required, based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low, nonnative seeds may be used, as long as they meet GRSG habitat conservation objectives. Reestablishing appropriate sagebrush species/subspecies and important understory plants, relative to site potential, should be the highest priority for rehabilitation.	No change (same as 2015)
Action FIRE-1.10: In PHMA, design post ES&R management to ensure long-term persistence of seeded or pre-burn native plants. This can include changes in current resource management to achieve and maintain the desired condition of the restoration effort that benefits GRSG. Modifications to livestock grazing will be made in accordance with BLM grazing regulation 43 CFR, Part 4130.3-3 and after consultation, cooperation and coordination with owners or lessees having lands or managing resources within the affected allotment(s), affected cooperative state grazing districts and the interested public, if the grazing permit is being modified to make these adjustments. Temporary or long-term adjustments in post-restoration livestock use will be implemented by documented agreement or by the decision of the authorized officer in accordance with BLM grazing regulation 43 CFR, Part 4160.	Partially Revised - revised by rangewide state specific direction to clarify and be consistent with rangeland management section
Action FIRE-1.11: In PHMA, consider potential changes in climate when proposing restoration seeding of native plants. Consider collection from the warmer component of the species' current range when selecting native seed.	No change (same as 2015)
Action FIRE-1.12: Develop an appropriate seed mix for the location, based on current climatic data as well as soils/ecological site descriptions.	No change (same as 2015)
Action FIRE-1.13: Appropriate pre and post treatment monitoring will be established to document impacts and success of the treatments.	No change (same as 2015)

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Action FIRE-1.14: Requirements for resting or deferring areas from livestock grazing following fire will depend on a variety of factors including resource objectives, the type of fuel, time and intensity of burn, accessibility of the burned area to livestock, and post-burn climatic factors. Compliance with land health standards (see Appendix F in the Lewistown Field Office Proposed RMPA/Final EIS).	No change (same as 2015)
Livestock Grazing (LG)	
Action LG-1.1: GRSG habitat objectives will be considered when evaluating an allotment's conformance with land health standards (see Appendix F in the Lewistown Field Office Proposed RMPA/Final EIS) prior to renewing a grazing authorization.	Completely Revised – revised by rangewide direction
Action LG-1.2: In PHMA and GHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions will be developed and implemented within one year if land health determinations indicate that an allotment is not meeting standards due to current livestock grazing. Appendix D addresses mid-scale monitoring.	Completely Revised – revised by rangewide direction
Action LG-1.3: Livestock grazing will be allowed on all areas not specifically closed to grazing (570,112 acres will be open to grazing and 103,806 animal unit months available). See Figure 2-3, Lewistown Livestock Grazing (Appendix A).	Completely Revised – revised by rangewide direction
Action LG-1.4: In PHMA, cooperate with ranchers and other agencies on integrated ranch planning so operations with intermingled land ownerships within BLM allotments can be planned as single units.	Completely Revised – revised by rangewide direction
Action LG-1.5: The BLM will prioritize (1) the review of grazing permits/leases in particular to determine if modification is necessary prior to renewal): and (2) the processing of grazing permits/leases in in SFA, followed by PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds, based on GRSG Habitat Objectives (Table 2-2), Land Health Standards (43 CFR, Part 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks can include monitoring for actual use, utilization, and use supervision. At the time a permittee or lessee voluntarily relinquishes a grazing permit or lease, the BLM will consider whether the public lands where that permitted use was authorized shall remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, 4110.2-3. Ecological site descriptions, riparian PFC protocols, water quality data,	Completely Revised – revised by rangewide direction

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
and various types of appropriate vegetative, riparian, habitat, and any other applicable data will continue to be used as the basis in allotment evaluations to determine conformance to Standards for Land Health and Guidelines for Livestock Grazing Management (see Appendix F, in the Lewistown Field Office Proposed RMPA/Final EIS).	
Action LG-1.6: Allotments that have the best opportunities for conserving, enhancing, or restoring habitat for GRSG will receive high priority for monitoring, evaluation, and management.	Completely Revised – revised by rangewide direction
Action LG-1.7: In PHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions will be developed if land health determinations indicate that an allotment is not meeting standards due to current livestock grazing. Appendix D addresses mid-scale monitoring.	Completely Revised – revised by rangewide direction
Action LG-1.8: The BLM will monitor grazing permits/leases renewed or modified in accordance with the direction contained in this guidance as follows: Allotments within SFA, followed by those in other PHMA, and focusing on those with riparian areas, will be prioritized for monitoring to ensure compliance with the terms and conditions in the permits. The BLM will collect, at a minimum, the following monitoring data: • Vegetation Condition • Actual Use • Utilization • Use Supervision	Completely Revised – revised by rangewide direction
Implementation Management Action After Land Health Evaluations	
Action LG-1.9: In PHMA and GHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions will be developed if land health determinations indicate that an allotment is not meeting standards due to livestock grazing in accordance with BLM grazing regulations 43 CFR, Part 4100. Appendix D addresses mid-scale monitoring.	Completely Revised – revised by rangewide direction
Action LG-1.10: Conserve, enhance, or restore PHMA based on ecological site descriptions (including wetlands and riparian areas). If an effective grazing system that meets GRSG habitat objectives is not already in place, analyze at least one allotment-specific alternative within the planning unit/permit renewal process that conserves, restores, or enhances PHMA.	Partially Revised - revised by rangewide direction to clarify
Action LG-1.11: In PHMA, manage for vegetation composition and structure consistent with ecological site potential within the reference state to achieve GRSG seasonal habitat objectives. Natural ecological processes that impede localized site potential and that create a mosaic of habitat successional patterns will continue to occur.	Completely Revised – revised by rangewide direction

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Action LG-1.12: In PHMA, implement management actions within or outside of the watershed planning/permit renewal process to modify grazing management and to meet seasonal GRSG habitat objectives. Consider singly, or in combination, for changes in: Season or timing of use Numbers of livestock (includes temporary non-use or livestock removal) Distribution of livestock use Intensity of use Type of livestock	Completely Revised – revised by rangewide direction
Action LG-1.13: During drought periods, prioritize evaluating effects of the drought in PHMA, relative to their needs for food and cover. Drought management will continue to be in accordance with the Montana/Dakotas drought policy (see Appendix I, Drought Policy, in the Lewistown Field Office Proposed RMPA/Final EIS). Since there is a lag in vegetation recovery following drought, post-drought management will be implemented to allow for vegetation recovery that meets GRSG needs in PHMA. In accordance with BLM grazing regulation 43 CFR, Part 4130.3-3, consultation, cooperation, and coordination with owners or lessees having lands or managing resources within the area, the affected cooperative state grazing district, and interested public will be completed prior to adjusting post- drought livestock management if the grazing permit is being modified to make these adjustments. Implementation of adjustments will be initiated through documented agreement or by decision of the authorized officer in accordance with BLM grazing regulation 43 CFR, Part 4160.	Completely Revised – revised by rangewide direction
Riparian Areas and Wet Meadows	
Action LG-1.14: Riparian-wetland areas will be managed for PFC within the LFO. Within PHMA and GHMA, manage wet meadows to maintain a component of perennial forbs with diverse species richness relative to site potential (e.g., reference state) to facilitate brood rearing. Also conserve or enhance these wet meadow complexes.	Completely Revised – revised by rangewide direction
Action LG-1.15: Riparian-wetland areas currently achieving PFC will be managed for desired future condition and the desired plant community, based on ecological site potential. Other values to be considered include important wildlife habitat, water quality impaired streams, fisheries, riparian woodland forest, and habitat for currently listed threatened, endangered, and sensitive species.	Partially Revised - revised by rangewide direction to clarify
Action LG-1.16: Riparian-wetland areas with altered potential (i.e., those riparian-wetland areas that are incapable of reaching potential because of causes that are outside of the control of the BLM) will be managed for their capability.	Partially Revised - revised by rangewide direction to clarify
Action LG-1.17: Human-made water developments, such as reservoirs and stock ponds, can develop riparian-wetland characteristics. Those that have the capability to support important wildlife values (such as GRSG habitats and fisheries) will be managed for such to the extent practical, with greater consideration given to the purpose of the development. When constructing or modifying water developments in PHMA, use RDFs (Appendix C) to reduce potential impacts from West Nile virus.	Partially Revised - revised by rangewide direction to clarify

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Action LG-1.18: Within PHMA, reduce hot season grazing on riparian and meadow complexes to promote recovery or maintenance of appropriate vegetation and water quality. Use fencing/herding techniques or seasonal use or livestock distribution changes to reduce pressure on riparian or wet meadow vegetation used by GRSG in summer. Hot season use of riparian and wet meadow complexes may be authorized where consistent with overall GRSG habitat objectives and where use is currently resulting in vegetative conditions that are in conformance with land health standards.	Partially Revised - revised by rangewide direction to clarify
Action LG-1.19: In PHMA, management emphasis will be placed on riparian and wetland potential associated with springs and seeps. Water from other sources will be prioritized to develop grazing management infrastructure. New water development for diversion from spring or seeps will be authorized only when no other sources are available and where such considerations will be neutral or beneficial to GRSG.	Partially Revised - revised by rangewide direction to clarify
Action LG-1.20: Analyze springs, seeps, and associated pipelines during the land health evaluation and determination process to determine if modifications are necessary to maintain the continuity of the predevelopment riparian area within PHMA. Make modifications, where necessary, in accordance with Montana water law, considering impacts on other water uses, when such considerations are neutral or beneficial to GRSG.	Partially Revised - revised by rangewide direction to clarify
Treatments to Increase Forage for Livestock/Wild Ungulates	
Objective LG-1.1: Develop and implement (as budgets and workloads allow) methods for prioritizing and restoring sagebrush steppe invaded by nonnative plants.	Completely Revised – revised by rangewide direction
Action LG-1.21: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to PHMA to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings are part of a grazing management plan that is providing value in conserving or enhancing native rangelands in PHMA and other priority wildlife habitats, then no restoration will be necessary. Assess the compatibility of these seedings for GRSG habitat or as a component of a grazing system during the land health evaluation and determination process.	Completely Revised – revised by rangewide direction
Action LG-1.22: Integrated vegetation management will be used to control, suppress, and eradicate, where possible, noxious and invasive species, in accordance with Chapter 6, sections II and III of BLM Handbook H-1740-2. Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species.	Completely Revised – revised by rangewide direction
Action LG-1.23: Noxious weed control on affected grazing allotments will be implemented through Weed Control Cooperative Range Improvement Project Agreements, which requires as a term and condition of a grazing authorization that the operator control noxious weeds on the grazing allotment(s) they are authorized to use.	Completely Revised – revised by rangewide direction

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Structural Range Improvement and Livestock Management Tools	
Action LG-1.24: In PHMA, site and design new structural range improvements and location of supplements (salt or protein blocks) to conserve, enhance, or restore said habitat through an improved grazing management system relative to GRSG habitat objectives. Structural range improvements, in this context, include cattle guards, fences, exclosures, corrals, or other livestock handling structures; pipelines, troughs, storage tanks (including movable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels, and spring developments).	Completely Revised – revised by rangewide direction
Action LG-1.25: Potential for invasive species establishment or increase following construction will be considered in the project planning process and monitored and treated post-construction. Projects will be designed to the extent practical to reduce or eliminate the establishment of new two-track roads and trails that may be created during construction and maintenance.	Completely Revised – revised by rangewide direction
Action LG-1.26: When developing or modifying water developments in PHMA and GHMA, use applicable RDFs (Appendix C) to reduce potential impacts from West Nile virus.	Completely Revised – revised by rangewide direction
Action LG-1.27: During the land health evaluation and determination and grazing authorization renewal process (typically every 10 years), examine existing structural range improvements and location of supplements (salt or protein blocks) to ensure they conserve, enhance or restore PHMA. Identify and mark fences in high and moderate risk areas, as identified by the use of "The Fence Collision Risk Tool" (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/) within PHMA, based on proximity to lek, lek size, and topography (Stevens 2011, Stevens et al. 2013). During the allotment evaluation and determination and grazing authorization renewal process, examine existing structural range improvements to ensure they conserve, enhance, or restore PHMA. In PHMA and GHMA, monitor for and treat invasive and noxious weed species associated with existing range improvement projects.	Completely Revised – revised by rangewide direction
Mineral Resources (MR)	
Leased Federal Fluid Mineral Estate	
Action MR-1.1: Allow geophysical exploration within PHMA to obtain exploratory information for areas outside of and adjacent to PHMA areas. Allow only geophysical operations by helicopter-portable drilling methods and in accordance with seasonal timing restrictions and other restrictions that may apply (see Appendix C).	Completely Revised - revised by state specific direction
Action MR-1.2: During implementation level review and decisions, (e.g., approval of an application for permit to drill or Sundry Notice) and on completion of the environmental record of review (43 CFR, Part 3162.5), include appropriate documentation of compliance with NEPA. In this process evaluate, among other things: Whether the conservation measure is reasonable (43 CFR, Part 3101.1-2) with the valid existing rights; and Whether the action is in conformance with the ARMPA. The following operating constraints will be applied to existing leases as COAs in PHMA and GHMA. Exceptions may be granted by the authorized officer if an environmental review demonstrates that effects can be mitigated to an acceptable level, if habitat for the species is not present in the area, or if portions of the area can be occupied without	Completely Revised – revised by rangewide direction

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
affecting GRSG. Exceptions may also be granted where the short-term effects on GRSG within PHMA and GHMA are mitigated by the long-term benefits. Permanent (longer than two months) structures that create movement must be designed or sited to minimize impacts on GRSG. As reasonable (43 CFR, Part 3101.1-2), in consideration of valid existing rights, and to achieve a net conservation gain, the BLM will require compensatory mitigation when impacts cannot be adequately avoided and minimized, and residual impacts will result in habitat loss and degradation. Compensatory mitigation actions will align with the recommendations in the Regional Mitigation Strategy (see Appendix F), as appropriate. A priority may be given to compensatory mitigation actions in the same PHMA as is being impacted, unless a greater benefit can be achieved elsewhere. Compensatory mitigation will be considered when no feasible options remain to adequately avoid and minimize impacts within and immediately adjacent to the impacted site. Make applicable RDFs (Appendix C) mandatory as COAs within PHMA and GHMA. RDFs provided in Appendix C will be site-specific restrictions applied to permits to drill as COAs after the completion of site- specific NEPA analysis. Standard stipulations (see Appendix G, Oil and Gas Lease Stipulations) apply to existing leases. See Figure 2-4, Lewistown Fluid Minerals (Oil and Gas) (Appendix A). Applied RDFs will have to be reasonable (43 CFR, Part 3101.1-2) with the valid existing rights and in conformance with the approved Judith and Headwaters RMPs.	
Unleased Federal Fluid Mineral (Oil and Gas and Geothermal) Estate: 2021 Revision	
FW–AU-01: Apply NSO stipulations to greater sage-grouse PHMA.	Completely Revised - revised by rangewide and state specific direction
FW–AU-02: Apply NSO stipulations within 0.6 miles of a lek within GHMA.	Completely Revised - revised by rangewide and state specific direction
FW-AU-03: Apply CSU stipulations within 2 miles of a lek within GHMA.	Completely Revised - revised by rangewide and state specific direction
MD-1: No waivers or modifications to a fluid mineral lease NSO stipulation will be granted in PHMA. The authorized officer may grant an exception to a fluid mineral lease NSO stipulation only where the proposed action: (i) would not have direct, indirect, or cumulative effects on Greater Sage-Grouse or its habitat; or (ii) is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to Greater Sage-Grouse. *Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid federal fluid mineral lease existing as of the date of this RMP revision. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will	Completely Revised - revised by rangewide and state specific direction

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
endure for the duration of the proposed action's impacts. *Any exceptions to this lease stipulation may be approved by the authorized officer only with the concurrence of the State Director. The authorized officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other Greater Sage-Grouse expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publicly available at least quarterly.	
Solid Minerals	
Coal	
Action MR-1.3: At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1).	Completely Revised - revised by rangewide direction
Locatable Minerals	
Action MR-1.4: Recommend SFA (53,440 acres) for withdrawal from the General Mining Act of 1872 (as amended), subject to valid existing rights. Analyze proposed action in Plan of Operations and apply mitigating measures needed to prevent unnecessary or undue degradation, as appropriate and in accordance with applicable law.	Completely Revised - revised by rangewide and state specific direction
Action MR-1.5: Locatable minerals exploration and development under the mining laws are not authorized under the discretion of the field manager but are reviewed (Notice and Plan of Operations) and approved (Plan of Operations) to prevent unnecessary or undue degradation. Proposed actions under Plan of Operations will be analyzed on a case-by-case basis in coordination with Montana Department of Environmental Quality, and RDFs apply to locatables to the extent consistent with applicable law (Appendix C).	No change (same as 2015)
Action MR-1.6: See Figure 2-5, Lewistown Locatable Minerals (Appendix A). At a minimum, annual compliance inspections will be conducted on each active Notice or Plan of Operations.	No change (same as 2015)
Nonenergy Leasable Minerals	
Action MR-1.7: Close PHMA to nonenergy leasable mineral leasing. This includes not permitting any new leases to expand an existing mine. See Figure 2-7, Lewistown Non-Energy Leasable Minerals (Appendix A).	Completely Revised – revised by rangewide direction
Action MR-1.8: For existing nonenergy leasable mineral leases in PHMA, apply all appropriate RDFs from Appendix C, whether traditional or solution mining is used to extract resources.	Completely Revised – revised by rangewide direction

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Salable Minerals	
2021 Revision Changed Management: MM-AU-02: Federal mineral estate (including HMAs) open to mineral materials disposal. 2015 Action was: Action MR-1.9: PHMA are closed to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met: • the activity is within the BSU and project area disturbance cap; • the activity is subject to the provisions set forth in the mitigation framework (Appendix F); and • all applicable RDFs are applied; and [if applicable] the activity is permissible under the specific subregional screening criteria. In GHMA, the BLM will issue permits for salable minerals, where disposal is deemed to be in the public interest (Figure 2-6, Appendix A), while providing for reclamation of mined lands and preventing unnecessary or undue degradation, and meeting goals and objectives for PHMA, surface disturbance limits (applies only to PHMA), mitigation and other measures through the application of appropriate RDFs (Appendix C). Salable mineral permits are considered on a case-by-case basis and are issued at the discretion of the field manager. If activity under the permit application cannot be mitigated based on appropriate RDFs and strategies outlined in Appendix F to achieve net conservation gain and prevent unnecessary or undue degradation to GRSG habitat.	Completely Revised - revised by rangewide and state specific direction
Action MR-1.10: In PHMA, restore salable mineral pits no longer in use to meet GRSG habitat conservation objectives.	No change (same as 2015)
Mineral Split Estate	
Action MR-1.11: Where the federal government owns the surface and the mineral estate is in non- federal ownership in PHMA and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee (Appendix C).	Partially Revised - revised by state specific direction to clarify HMA language
Action MR-1.12: Where the federal government owns the mineral estate in PHMA and GHMA, and the surface estate is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs (Appendix C) applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.	Partially Revised - revised by state specific direction to clarify HMA language
Lands and Realty (LR)	
Objective LR-1.1: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available.	No change (same as 2015)
Rights-of-Way	
Action LR-1.1: PHMA and GHMA will be managed as ROW avoidance areas for high voltage transmission lines (100 kilovolt [kV] and over) and large pipelines (24 inches in width and over) (345,560 acres) with limited exceptions, which must be based on an explicit rationale that biological impacts on GRSG are being avoided with the exception. See Figure 2-10a, Major Rights-of-Way (Appendix A).	Completely Revised - revised by rangewide and state specific direction

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
PHMA will also be managed as a minor ROW avoidance area (233,219 acres). See Figure 2-10b, Lewistown Minor Rights-of-Way (Appendix A).	Completely Revised - revised by rangewide and state specific direction
GMHA will be open to minor ROWs (112,341 acres). Where new ROWs are required, collocate new ROWs within existing ROWs or where it best minimizes impacts on GRSG and GRSG habitat. Appropriate RDFs identified within the terms of the authorization to minimize surface- disturbing and disruptive activities. See Appendix C for RDFs that may be applied based on site-specific project level NEPA analysis.	Completely Revised - revised by rangewide and state specific direction
Action LR-1.2: PHMA will be managed as a ROW exclusion area for wind and solar energy (233,219 acres) and GHMA will be managed as a ROW avoidance area for wind and solar energy (112,341 acres). See Figure 2-8, Lewistown Wind, and Figure 2-9, Lewistown Solar (Appendix A).	Completely Revised - revised by rangewide and state specific direction
Action LR-1.3: When addressing ROW authorizations in PHMA, identify and evaluate opportunities to remove, bury, or modify power lines within PHMA. Financial and technical feasibility will be evaluated during the environmental analysis process.	No change (same as 2015)
Action LR-1.4: Current FLPMA ROWs have a stipulation that when the ROW terminates, the site must be remediated and restored by the grant holder to BLM's satisfaction (43 CFR, Part 2807.19).	No change (same as 2015)
Action LR-1.5: Many pre-FLPMA grant authorizations are for water, or electricity, to large areas and most of these grants are perpetual or non-expiring. If an amendment is needed the grant will be renewed/reauthorized under current authority with additional stipulations and/or mitigation requirements. If the pre-FLPMA authorizations are no longer needed, grantees will be required to reclaim sites by removing features/fixtures and restoring habitat. Grant authorizations under the Mineral Leasing Act will be renewed if they are still being used for their original purposes.	No change (same as 2015)
Action LR-1.6: Leases and permits (other than for cabin site leasing), which may be for occupancy, and film production, will be considered on a case-by-case basis; however, PHMA will be lease and permit avoidance areas. Leases and permits will be allowed in GHMA with appropriate stipulations and conservation measures identified within the terms of the authorization to minimize surface-disturbing and disruptive activities. Avoidance areas within GHMA may be identified.	No change (same as 2015
Action LR-1.7: The holder of a ROW shall be responsible for weed control on disturbed areas within the limits of the ROW. The holder shall be responsible for invasive weed control for the life of the ROW. ROW holder is responsible for weed control and monitoring for three years after reclamation has been completed. The holder will be responsible for consultation with the authorized officer and/or local authorities for acceptable weed control methods.	No change (same as 2015)
Action LR-1.8: No utility corridors designated within the planning area.	No change (same as 2015)
Action LR-1.9: Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in Table D.2 of the Monitoring Framework (Appendix D)−under valid existing rights prior to authorizing new projects in PHMA.	Partially Revised – updated Appendix Reference as needed

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Land Tenure Adjustment	
Action LR-1.9: Lands classified as PHMA and GHMA will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the GRSG or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the GRSG. See Figure 2-11, Lewistown Land Tenure (Appendix A).	No change (same as 2015)
Action LR-1.10: Land tenure adjustments in the Headwaters planning area will be subject to disposal/acquisition criteria identified (BLM 1984, page 20).	No change (same as 2015)
Action LR-1.11: Retain important wildlife habitat (one of the three main criteria for land tenure adjustments outlined in the Judith Resource Area RMP) (BLM 1994).	No change (same as 2015)
Action LR-1.12: Headwaters RMP land ownership adjustment criteria include nesting/breeding habitat for game animals (BLM 1984, page 20).	No change (same as 2015)
Action LR-1.13: When offered, PHMA will be a priority in consideration of land acquisitions (refer to Appendix H, Land Pattern Review and Land Adjustment, in Lewistown Field Office Proposed RMPA/Final EIS). Consider GRSG for all land tenure actions.	No change (same as 2015)
Recommend Land Withdrawals	
Action LR-1.14: Withdrawals from minerals on BLM surface (2,686 acres).	No change (same as 2015)
Action LR-1.15: SFA (53,440 acres) will be recommended for withdrawal from the General Mining Act of 1872 (as amended), subject to valid existing rights.	Completely Revised – revised by rangewide direction
Recreation and Visitor Services (REC)	
Action REC-1.1: Special recreation permits in PHMA may be allowed if they are neutral or beneficial for GRSG habitat.	No change (same as 2015)
Action REC-1.2: In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, and staging areas) unless the development will have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from important areas, etc.), or unless the development is required for visitor health and safety or resource protection.	Partially Revised - revised by state specific direction, see mitigation and SSS sections
Travel and Transportation (TRM)	
Action TTM-1.1: BLM-administered lands are designated limited to existing roads, primitive roads, and trails yearlong for off-highway vehicle use (OHVs; OHVs are restricted to existing roads, primitive roads, and trails). Implement a comprehensive travel and transportation management (CTTM) plan to designate roads and trails (when travel management plan is complete). Administrative off-road use for BLM personnel and BLM authorized activities will be allowed. BLM-implemented CTTM will not apply to private or other state or federal lands within the LFO.	No change (same as 2015)
Action TTM-1.2: On completion of site-specific projects, roads used for commercial or administrative access on BLM-administered lands will be reclaimed, unless the route will provide specific benefits for public access, will minimize impacts on the resources, and will be considered on a case-by-case basis.	No change (same as 2015)
Action TTM-1.3: The BLM will close or restore unauthorized, user created roads and trails to prevent resource damage, including impacts on GRSG.	No change (same as 2015)

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Action TTM-1.4: During route designation and travel planning in PHMA, travel management will evaluate the need for permanent or seasonal route or area closures where vehicle use is causing or will cause considerable adverse effects on habitat.	No change (same as 2015)
Action TTM-1.5: Through site-specific planning, the BLM will designate roads, primitive roads, and trails for motorized use. Roads, primitive roads, and trails will be inventoried, mapped, and analyzed to the degree necessary to evaluate and designate the roads, primitive roads, and trails as open, seasonally open, or closed (BLM 2003). All CTTM planning shall be completed within 5 years of the signing of the ROD. The CTTM planning will be conducted using an interdisciplinary team approach to address all resource uses, including administrative, recreation, commercial, and associated modes of travel (motorized, mechanized, and nonmotorized types; BLM—Travel and Transportation Handbook [H- 8342]).	No change (same as 2015)
Action TTM-1.6: In PHMA, during site-specific travel and transportation management planning, limit route construction to realignment of existing routes if that realignment has a minimal impact on GRSG habitat, if it eliminates the need to construct a new road, or if it is necessary for motorist safety.	No change (same as 2015)
Action TTM-1.7: In PHMA, during site-specific travel and transportation management planning, use existing routes or realignments, as described above, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing routes, then build any new route to the absolute minimum standard necessary.	No change (same as 2015)
Action TTM-1.8: In PHMA, during site-specific travel and transportation management planning, the upgrading of existing routes that will change route category (road, primitive road, or trail) or capacity may be allowed when there are minimal impacts on GRSG and GRSG habitat, if it is necessary for motorist safety, or if it eliminates the need to construct a new road. All upgrades to existing routes will be evaluated on a case-by-case basis and will be subject to valid existing rights (e.g., existing ROWs or easements).	No change (same as 2015)
Action TTM-1.9: When travel plans are complete, restore roads, primitive roads and trails in PHMA that are not designated in travel management plans. This also includes primitive routes/roads that were not designated in wilderness study areas (WSA) that have been selected for protection in previous RMPs.	No change (same as 2015)
Action TTM-1.10: When reseeding roads, primitive roads, and trails in PHMA, use appropriate seed mixes and consider the use of transplanted sagebrush.	No change (same as 2015)
Action TTM-1.11: In PHMA and GHMA, temporary closures will be considered in accordance with 43 CFR, subpart 8364 (Closures and Restrictions); 43 CFR, subpart 8351 (Designated National Area); 43 CFR, subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR, subpart 8341 (Conditions of Use).	No change (same as 2015)
Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that OHVs are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse	No change (same as 2015)

GRSG Management from Lewistown RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
effect until the adverse effects are eliminated and measures implemented to prevent recurrence (43 CFR, Part 8341.2). A closure or restriction order shall be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders shall be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.	

Table 1. Lewistown Habitat Objectives for GRSG

[Note: Table from 2015 Plan, see Appendix 8 for Indicator Tables for Proposed Plan]

Attribute	Indicator	Desired Condition	Reference
BREEDING, NESTING, AND EARLY BROOD REARING (Seasonal Use Period: March 1 to June 30)			
Lek Security	Proximity of trees	Trees or other tall structures are not within line of sight of lek and absent or uncommon within 3 kilometers (km) (1.9 miles) of the lek.	Connelly et al. 2000
	Collision Risks	Fences and other structures that pose a high collision risk are absent or mitigated with visual markers.	Connelly et al. 2000. Stevens 2011
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 100 meters (m; 328 feet [ft.]) of an active lek.	Stiver et al. 2015
Cover	Sagebrush cover	10-25%	Berkeley et al. 2013 Connelly et al. 2000 Doherty et al. 2010 Lane 2005 Hagen et al. 2007 Sant et al. 2014
	Sagebrush height	40-80 centimeters (cm) (15.7-31.5 inches) individual sagebrush available within stand (for nesting) with a variety of heights (including those <40 cm [<15.7 inches]).	Connelly et al. 2000 Lane 2005
	Predominant sagebrush shape	Spreading	Stiver et al. 2015
	Perennial grass cover (such as bluebunch wheatgrass, green needlegrass and western wheatgrass)	≥15%	Connelly et al. 2000 Lane 2005 Sant et al. 2014
	Perennial grass and forb height (includes residual grasses)	≥18 cm (≥7.1 inches)	Berkeley et al. 2013 Connelly et al. 2000 Doherty et al. 2014 Hagen et al. 2007 Taylor et al. 2012
	Perennial forb cover	≥10%	Connelly et al. 2000 Sant et al. 2014

Attribute	Indicator	Desired Condition	Reference
LATE BROOD-REARING/SUMMER (Seasonal Use Period: July 1 to October 31)			
Cover	Sagebrush cover	5-25%	Connelly et al. 2000 Lane 2005 Hagen et al. 2007 Sant et al. 2014
	Sagebrush height	40-80 cm (15.7-31.5 inches) individual sagebrush available within stand (for nesting) with a variety of heights (including those <40 cm [<15.7 inches]).	Connelly et al. 2000 Lane 2005
	Perennial grass and forb cover	≥25%	Connelly et al. 2000 Hagen et al. 2007 Sant et al. 2014
	Riparian areas/mesic meadows	80% or more of PHMA in Proper Functioning Condition (PFC) or higher.	Prichard et al. 1999 Schroeder et al. 1999 USDI BLM 1997
	Upland and riparian perennial forb availability	Preferred forbs are common with several preferred species present	Connelly et al. 2000 Stiver et al. 2015
WINTER (Seasonal Use Period: November 1 to February 28)			
Cover and Food	Sagebrush cover	≥10%	Wallestad 1975 Connelly et al. 2000 Sant et al. 2014
	Sagebrush height	≥25cm (≥9.8 inches)	Connelly et al. 2000.

2.7.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2021 plans have management direction that may change through the Proposed RMPA. The 2015 Appendices can be found on the Lewistown GRSG ePlanning website. The 2021 Appendices can be found on the Lewistown RMP ePlanning website.

ARMPA Appendix Name	Year	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Figures	2021	Completely Revised – see new maps in Appendix 1
B: Collaboration and Coordination	2021	No change (same as 2021)
D: Implementation and Monitoring	2021	No change (same as 2021)
F: Design Features and Best Management Practices	2021	Partially revised – revised to add livestock grazing BMPs
G: Reclamation	2021	No change (same as 2021)
H: Draft Air Resource Management Plan: Adaptive Management Strategy for Oil and Gas Resources	2021	No change (same as 2021)
I: Fire and Emergency Stabilization and Rehabilitation	2021	No change (same as 2021)
J: Impoundments	2021	No change (same as 2021)
K: North Continental Divide Ecosystem Grizzly Bear Conservation Strategy	2021	No change (same as 2021)
L: Stipulations and Allocations Applicable to Fluid Minerals Leasing	2021	Partially revised, GRSG stipulations changed, see Appendix 16
M: Summary of the Lewistown Field Office Wilderness Characteristics: 2014 Update	2021	No change (same as 2021)
N: BLM Standards for Rangeland Health and Guidelines for Livestock Grazing Management Grazing	2021	No change (same as 2021)
O: Allotments	2021	No change (same as 2021)

ARMPA Appendix Name	Year	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
P: Drought Policy	2021	No change (same as 2021)
Q: Recreation Management Areas	2021	No change (same as 2021)
R: Land Ownership Adjustment Categories	2021	No change (same as 2021)
S: Withdrawal Segregations	2021	No change (same as 2021)
U: Land Management Allocations	2021	No change (same as 2021)
A - Approved RMP Amendment Maps	2015	Completely Revised – See new maps in Appendix 1
B - Applying Lek Buffer Distances When Approving Actions	2015	Completely revised – see state-specific language
C - Required Design Features	2015	Partially revised – added livestock grazing BMPs, See also 2021 appendix
D - The Greater Sage-Grouse Monitoring Framework	2015	Completely revised – see new rangewide version
E - Greater Sage-Grouse Disturbance Caps	2015	Removed, see new rangewide management direction
F - Regional Mitigation Strategy	2015	Removed, see new rangewide management direction
G - Oil and Gas Stipulations	2015	N/A – See 2021
H - GRSG Wildfire and Invasive Species Habitat Assessment	2015	Removed
I - Adaptive Management Strategy for Greater Sage-Grouse Habitat Management	2015	Removed, see new rangewide management direction

Appendix 2.8
Miles City RMP

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2.8 MILES CITY RMP

This appendix presents the approved RMP revision language from the 2015 record of decision for the Miles City RMP that relate to GRSG management. The Miles City RMP was not amended in 2019. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment (RMPA), either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMPA include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable RMP appendices that are listed in **Section 2.8.2** of this appendix. For the additional state-specific Montana/Dakotas management direction for the Proposed RMPA, see Chapter 2, Table 2-7.

2.8.1 Miles City RMP (Montana)

Table 1. Comparison of the Proposed RMP Amendment to Existing GRSG RMP Management Direction in Miles City RMP

GRSG Management from Miles City RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Special Status Species: *GRSG Habitat*	
Goal 1: Provide for the conservation, enhancement, restoration, and connectivity of the Northern Great Plains mixed grass prairie and shrubland, capable of supporting sustainable populations of GRSG and other wildlife species.	Partially Revised: Clarified to a general sagebrush goal, and rangewide goal added.
Objective 1: Maintain, improve and increase sagebrush habitats to sustain sagebrush obligates and other sagebrush dependent species.	No change (same as 2015)
Objective 2: Conserve GRSG habitat while promoting movement and genetic diversity	No change (same as 2015)
Objective 3: Priority will be given to leasing and development of fluid minerals outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources in PHMA and GHMA, and subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 United States Code (U.S.C.) 226(p) and 43 CFR, Part 3162.3- 1(h).	Completely Revised – revised by rangewide direction
Objective 4: Where a proposed fluid mineral development on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other proponents to avoid, minimize and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessees, operators, or other proponent in developing an application for permit to drill (APD) for the lease to avoid and minimize impacts on GRSG or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such Federal leases.	Completely Revised – revised by rangewide direction

GRSG Management from Miles City RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
MD 1: In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions.	Completely Revised - revised by rangewide and state specific direction
MD 2: Will follow the adaptive management strategy outlined in Appendix H, GRSG Adaptive Management Strategy. The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter.	Completely Revised – revised by rangewide direction
New: state-specific sensitive status species management	Added by state specific direction
New: rangewide predation management	Added by rangewide direction
Sage Grouse Habitat – General Habitat Management Areas	
Goal 1: Maintain or increase habitat needed for GRSG through the management of surface disturbing and disruptive activities, including the loss and distribution of sagebrush habitat.	No change (same as 2015)
Objective 1: Conserve GRSG habitat while promoting movement and genetic diversity.	No change (same as 2015)
MD 1: Major ROWs (100 kv and over for high voltage transmission lines and 24 inch in width and over for large pipelines) and renewable energy ROWs will avoid GRSG GHMA (1,395,000 acres).	Completely Revised - revised by rangewide and state specific direction
Minor ROWs will be allowed with design features to protect breeding, nesting and brood rearing in GRSG GHMA (1,365,000 acres).	Completely Revised - revised by rangewide and state specific direction
Other surface-disturbing and disruptive activities (including Mineral Material Sales) will be allowed with design features to protect breeding, nesting, and brood-rearing GRSG habitat (1,365,000 acres).	Completely Revised - revised by rangewide and state specific direction
Oil and gas leasing is open and surface occupancy and use is prohibited within 0.6 miles of the perimeter of leks (NSO) (61,000 acres).	Completely Revised - revised by rangewide and state specific direction
In addition, surface occupancy and use within 2 miles of leks is restricted or prohibited. Prior to such activities, a plan to mitigate impacts on nesting GRSG or their habitat will be prepared by the proponent and implemented upon approval, by the Authorized Officer (AO) (CSU) (652,000 acres).	Completely Revised - revised by rangewide and state specific direction
In undertaking BLM management actions and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the United States geological Survey (USGS) Report (see Appendix B, GRSG Conservation Buffer).	Completely Revised - revised by state specific direction
Sage Grouse Habitat – Priority Habitat Management Areas	
Objective 1: Maintain or increase GRSG habitat over the long-term, recognizing valid existing rights.	No change (same as 2015)
Objective 2: Restore degraded GRSG habitat.	No change (same as 2015)
Objective 3: Manage permitted uses while providing GRSG habitat for the long-term.	No change (same as 2015)
MD 1: Where deemed effective, water developments will be managed to reduce the spread of West Nile virus (see Appendix C, GRSG Required Design Features).	Completely Revised - revised by state specific direction

GRSG Management from Miles City RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
MD 2: At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1).	Completely Revised - revised by rangewide direction
MD 3: PHMA is managed according to the following prescriptions:	Completely Revised - revised by state specific direction
• Renewable Energy ROWs will be excluded within GRSG priority areas (817,000 acres).	Completely Revised - revised by state specific direction
• PHMA are closed to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met:	Completely Revised - revised by state specific direction
• The activity is within the PHMA BSU and area disturbance cap.	Completely Revised - revised by state specific direction
• The activity is subject to the provisions set forth in the mitigation framework (Appendix F, GRSG Regional Mitigation Strategy).	Completely Revised - revised by state specific direction
• All applicable required design features are applied; and (if applicable) the activity is permissible under the specific subregional screening criteria.	Completely Revised - revised by state specific direction
• Oil and gas leasing is open and surface occupancy and use is prohibited within sage grouse priority areas (NSO (1,329,000 acres).	Completely Revised - revised by state specific direction
• No waivers or modifications to a fluid mineral lease no-surface occupancy stipulation will be granted. The AO may grant an exception to a fluid mineral lease no-surface occupancy stipulation only where the proposed action: • Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or, • Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and will provide a clear conservation gain to GRSG. • Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP revision. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. • Any exceptions to this lease stipulation may be approved by the AO only with the concurrence of the State Director. The AO may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfied (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publically available at least quarterly.	Completely Revised - revised by state specific direction

GRSG Management from Miles City RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
• Major (high voltage transmission lines and large pipelines) and minor ROWs will avoid GRSG priority areas (817,000 acres).	Completely Revised - revised by state specific direction
• In undertaking BLM management actions, and consistent with valid and existing rights and law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS Report *Conservation Buffer Distance Estimates for Greater Sage-grouse – A Review (Open File Report 2014-1239)*, in accordance with Appendix B, GRSG Conservation Buffer.	Completely Revised - revised by state specific direction
[Plan Maintenance Action in 2018 conducted to acknowledge adoption of the State of Montana Habitat Conservation Program Density Disturbance Calculation Tool, changed Montana BLM Field Offices to a 5% cap. See DOI-BLM-MT-2018-0005-CX.] • If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG PHMA in any given BSU, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the Mining Law of 1872, as amended, valid existing rights, etc.) will be permitted by BLM within GRSG PHMA in any given BSU until the disturbance has been reduced to less than the cap. • If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) or if anthropogenic disturbance and habitat loss associated with conversion to agricultural tillage or fire exceed 5% within a analysis area in PHMA, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the Mining Law of 1872, valid existing rights, etc.) will be permitted by BLM within PHMA in a analysis area until the disturbance has been reduced to less than the cap. • If the BLM determines that the State of Montana has adopted a GRSG Habitat Conservation Program that contains comparable components to those found in the State of Wyoming's Core Area Strategy including an all lands approach for calculating anthropogenic disturbances, a clear methodology for measuring the density of operations, and a fully operational Density Disturbance Calculation Tool, the 3% disturbance cap will be converted to a 5% cap for all sources of habitat alteration within an analysis area.	Completely Revised - revised by state specific direction
MD 4: Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in Table 2 of the Monitoring Framework (Appendix D)−under valid existing rights prior to authorizing new projects in PHMA.	Partially Revised – updated Appendix Reference as needed
GRSG Habitat – Restoration Areas	
Objective 1: Strive for proponents to develop area-wide Habitat Recovery Plans.	Completely Revised - revised by rangewide and state specific direction
Objective 2: Strive for no net loss of GRSG habitat.	Completely Revised - revised by rangewide and state specific direction
Objective 3: Strive for the restoration of previously disturbed landscapes in a manner which increases or improves the quality and quantity of GRSG habitat.	Completely Revised - revised by rangewide and state specific direction

GRSG Management from Miles City RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
MD 1: Surface-disturbing and disruptive activities will be allowed with required design features to minimize disturbance to GRSG habitat (87,000 acres). Oil and gas leasing is open and surface occupancy and use is subject to design features, to minimize disturbance to GRSG habitat in the Cedar Creek Area (CSU) (22,000 acres). In the West Decker (11,000 acres) and South Carter Area (164,000 acres) oil and gas leasing is open and surface occupancy and use is prohibited (NSO). Renewable Energy ROWs will be excluded within all Restoration Areas. Major ROWs will be avoided and minor ROWs will be allowed with design features.	Completely Revised - revised by rangewide and state specific direction
Vegetation	
Objective 5: In all PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).	No change (same as 2015)
MD 2: Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those included in the Fire and Invasive Species Team (FIAT) report (Chambers et. al., 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated.	Partially Revised - revised by state specific direction for clarity
MD 4: Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species.	No change (same as 2015)
Wildland Fire Management and Ecology	
Fuels Management/Prescribed Fire	
MD 3: If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address: • why alternative techniques were not selected as a viable options; • how GRSG goals and objectives will be met by its use; • how the COT Report objectives will be addressed and met; • a risk assessment to address how potential threats to GRSG habitat will be minimized. Prescribed fire as vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that will protect GRSG habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.	No change (same as 2015)

GRSG Management from Miles City RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Wildfire Management	
MD 1: The BLM will prioritize fire management activities according to potential risks to life and property across the planning area. Wildfires adjacent to or near wildland urban or industrial interface will have the highest priority for fire suppression. In PHMA, prioritize suppression, after life and property, to conserve the habitat. In GHMA, prioritize suppression where wildfires threaten PHMA.	No change (same as 2015)
Livestock Grazing	
MD 3: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (ex., fire) and legal obligations.	Completely Revised – revised by rangewide direction
MD 4: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds based on GRSG Habitat Objectives Table and Land Health Standards (43 CFR, Part 4180.2) and ecological site potential and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.	Completely Revised – revised by rangewide direction
MD 5: Allotments within PHMA, focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.	Completely Revised – revised by rangewide direction
MD 6: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments (RCAs) or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3.	Completely Revised – revised by rangewide direction
Lands and Realty	
Land Tenure	
MD 5: Lands classified as PHMA and GHMA for GRSG will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the GRSG or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the GRSG.	No change (same as 2015)
Minerals	
Fluid Minerals (oil and gas)	
Geothermal managed as a fluid mineral (e.g., same stipulations as oil and gas)	Partially Revised to clarify fluid minerals is O&G and geothermal

GRSG Management from Miles City RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
MD 8: Where the federal government owns the mineral estate in PHMA and GHMA, and the surface is in non-federal ownership, apply the same stipulations, conditions of approval (COAs), and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.	Partially Revised - revised by state specific direction to clarify HMA language.
Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMA and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.	Partially Revised - revised by state specific direction to clarify HMA language.
Coal	
MD 3: At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1).	Completely Revised - revised by rangewide direction
Non-Energy Leasable	
New: rangewide nonenergy minerals management	Added by rangewide direction
Comprehensive Trails and Travel Management	
Objective 7: The BLM will strive to complete travel management planning using a developed strategy that sets time frames and prioritizes Travel Management Areas (TMAs). TMAs within the priority GRSG habitat area will strive to be prioritized and completed as funding and staffing allows.	No change (same as 2015)
Objective 8: The BLM will create a developed strategy based on information found in the BLM Handbook H-8342, Travel and Transportation. Areas receiving focus and a higher priority will be based on priority GRSG habitat areas, heavily used areas, social conflict concerns, resource concerns, consideration of primary travelers, valid existing rights, visitor recreation experiences, and development for administrative or public access.	No change (same as 2015)
MD 1: On BLM administered surface, including PHMA and GHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use).	No change (same as 2015)
Temporary closure or restriction orders under these authorities are enacted at the discretion of the AO to resolve management conflicts and protect persons, property, and public lands and resources. Where an AO determines that OHVs are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR, Part 8341.2) A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.	No change (same as 2015)

GRSG Management from Miles City RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Recreation and Visitor Services (SRMAs)	
MD 1: In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the development will have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from critical areas, etc.), or unless the development is required for visitor health and safety or resource protection.	Partially Revised - revised by state specific direction, see mitigation and SSS sections.
GRSG Habitat Objectives	
[Plan Maintenance Action in 2018 (February 2, 2018) clarified the use and application of the habitat objectives. Habitat objective language was deleted and replaced with the text below.] The habitat objectives for GRSG (Table 2-6) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site. The seasonal habitat descriptions in Table 2-6 vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sagegrouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area. The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards. The Habitat Objectives Tables are to be used: ● To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments ● To evaluate land use plan effectiveness for sage-grouse conservation, and ● As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.	Completely Revised – revised by rangewide direction. Table 2-6 removed, indicators now in new appendix.

Table 2. Miles City Habitat Objectives for GRSG

[Note: Table from 2015 Plan, see Appendix 8 for Indicator Tables for Proposed Plan]

Attribute	Indicator	Desired Condition	References
BREEDING, NESTING AND EARLY BROOD-REARING (Seasonal Use Period March 1-June 15)			
Lek Security	Proximity of trees	.65–Km^2 (.388 miles) avoidance of coniferous habitats	Doherty 2008
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek	Stiver et al. 2015
Cover	Sagebrush canopy cover	5-25%	Herman–Brunson 2007 Swanson 2009 Doherty et al. 2010 Hagen et al. 2007 Doherty et al. 2011 Foster et al. 2014 Wright and Wegner 2008
	Sagebrush height	6-31 inches (15-50cm)	Swanson 2009 Doherty et al. 2011 Schroeder et al. 1999 Holloran et al. 2005
	Predominant sagebrush shape	Predominately spreading shape	Stiver et al. 2015
	Perennial grass cover (such as western wheatgrass)	≥10%	Doherty et al. 2010 Hagen et al. 2007 Doherty et al. 2011 Holloran et al. 2005
	Perennial grass and forb height (includes residual grasses)	Adequate nest cover based on ecological site potential and seasonal precipitation; 4.4-11.3 inches (11.4-29 cm)	Doherty et al. 2014
	Perennial forb canopy cover	≥3%	Doherty et al. 2010 Hagen et al. 2007 Doherty et al. 2011 Holloran et al. 2005
BROOD-REARING/SUMMER (Seasonal Use Period June 16-October 31)			
Cover	Sagebrush canopy cover	5-25%	Herman–Brunson 2007 Swanson 2009 Doherty et al. 2010 Hagen et al. 2007 Doherty et al. 2011 Foster et al. 2014
	Sagebrush height	6-31 inches (15-50cm)	Doherty et al. 2011 Foster et al. 2014 Schroeder et al. 1999 Holloran et al. 2005
	Perennial grass canopy cover and forbs	≥10%	Doherty et al. 2010 Hagen et al. 2007 Doherty et al. 2011 Holloran et al. 2005
	Riparian areas/mesic meadows	Proper Functioning Condition	BLM 1997 Prichard et al. 1999 Prichard 1998
	Upland and riparian perennial forb availability	Preferred forbs are common with several preferred species present.	Stiver et al. 2015 Doherty et al. 2011

Attribute	Indicator	Desired Condition	References
WINTER (Seasonal Use Period November 1-February 28)			
Cover and Food	Sagebrush canopy cover above snow	>10%	Swanson 2009 Foster et al. 2014 Schroeder et al. 1999
	Sagebrush height above snow	6-31 inches (15-50cm)	Doherty et al. 2011 Schroeder et al. 1999

2.8.2 Relevant Appendices

The following table shows which appendices from the 2015 plan have management direction that may change through the Proposed RMPA. The 2015 Appendices can be found on the Miles City RMP ePlanning website.

ARMPA Appendix Name	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Approved RMP Maps	Completely Revised – see Appendix 1 for new maps
B: GRSG Conservation Buffer	Completely revised – see state-specific language
C: GRSG Required Design Features	Partially revised – updates and additions per rangewide and state specific management
D: GRSG Monitoring Framework	Completely revised –see new rangewide management direction
E: GRSG Disturbance Cap	Removed, replaced by rangewide direction
F: GRSG Regional Mitigation Strategy	Removed, replaced by rangewide direction
G: Minerals Stipulations	Partially revised – updated for GRSG stipulations (see Appendix 16)
H: Adaptive Management Strategy for GRSG Habitat Management	Removed, replaced by rangewide direction
I: Air Resources and Climate	No change (same as 2015)
J: Fish, Aquatic and Wildlife Habitat Including Special Status Species	No change (same as 2015)
K: Livestock Grazing	No change (same as 2015)
L: Mitigation Measures and Conservation Actions	No change (same as 2015)
M: Monitoring	No change (same as 2015)
N: Reclamation	No change (same as 2015)
O: Recreation	No change (same as 2015)
P: Special Designation Areas	No change (same as 2015)

Appendix 2.9

Upper Missouri River Breaks National Monument RMP

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2.9 UPPER MISSOURI RIVER BREAKS NATIONAL MONUMENT RMP

This appendix presents the approved RMP language from the 2009 record of decision for the Upper Missouri River Breaks National Monument (UMRBNM) RMP that relate to GRSG management. The UMRBNM RMP was not part of either 2015 or 2019 GRSG amendment process. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment (RMPA), either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMPA include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable RMP appendices that are listed in **Section 2.9.2** of this appendix. For the additional state-specific Montana/Dakotas management direction for the Proposed RMPA, see Chapter 2, Table 2-7.

2.9.1 UMRBNM RMP (Montana)

Table 1. Comparison of the Proposed RMP Amendment to Existing GRSG RMP Management Direction in UMRBNM RMP

GRSG Management from UMRBNM RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Management Decisions: Vegetation Communities	
The BLM will consider mechanical treatment as the primary method and prescribed fire as a secondary method to remove conifers encroaching on sage-grouse habitat, except where forested habitat is limited.	No change (same as 2009)
The BLM will promote sage planting, where appropriate, on project areas (such as sites where sagebrush has been removed for crested wheat grass conversions) occurring within sage-grouse habitats and will reclaim and/or reseed areas disturbed by treatments.	No change (same as 2009)
New: state-specific vegetation management	Added by state specific direction
Management Decisions: Terrestrial and Aquatic Wildlife Resources	
Sage-grouse management will utilize the 2005 Management Plan and Conservation Strategies for Sage-Grouse in Montana – Final for overall guidance and direction.	Completely Revised - revised by state specific direction
New: rangewide predation, adaptive management, mitigation, disturbance, and HMA, management	Added by rangewide direction
New: state-specific sensitive status species, including HMA, management	Added by state specific direction
Management Decisions: Habitat Objectives	
The BLM will manage for a healthy diverse vegetative community with a variety of forbs, and maintain big sagebrush and silver sage on sage-grouse wintering and nesting areas with a canopy cover of 15-30% and an average height of 12 inches.	Completely Revised - revised by rangewide direction
New: rangewide habitat objectives	Added by rangewide direction
Management Decisions: Disturbance	
Greater Sage-Grouse – The BLM will not authorize new surface-disturbing or disruptive activities within 1/4 mile of active leks, nor will it allow new surface-disturbing or disruptive activities within nesting areas (a 2-mile radius of an active lek) from March 1 to June 15. The BLM will not authorize any new surface-disturbing or disruptive activities in active sage-grouse winter habitat from December 1 to March 31.	Completely Revised - revised by rangewide and state specific direction

GRSG Management from UMRBNM RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
The following mitigating measures will be applied to new surface-disturbing or disruptive activities for identified/important wildlife habitat in the Monument. Mitigating measures will be applied on a case-by-case basis during activity level planning after an on-site evaluation of the project area indicates the presence of a species. Exceptions to these mitigation measures may be granted by the authorized officer if an environmental review demonstrates there would be no adverse impacts, habitat for the species is not present in the area, or portions of the area can be occupied without affecting a particular species. Exceptions will also be considered for interim and final reclamation.	Partially Revised - revised by rangewide and state specific direction to specify GRSG mitigation approach (refer to GRSG mitigation section)
Management Decisions: Wildland Fire Ecology and Management	
The appropriate management response to all wildland fires will be based on firefighter and public safety and resource values on BLM, state, and private land while considering the natural role of fire. Fires could be managed with less than full suppression efforts and, in most cases, allowed to burn to natural barriers or roads. The cost of suppression will also be considered. Resource values, such as sage-grouse habitat, will be protected during wildland fire suppression through the knowledge of resource advisors assigned to wildland fire incidents and/or information on the location of critical resource areas available to incident commanders; however, protection for resource values will be secondary to life safety and property values.	No change (same as 2009)
New: state-specific fire and fuels management	Added by state specific direction
Management Decisions: Lands and Realty	
The BLM's goal is to provide reasonable access for the public and for private landowners, as well as for the administrative needs and authorized uses of industry and government agencies. Under the Proclamation, all federal lands and interests in lands are "hereby appropriated and withdrawn from all forms of entry, location, selection, sale, or leasing or other disposition under the public land laws . . . and from disposition under all laws relating to mineral and geothermal leasing, other than by exchange that furthers the protective purposes of the monument. The establishment of this monument is subject to valid existing rights. . . . Lands and interests in lands within the proposed monument not owned by the United States shall be reserved as a part of the monument upon acquisition of title thereto by the United States." In addition to the seven utility and transportation corridors that cross the Missouri River, the Klabzuba pipeline on the south side of the river will also be a designated corridor (Table 2.5). The corridor for the Klabzuba pipeline will only be on the south side of the river. The pipeline follows the McClelland/Stafford Ferry corridor on the north side of the river. [Language about corridors is general, but included here for reference. RMP goes forward with specifics about each corridor.]	No change (same as 2009)
Avoidance areas for ROWs include the scenic sections of the UMNWSR, the Bodmer Landscapes, the Cow Creek ACEC, cultural/historic sites, riparian and wetland areas, areas containing unique geologic formations, areas considered unsuitable due to erosion and slope, and sage-grouse seasonal habitat where impacts could not be mitigated or effectively controlled.	Completely Revised - revised by rangewide direction [Amendment applies to GRSG Only]

GRSG Management from UMRBNM RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Applications for commercial wind energy systems, solar energy systems and communication sites will not be considered.	No change (same as 2009) Rangewide exceptions to exclusion not applicable in UMRBNM
New: rangewide and state-specific ROW management	Added by rangewide and state specific direction
Management Decisions: Fluid Mineral Resources	
The BLM's goal is to provide reasonable oil and gas exploration and development on existing leased land without diminishing the objects of the Monument. The Proclamation does not allow new oil and gas leases in the Monument. The 43 federal oil and gas leases in the Monument are considered to have valid existing rights based upon the Proclamation, wherein it states "The establishment of this monument is subject to valid existing rights. The Secretary of Interior shall manage development on existing oil and gas leases within the monument, subject to valid existing rights, so as not to create any new impacts that would interfere with the proper care and management of the objects protected by this proclamation." The existing leases are also in compliance with their lease terms and conditions.	No change (same as 2009)
[RMP includes language about managing O&G leases in general with consideration for the objects of the monument: Through the environmental review process, the BLM will determine the potential impacts of oil and gas operations and mitigation measures to avoid interference with the proper care and management of the objects protected by the Monument. If the analysis and documentation indicate that a proposal may have impacts that are not in conformance with the Proclamation, regulation, BMPs or existing resource management plans, the BLM will work with the applicant to find alternatives or modifications to the proposal that will minimize such impacts through special permit conditions, consistent with the applicant's rights under applicable laws, regulations and stipulations. See the RMP for specific language.]	No change (same as 2009)
Conditions of Approval In addition to the oil and gas lease stipulations (Appendix H), reasonable conditions of approval, under BLM's authority to protect the objects in the Monument, will be applied to APDs. The conditions of approval will apply to all the oil and gas lease acreage (42,805 acres) in the Monument. The conditions of approval will be applied to the APD after an onsite evaluation indicates the presence of the specific resource and after considering the waivers, exceptions and modifications listed in Appendix H. The current APD review process will be utilized, which includes a 30-day posting period for public review of the proposal. The current stipulations (Form 3109-1) will apply to the portions of five of the 12 West HiLine leases that are outside the Monument (2,454 acres). Seasonal or distance restrictions will be placed on oil and gas activities to protect sage-grouse nesting areas and winter habitat, active ferruginous hawk nests, big game winter range, and bighorn sheep distribution and bighorn sheep lambing areas.	No change (same as 2009)
New: state-specific and rangewide fluid mineral management	Added by rangewide and state specific direction

GRSG Management from UMRBNM RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Greater Sage-Grouse Nesting Zone – Surface-disturbing or disruptive activities will be prohibited from March 1 to June 15 in sage-grouse nesting habitat within 2 miles of a lek. Travel on identified designated roads may include these timing restrictions or limited site visits. *Greater Sage-Grouse Winter Habitat* – Surface-disturbing or disruptive activities will be prohibited from December 1 to March 31 within winter habitat for sage-grouse. This condition will not apply to the operation and maintenance of production facilities. Travel on identified designated roads may include these timing restrictions or limited site visits. *Greater Sage-Grouse Leks* – Surface-disturbing or disruptive activities will be prohibited within 1/4 mile of active sage-grouse leks.	Completely Revised - revised by rangewide and state specific direction
Travel on identified designated roads will be restricted to the minimal vehicle size and type needed for the job. Due to resource issues, timing restrictions may be applied to site visits. For construction and heavy trucks related to production, equipment that exceeds 49dB will be restricted from being within 2 miles of sage-grouse leks between 4:00 a.m. and 8:00 a.m. and from 7:00 p.m. to 10:00 p.m. between March 1 and June 15.	No change (same as 2009)
Management Decisions: Livestock Grazing	
Grazing permittees will avoid the placement of salt or mineral supplements near leks during the breeding season (March 1 to June 15). The placement of salt or mineral supplements by other entities will not be allowed. Supplemental winter feeding will not be allowed on sage-grouse winter habitat and around leks. Concentrations of livestock near leks or winter habitat can disturb or displace sage-grouse. Therefore, concentrations of livestock on leks or other key sage-grouse habitats could be avoided by using conservative stocking levels*, locating salt or other supplements away from leks or winter habitat, adjusting grazing seasons and locating water facilities where they would not jeopardize habitat. ***Conservative Stocking Level** Conservative stocking level is a stocking rate that will result in a moderate utilization level (or less) by livestock at the end of the grazing period for the year. A conservative stocking level will be established based on resource management goals including maintaining healthy vegetation; acceptable livestock performance; expected normal weather; and annual plant production consistent with the Standards for Rangeland Health and Guidelines for Livestock Grazing Management.	Partially revised - revised by rangewide and state specific direction to clarify
New: rangewide livestock grazing management	Added by rangewide direction
Management Decisions: Other Resources	
New: rangewide minerals management	Added by rangewide direction, NM withdrawn as part of the proclamation, current management will apply to these resources with clarifications for GRSG

Table 2. UMRBNM Habitat Objectives for GRSG

[Note: Table from 2015 LFO Plan, see Appendix 8 for Indicator Tables for Proposed Plan]

Attribute	Indicator	Desired Condition	Reference
BREEDING, NESTING, AND EARLY BROOD REARING (Seasonal Use Period: March 1 to June 30)			
Lek Security	Proximity of trees	Trees or other tall structures are not within line of sight of lek and absent or uncommon within 3 kilometers (km) (1.9 miles) of the lek.	Connelly et al. 2000
	Collision Risks	Fences and other structures that pose a high collision risk are absent or mitigated with visual markers.	Connelly et al. 2000. Stevens 2011
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 100 meters (m; 328 feet [ft.]) of an active lek.	Stiver et al. 2015
Cover	Sagebrush cover	10-25%	Berkeley et al. 2013 Connelly et al. 2000 Doherty et al. 2010 Lane 2005 Hagen et al. 2007 Sant et al. 2014
	Sagebrush height	40-80 centimeters (cm) (15.7-31.5 inches) individual sagebrush available within stand (for nesting) with a variety of heights (including those <40 cm [<15.7 inches]).	Connelly et al. 2000 Lane 2005
	Predominant sagebrush shape	Spreading	Stiver et al. 2015
	Perennial grass cover (such as bluebunch wheatgrass, green needlegrass and western wheatgrass)	≥15%	Connelly et al. 2000 Lane 2005 Sant et al. 2014
	Perennial grass and forb height (includes residual grasses)	≥18 cm (≥7.1 inches)	Berkeley et al. 2013 Connelly et al. 2000 Doherty et al. 2014 Hagen et al. 2007 Taylor et al. 2012
	Perennial forb cover	≥10%	Connelly et al. 2000 Sant et al. 2014
LATE BROOD-REARING/SUMMER (Seasonal Use Period: July 1 to October 31)			
Cover	Sagebrush cover	5-25%	Connelly et al. 2000 Lane 2005 Hagen et al. 2007 Sant et al. 2014
	Sagebrush height	40-80 cm (15.7-31.5 inches) individual sagebrush available within stand (for nesting) with a variety of heights (including those <40 cm [<15.7 inches]).	Connelly et al. 2000 Lane 2005
	Perennial grass and forb cover	≥25%	Connelly et al. 2000 Hagen et al. 2007 Sant et al. 2014
	Riparian areas/mesic meadows	80% or more of PHMA in Proper Functioning Condition (PFC) or higher.	Prichard et al. 1999 Schroeder et al. 1999 USDI BLM 1997
	Upland and riparian perennial forb availability	Preferred forbs are common with several preferred species present	Connelly et al. 2000 Stiver et al. 2015

Attribute	Indicator	Desired Condition	Reference
WINTER (Seasonal Use Period: November 1 to February 28)			
Cover and Food	Sagebrush cover	≥10%	Wallestad 1975 Connelly et al. 2000 Sant et al. 2014
	Sagebrush height	≥25cm (≥9.8 inches)	Connelly et al. 2000.

2.9.2 Relevant Appendices

The following table shows which appendices from the 2009 plan have management direction that may change through the Proposed RMPA. The appendices can be found on the Upper Missouri River Breaks National Monument RMP ePlanning website.

ARMPA Appendix Name	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Federal and Montana Ambient Air Quality Standards	No change (same as 2009)
B: Standards for Rangeland Health and Guidelines for Livestock Grazing Management	No change (same as 2009)
C: Best Management Practices	New livestock grazing BMPs to be added based on amendment
D: Cultural Resource Use Categories	No change (same as 2009)
E: Watershed Planning Process	No change (same as 2009)
F: Grazing Allotments	No change (same as 2009)
G: Visitor Use Standards and Indicators	No change (same as 2009)
H: Oil and Gas	Partial revision – addition of new GRSG approach
I: Wildlife Mitigation Noise Levels	No change (same as 2009)
NEW: Rangewide and State-Specific Appendices	New appendices added such as, RDF, Monitoring Framework, Habitat Objectives, and Map appendices

Appendix 2.10

Montana and Dakotas Alternative 1 and 2 Oil and Gas Lease Stipulations

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2.10 MONTANA AND DAKOTAS OIL AND GAS LEASE STIPULATIONS (ALTERNATIVES 1 AND 2)

The table below presents the oil and gas lease stipulations for Montana and the Dakotas current RMPs that apply to GRSG, including their ID number, stipulation text, and office in which the stipulation applies. All stipulations are completely revised by rangewide and state specific direction in the Alternatives 4, 5, and 6, and the Proposed RMP Amendment (RMPA). See Appendix 16 for stipulations for Alternatives 4, 5, and 6 and the Proposed RMPA and Chapter 2, Table 2-7 for the additional state-specific Montana/Dakotas management direction for the Proposed RMPA.

ID #	Stipulation	Office
LN 14-11	**GREATER SAGE-GROUSE HABITAT** The lease may, in part or in total, contain important greater sage grouse habitats as identified by the BLM, either currently or prospectively. The operator may be required to implement specific measures to reduce impacts of oil and gas operations on the greater sage grouse populations and habitat quality. Such measures shall be developed during the application for permit to drill on-site and environmental review process and will be consistent with the lease rights granted.	All
LN 14-37	**GREATER SAGE-GROUSE HABITAT CONSERVATION** The lessee/operator is given notice that prior to project-specific approval, the authorized officer may consider compensatory mitigation measures proffered by a project proponent, or compensatory mitigation requested or required by a state plan, program, or authorization. Any state required mitigation may be incorporated as a proposed design feature for a proposed project (Instructional Memorandum No. 2019-018). For projects in Montana, lessee/operators may be required to demonstrate they have submitted their project to the Montana Sage-Grouse Habitat Conservation Program for review, and have incorporated any State program requirements into their project proposal in any designated sage-grouse habitat. The objectives of these requirements are to avoid, minimize, or compensate for unavoidable impacts associated with oil and gas development in order to provide a net conservation gain, which is a benefit or gain above baseline conditions when the development occurs within Greater Sage-Grouse habitat as specified in the Record of Decision for the Field Office's Approved Resource Management Plan (Sept, 2015). Site-specific GRSG habitat conservation, mitigation, or compensation requirements would be identified during the BLM environmental review process and would be developed into the project proposal or as terms and conditions of the subsequent approval.	Billings HiLine Miles City South Dakota North Dakota
LN 14-44	**GREATER SAGE-GROUSE** The lease may in part, or in total contain important Greater Sage-Grouse habitats as identified by the BLM, either currently or prospectively. The operator may be required to implement specific measures to reduce effects of oil and gas operations on the Greater Sage-Grouse populations and habitat quality. Such measures shall be developed during the application for permit to drill on-site and environmental review process and will be consistent with the lease rights granted.	Lewistown
CSU 12-30	**SAGE-GROUSE GENERAL HABITAT MANAGEMENT AREAS** Surface occupancy and use within 2 miles of the perimeter of a lek active within the past 5 years may be restricted or prohibited. Prior to such activities, a plan to mitigate impacts to breeding or nesting sage- grouse; or breeding, nesting, or brood rearing habitat will be prepared by the proponent and implemented upon approval by the AO.	Miles City

ID #	Stipulation	Office
CSU 12-31	**SAGE-GROUSE HABITAT – CEDAR CREEK RESTORATION HABITAT MANAGEMENT AREA** Surface occupancy and use would be allowed with design features to minimize disturbance to sage- grouse habitat.	Miles City
CSU 12-40	**GREATER SAGE-GROUSE GENERAL HABITAT** Surface use prohibited within 2 miles of a lek. Surface disturbing and disruptive activities within 2 miles of a lek will be avoided unless the project proponent can clearly demonstrate that the impacts can be adequately mitigated and conservation actions or needed design features are included and the goals of this plan not compromised.	South Dakota
CSU 12-41	**GREATER SAGE-GROUSE GENERAL HABITAT MANAGEMENT AREAS (GHMAs) – UNDERGROUND UTILITY (POWER AND TRANSMISSION) LINES** All new utility and power lines that can be safely buried will be buried within 2 miles of sage-grouse leks and within sage-grouse winter range. When burial of power lines is not possible, above ground lines will be located and designed to minimize impacts of predation, collision, and other associated stressors to sage-grouse. Existing overhead lines within 2 miles of leks and within sage-grouse winter range will be evaluated for threats to sage-grouse and if necessary, modified to reduce the threat. If modification will not likely be effective, the overhead line may be relocated. Any requirements for modification or relocation of existing overhead lines will be subject to valid existing rights.	South Dakota
CSU 12-46	**GREATER SAGE-GROUSE GENERAL HABITAT MANAGEMENT AREA (GHMA)** All identified Greater Sage-Grouse habitat within GHMA is subject to the following operating constraints: Maintain Greater Sage-Grouse habitat to promote movement and genetic diversity of Greater Sage- Grouse populations To minimize the impacts of surface disturbing/disruptive activities and ensure maintenance of habitat for sustainable populations of Greater Sage-Grouse within GHMA, surface disturbing and disruptive activities are subject to the following requirements. a) Surface disturbing/disruptive activities will prevent or minimize disturbance to Greater Sage-Grouse or their habitat. Except as identified above or during emergency situations, activities will not compromise the habitat. b) Continuous noise (related to long-term operations and/or activities) will be no greater than 49 decibels at 1/4 miles from the perimeter of the lek. c) Temporary noise (related to installation, maintenance, one-time use, emergency operations, etc.) exceeding 49 decibels at 1/4 miles from the perimeter of a lek or surface disturbing/disruptive activities may be allowed, but only from 10 a.m. to 4 p.m. between March 15 and May15. d) Manage water developments to reduce the spread of West Nile virus within sage-grouse habitat areas. e) Site and/or minimize linear ROW to reduce disturbance to sagebrush habitats. f) Maximize placement of new utility developments (power lines, pipelines, etc.) and transportation routes in existing utility or transportation corridors. g) Power lines will be buried, eliminated, designed, or sited in a manner which does not impact sage- grouse. h) Placement of other high profile structures, exceeding 10 feet in height, will be eliminated, designed, or sited in a manner which does not impact sage-grouse. i) Remote monitoring of production facilities must be utilized, and all permit applications must contain a plan to reduce the frequency of vehicle use.	North Dakota

ID #	Stipulation	Office
	J) Maximize the area of interim reclamation on long-term access roads and well pads including reshaping, topsoiling and revegetating cut and fill slopes. k) Restore disturbed areas at final reclamation to pre-disturbance conditions or desired plant community. l) Permanent (longer than 2 months) structures which create movement must be designed or sited to minimize impacts to sage-grouse. m) Consider use of off-site mitigation, (e.g. creation of sagebrush habitat, purchase conservation easements, or buying down grazing) with proponent dollars to offset habitat losses. n) Consider creation of a "Mitigation Trust Account" when impacts cannot be avoided, minimized, or effectively mitigated through other means. If approved by the BLM, the proponent may contribute funding to maintain habitat function based on the estimated cost of habitat treatments or other mitigation needed to maintain the functions of impacted habitats. Off-site mitigation should only be considered when no feasible options are available to adequately mitigate within and immediately adjacent to the impacted site, or when the off- site location will provide more effective mitigation of the impact than can be achieved on-site	
CSU 12-66	**CRUCIAL WINTER RANGE – BIG GAME AND/OR SAGE-GROUSE** Prior to surface-disturbing or disruptive activities a plan to maintain functionality of crucial winter range for big game and/or Greater Sage-Grouse will be prepared by the proponent and implemented upon approval by the authorized officer. Within crucial winter range surface-disturbing or disruptive activities will be restricted or prohibited within 6/10 of a mile from any existing surface-disturbing or disruptive activity. The plan shall address how short-term and long-term direct and indirect effects to crucial winter range will be mitigated based on current science and research (Appendix E.5).	HiLine
CSU 12-67	**GREATER SAGE-GROUSE NESTING HABITAT (GENERAL HABITAT MANAGEMENT AREAS)** Within Greater Sage-Grouse general habitat surface-disturbing or disruptive activities may be restricted or prohibited within 2 miles of Greater Sage-Grouse leks. Prior to surface-disturbing or disruptive activities a plan to maintain functionality of Greater Sage-Grouse habitat will be prepared by the proponent and implemented upon approval by the authorized officer. This plan shall address how short- term and long-term direct and indirect effects to nesting and brood-rearing areas will be mitigated based on current science and research (Appendix E.5).	HiLine
CSU 12-69	**GREATER SAGE-GROUSE GENERAL HABITAT MANAGEMENT AREAS (GHMA)** In General Habitat Management Areas (GHMA), parcels would be offered for lease subject to Controlled Surface Use restrictions (including RDFs). Activities will be avoided within the following distances from a sage-grouse lek: • linear features (roads) within 3.1 miles of leks. • infrastructure related to energy development within 3.1 miles of leks. • tall structures (e.g., communication or transmission towers, transmission lines) within 2 miles of leks. • low structures (e.g., fences, rangeland structures) within 1.2 miles of leks. • surface disturbance (continuing human activities that alter or remove the natural vegetation) within 3.1 miles of leks. • noise and related disruptive activities including those that do not result in habitat loss (e.g., motorized recreational events) at least 0.25 miles from leks.	Dillon

ID #	Stipulation	Office
CSU 12-73	**GREATER SAGE-GROUSE GENERAL HABITAT MANAGEMENT AREAS (GHMAs)** Within Greater Sage-Grouse general habitat surface-disturbing or disruptive activities may be restricted or prohibited within 2 miles of Greater Sage-Grouse leks. Prior to surface-disturbing or disruptive activities, a plan to maintain functionality of Greater Sage-Grouse habitat will be prepared by the proponent and implemented upon approval by the authorized officer. This plan shall address how short-term and long-term direct and indirect effects to nesting and brood-rearing areas will be mitigated based on current science and research.	Lewistown
NSO 11-4	**GROUSE LEKS** No surface occupancy or use is allowed within one-quarter mile of grouse leks.	Butte Dillon
NSO 11-35	**SAGE GROUSE STRUTTING GROUNDS** No surface occupancy or use is allowed within one-quarter mile of active sage grouse strutting grounds.	North Dakota
NSO 11-79	**SAGE-GROUSE HABITAT – PRIORITY ARES, WEST DECKER RESTORATION AREA, SOUTH CARTER RESTORATION AREA** Surface occupancy and use is prohibited within sage-grouse priority areas, West Decker Restoration area, and South Carter Restoration Area.	Miles City
NSO 11-80	**SAGE-GROUSE HABITAT – GENERAL HABITAT MANAGEMENT AREA** Surface occupancy and use is prohibited within 6/10 mile of the perimeter of sage-grouse leks.	Miles City
NSO 11-96	**GREATER SAGE-GROUSE GENERAL HABITAT LEKS** No surface occupancy or use within 6/10 mile from leks.	South Dakota
NSO 11-97	**GREATER SAGE-GROUSE CRUCIAL WINTER RANGE** Sage-grouse crucial winter range will be managed as a No Surface Occupancy for oil and gas development and exploration.	South Dakota
NSO 11-98	**GREATER SAGE-GROUSE PRIORITY HABITAT MANAGEMENT AREAS (PHMAs)** Greater Sage-Grouse PHMAs will be managed as No Surface Occupancy and Use (127,735 surface and 412,822 oil and gas subsurface mineral acres.) These areas will be open to oil and gas leasing with no surface occupancy stipulation. All sage-grouse habitat that is not part of PHMAs will be managed as GHMA as noted in Figure 1-2.	South Dakota
NSO 11-99	**GREATER SAGE-GROUSE WINTER RANGE IN PRIORITY HABITAT MANAGEMENT AREAS (PHMAs)** Sage-grouse crucial winter range will be managed as a No Surface Occupancy for oil and gas development and exploration.	South Dakota
NSO 11-111	**GREATER SAGE-GROUSE PRIORITY HABITAT MANAGEMENT AREA (PHMA)** Surface occupancy and use is prohibited within Greater Sage-Grouse PHMA.	North Dakota
NSO 11-127	**GREATER SAGE-GROUSE PRIORITY HABITAT MANAGEMENT AREAS (PHMAs)** To protect Greater Sage-grouse, a priority species for management, surface occupancy and use is prohibited for oil and gas exploration and development within Greater Sage-grouse Priority Habitat Management Areas (PHMAs).	Billings
NSO 11-128	**GREATER SAGE-GROUSE GENERAL HABITAT MANAGEMENT AREAS** To protect general habitat areas for Greater Sage-grouse breeding activities, surface occupancy and use is prohibited for oil and gas exploration and development within 0.6 mile of the perimeter of Greater Sage-grouse leks.	Billings

ID #	Stipulation	Office
NSO 11-129	**GREATER SAGE-GROUSE RESTORATION AREAS** To protect restoration areas for Greater Sage-grouse breeding activities, surface occupancy and use is prohibited for oil and gas exploration and development within 0.6 mile of the perimeter of Greater Sage- grouse leks.	Billings
NSO 11-136	**CRUCIAL WINTER RANGE** Surface occupancy and use is prohibited for oil and gas exploration and development in crucial winter range for antelope, elk, moose, bighorn sheep, mule deer, white-tailed deer, and Greater Sage-grouse.	Billings
NSO 11-141	**SAGEBRUSH FOCAL AREA** Surface occupancy and use is prohibited within the Sagebrush Focal Area.	HiLine
NSO 11-151	**GREATER SAGE-GROUSE LEKS (GENERAL HABITAT AREAS)** Surface occupancy and use is prohibited within 0.6 miles of Greater Sage-Grouse leks. This stipulation does not apply within the boundaries of the Greater Sage-Grouse Priority Habitat Management Area.	HiLine
NSO 11-152	**GREATER SAGE-GROUSE PRIORITY HABITAT MANAGEMENT AREAS (PHMA)** Surface occupancy and use is prohibited within Greater Sage-Grouse Priority Habitat Management Area and the Grassland Bird/Greater Sage-Grouse Priority Habitat Management Area.	HiLine
NSO 11-159	**GREATER SAGE-GROUSE PRIORITY HABITAT MANAGEMENT AREAS (PHMA)** Priority Habitat Management Areas (PHMA) outside of Sagebrush Focal Areas would be open to mineral leasing and development subject to NSO with a limited **Exception**.	Dillon
NSO 11-171	**CRUCIAL WINTER RANGE** Surface occupancy and use is prohibited in crucial winter range for the following BLM priority species for management: • bighorn sheep • elk • greater sage-grouse • moose • mule deer • pronghorn • whitetail deer	Lewistown
NSO 11-181	**SAGEBRUSH FOCAL AREA** Surface occupancy and use is prohibited within the Sagebrush Focal Area (SFA)	Lewistown
NSO 11-182	**GREATER SAGE-GROUSE PRIORITY HABITAT MANAGEMENT AREAS (PHMAs)** To protect greater sage-grouse, a priority species for management, surface occupancy and use is prohibited for oil and gas exploration and development within greater sage-grouse Priority Habitat Management Areas (PHMAs).	Lewistown
NSO 11-183	**GREATER SAGE-GROUSE LEKS IN GENERAL HABITAT MANAGEMENT AREAS (GHMAs)** Surface occupancy and use is prohibited within 0.6 miles of the perimeter of greater sage-grouse leks in general habitat management areas.	Lewistown
TL 13-6	**BROOD-BEARING HABITAT** No surface use is allowed in nesting and early brood-rearing habitat (defined as within three miles of Leks) during the following time period: March 1 through June 30	Dillon

ID #	Stipulation	Office
TL 13-14	**SAGE GROUSE WINTER AND SPRING RANGE** No surface use is allowed from December 1 through May 15 within winter and spring range for Sage Grouse. This stipulation does not apply to operation and maintenance of production facilities.	Butte Dillon
TL 13-17	**STRUTTING GROUNDS** No surface use is allowed within two miles of active strutting grounds during the following time period: March 1 to June 15. This stipulation does not apply to the operation and maintenance of production facilities.	North Dakota
TL 13-30	**EARLY BROOD REARING HABITAT** No surface use is allowed from March 1 through June 30 in nesting and early brood rearing habitat (defined as within three miles of Leks). This stipulation does not apply to operation and maintenance of production facilities unless the findings of analysis demonstrate the continued need for such mitigation and that less stringent project- specific mitigation measures would be insufficient.	Butte
TL 13-40	**SAGE-GROUSE NEST AREAS (RESTORATION AREAS AND GENERAL HABITAT MANAGEMENT AREAS)** Surface use is prohibited from March 1 through June 30 within 3 miles of sage grouse leks. This stipulation does not apply to operation and maintenance of production facilities.	Billings
TL 13-43	**GREATER SAGE-GROUSE WINTER RANGE** Surface occupancy and use is prohibited from December 1 through March 31 in Greater Sage-Grouse winter range.	HiLine
TL 13-48	**WINTER RANGE – BIG GAME AND GREATER SAGE-GROUSE** Surface occupancy and use is prohibited from December 1 through May 15 in big game winter range.	HiLine

Appendix 2.11
North Dakota RMP

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2.11 NORTH DAKOTA RMP

This appendix presents the GRSG approved RMP amendment language from the 2015 record of decision for the North Dakota RMP Amendment. The North Dakota RMP was not amended in 2019. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment (RMPA), either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMPA include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable 2015 appendices that are listed in **Section 2.11.2** of this appendix. For the additional state-specific Montana/Dakotas management direction for the Proposed RMPA, see Chapter 2, Table 2-7.

2.11.1 North Dakota RMP

Table 1. Comparison of the Proposed RMP Amendment to Existing GRSG RMP Management Direction in North Dakota RMP

GRSG Management from North Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Special Status Species (SSS)	
Goal SSS-1: Maintain and/or increase GRSG abundance and distribution by conserving, enhancing, or restoring the sagebrush ecosystem upon which populations depend, in cooperation with other conservation partners.	Completely Revised – revised by rangewide direction
Objective SSS-1.1: Protect PHMA from anthropogenic disturbances that will reduce distribution or abundance of GRSG. Manage PHMA so that discrete anthropogenic disturbances cover less than 3% of the total GRSG habitat.	Completely Revised - revised by rangewide and state specific direction
Objective SSS-1.2: Habitat Delineation: Delineate PHMA to encompass the 100% Breeding Bird Density map: 32,900 BLM surface acres (7% of total PHMA acres). Since mapping 75% of breeding bird density map misses the majority of GRSG habitat in North Dakota, 100% was used. See Figure 2-1, North Dakota Habitat Management Areas (Appendix A, Approved RMP Amendment Maps).	Completely Revised - revised by rangewide and state specific direction
Objective SSS-1.3: Habitat Delineation: Delineate GHMA to encompass the remainder of the habitat: 80 BLM surface acres. See Figure 2-1 (Appendix A).	Completely Revised - revised by rangewide and state specific direction
[Plan Maintenance Action in 2018 (February 2, 2018) clarified the use and application of the habitat objectives. Updated the language for Objective SSS 1-4. These two MDs are deleted and replace with the text below.] The habitat objectives for GRSG (Table 2-2) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site. The seasonal habitat descriptions in Table 2-2 vary across the range of sage-	Completely Revised – revised by rangewide direction. Table 2-2 removed, indicators now in new appendix.

GRSG Management from North Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sagegrouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area. The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards. The Habitat Objectives Tables are to be used: ● To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments ● To evaluate land use plan effectiveness for sage-grouse conservation, and ● As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.	
Action SSS-1.1: Protect PHMA from anthropogenic disturbances that will reduce distribution or abundance of GRSG. See Appendix E, Greater Sage-Grouse Disturbance Caps. In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third- party actions, the BLM will apply the lek buffer-distances identified in the US Geological Survey Report Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review (Open File Report 2014- 1239) in accordance with Appendix B, Applying Lek Buffer Distances When Approving Actions.	Completely Revised - revised by rangewide and state specific direction
Action SSS-1.2: If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of landownership) within GRSG PHMA in any given BSU (see Figure 2-2, North Dakota and South Dakota GRSG Biologically Significant Unit and Priority Habitat Management Areas [Appendix A]), then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 hard rock mining law, valid existing rights, etc.) will be permitted by BLM within GRSG PHMA in any given BSU until the disturbance has been reduced to less than the cap. (BSU for this ARMPA is the summary of all the PHMA within the Dakotas GRSG population as delineated by USFWS.)	Completely Revised - revised by rangewide and state specific direction

GRSG Management from North Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Action SSS-1.3: If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of landownership) or if anthropogenic disturbance and habitat loss associated with conversion to agricultural tillage or fire exceed 5% within a project analysis area in PHMA, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 Mining Law, valid existing rights, etc.) will be permitted by BLM within PHMA in a project analysis area until the disturbance has been reduced to less than the cap.	Completely Revised - revised by rangewide and state specific direction
Action SSS-1.4: Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of landownership) in the PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is co-located into an existing disturbed area.	No change (same as 2015)
Action SSS-1.5: Implement Regional Mitigation Strategy (Appendix F, Regional Mitigation Strategy).	Completely Revised - revised by rangewide and state specific direction
New: rangewide predation management	Added by rangewide direction
Habitat Restoration/Vegetation Management (VEG)	
Objective VEG-1.1: In all PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).	No change (same as 2015)
Action VEG-1.1: Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those included in RMRS-GTR-326: Using resistance and resilience concepts to reduce impacts of invasive annual grasses and altered fire regimes on the sagebrush ecosystem and GRSG: A strategic multi-scale approach (Chambers et al., 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated.	Partially Revised - revised by state specific direction to clarify and remove FIAT reference.
Action VEG -1.2: Consideration for other threatened, endangered or sensitive species will be evaluated in addition to GRSG when prioritizing restoration projects.	No change (same as 2015)
Action VEG -1.3: Include GRSG habitat parameters as defined by State of North Dakota Sage-Grouse conservation plans and appropriate local information in habitat restoration objectives. Make meeting these objectives within PHMA the highest restoration priority, along with other priority species habitat.	Completely Revised – revised by rangewide direction
Action VEG -1.4: In PHMA, require use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success. Where probability of success or adapted seed availability is low, non-native seeds may be used as long as they support GRSG habitat objectives.	No change (same as 2015)

GRSG Management from North Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Action VEG -1.5: Design post restoration management to ensure long-term persistence in PHMA. This could include changes in livestock grazing management, travel management, etc., to achieve and maintain the desired condition of the restoration effort that benefits GRSG.	No change (same as 2015)
Action VEG -1.6: In PHMA, consider potential changes in climate when proposing restoration seedings when using native plants. Consider collection from the warmer component of the species current range when selecting native species.	No change (same as 2015)
Action VEG -1.7: In PHMA, restore native (or desirable) plants and create landscape patterns which most benefit GRSG, as well as other priority species.	No change (same as 2015)
Action VEG -1.8: Make re-establishment of sagebrush cover and desirable understory plants (relative to ecological site potential) a high priority for restoration efforts in PHMA. Prioritize areas for juniper removal to benefit GRSG habitat.	No change (same as 2015)
Action VEG -1.9: In PHMA fire prone areas, where sagebrush seed is required for GRSG habitat restoration, consider establishing seed harvest areas that are managed for seed production and are a priority for protection from outside disturbances.	No change (same as 2015)
Action VEG - 1.10: Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species.	No change (same as 2015)
Fire and Fuels Management (FIRE)	
Fuels Management	
Action FIRE-1.1: In PHMA, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems.	No change (same as 2015)
Do not reduce sagebrush cover to less than 15% unless a fuels management objective requires additional reduction in sagebrush cover to meet strategic protection of PHMA and conserve habitat quality for the species. Closely evaluate the benefits of the fuel break against the additional loss of sagebrush cover in future NEPA documents.	No change (same as 2015)
Apply appropriate seasonal restrictions for implementing fuels management treatments according to the type of seasonal habitats present in a priority area.	No change (same as 2015)
If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address: why alternative techniques were not selected as a viable options; • how GRSG goals and objectives will be met by its use; • how the COT report objectives will be addressed and met; • a risk assessment to address how potential threats to GRSG habitat will be minimized. Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect GRSG habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined	No change (same as 2015)

GRSG Management from North Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.	
Monitor and control invasive vegetation post-treatment.	No change (same as 2015)
Rest treated areas from grazing for two full growing seasons unless vegetation recovery dictates otherwise.	No change (same as 2015)
Require use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low, non-native seeds may be used as long as they meet GRSG habitat objectives.	No change (same as 2015)
Design post fuels management projects to ensure long-term persistence of seeded or pre- treatment native plants. This may require temporary or long-term changes in livestock grazing management, travel management, or other activities to achieve and maintain the desired condition of the fuels management project.	No change (same as 2015)
Action FIRE -1.2: Design fuels management projects in PHMA to strategically and effectively reduce wildfire threats in the greatest area.	No change (same as 2015)
Action FIRE -1.3: In PHMA, during fuels management project design, consider the utility of using livestock to strategically reduce fine fuels, and implement grazing management that will accomplish this objective. Consult with ecologists to minimize impacts on native perennial grasses.	No change (same as 2015)
Action FIRE -1.4: If prescribed fire is used, the Burn Plan will clearly indicate how COT objectives will be addressed and met, and why alternative techniques are not applicable. A fire risk assessment will be completed for implementation of prescribed fire used to meet the GRSG goals and objectives in PHMA (see Appendix H, GRSG Wildfire and Invasive Species Habitat Assessment).	Completely Revised - revised by state specific direction
Fire Operations	
Action FIRE -1.5: The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. In PHMA, prioritize suppression, immediately after life and property, to conserve the habitat. See Appendix H, which will be completed to help further refine fire management actions once this plan is completed.	No change (same as 2015)
Action FIRE -1.6: In GHMA, prioritize suppression where wildfires threaten PHMA.	No change (same as 2015)
Action FIRE -1.7: Follow the most current BMPs/RDFs for fire and fuels (Appendix C, Required Design Features).	No change (same as 2015)
Emergency Stabilization and Rehabilitation	
Action FIRE -1.8: In PHMA, prioritize native seed allocation for use in GRSG habitat in years when preferred native seed is in short supply. This may require reallocation of native seed from emergency stabilization and rehabilitation (ES&R) projects outside of PHMA to those inside it. Use of native plant seeds for ES&R seedings is required based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low, non-native seeds may be used as long as they meet GRSG habitat conservation objectives. Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, shall be the highest priority for rehabilitation efforts.	No change (same as 2015)

GRSG Management from North Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Action FIRE -1.9: In PHMA, design post ES&R management to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, and travel management, etc., to achieve and maintain the desired condition of ES&R projects to benefit GRSG.	No change (same as 2015)
Action FIRE -1.10: In PHMA, consider potential changes in climate when proposing post-fire seedings using native plants. Consider seed collections from the warmer component within a species' current range for selection of native seed.	No change (same as 2015)
Livestock Grazing (LG)	
Action LG-1.1: Grazing will be allowed on all lands identified as suitable (approximately 32,945 acres). See Figure 2-3, North Dakota Livestock Grazing (Appendix A).	Completely Revised – revised by rangewide direction
Action LG-1.2: Allocate up to an estimated 5,780 animal unit months to livestock in the long term (livestock use set at 25% of average annual forage production).	Completely Revised – revised by rangewide direction
Action LG-1.3: Within PHMA, incorporate GRSG habitat objectives and management considerations into all BLM grazing allotments through allotment management plans (AMP) or permit renewals. Develop standards with State of North Dakota and USFWS.	Completely Revised – revised by rangewide direction
Action LG-1.4: In PHMA, work cooperatively on integrated ranch planning within GRSG habitat so operations with deeded/BLM allotments can be planned as single units.	Completely Revised – revised by rangewide direction
Action LG-1.5: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (such as fire) and legal obligations.	Completely Revised – revised by rangewide direction
The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds, based on GRSG Habitat Objectives (Table 2-2), Land Health Standards (43 CFR, Part 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.	Completely Revised – revised by rangewide direction
Allotments within PHMA, focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks can include monitoring for actual use, utilization, and use supervision.	Completely Revised – revised by rangewide direction
Action LG-1.6: In PHMA, conduct land health assessments that include (at a minimum) indicators and measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Local objectives will be developed at the field office level in partnership with North Dakota Game and Fish Department and USFWS, and incorporated into AMPs or livestock grazing permits as appropriate incorporating best available science.	Completely Revised – revised by rangewide direction

GRSG Management from North Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Action LG-1.7: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3.	Completely Revised – revised by rangewide direction
Implementation Management Action after Land Health Evaluations	
Action LG-1.8: Develop specific objectives to conserve, enhance or restore PHMA based on ecological site descriptions (ESD) and assessments (including within wetlands and riparian areas). If an effective grazing system that meets GRSG habitat requirements is not already in place, analyze at least one alternative that conserves, restores or enhances GRSG habitat in the NEPA document prepared for the permit renewal.	Completely Revised – revised by rangewide direction
Action LG-1.9: In PHMA, manage for vegetation composition and structure consistent with GRSG seasonal habitat objectives. ESDs can help determine whether or not the GRSG seasonal habitat objectives are consistent with the ecological site potential within the reference state. GRSG seasonal habitat objectives and ecological site potential within reference states are not always going to be the same.	Completely Revised – revised by rangewide direction
Action LG-1.10: In PHMA, implement management actions (grazing decisions, AMP/Conservation Plan development, or other agreements) to modify grazing management to meet State of North Dakota seasonal GRSG habitat requirements, where allotment evaluations indicate land health assessments are not being met due to livestock. Consider singly, or in combination, changes in: • Season or timing of use; • Numbers of livestock (includes temporary non-use or livestock removal); • Distribution of livestock use; • Intensity of use; and • Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas, and goats).	Completely Revised – revised by rangewide direction
Action LG-1.11: During drought periods, prioritize evaluating effects of the drought in PHMA relative to their needs for food and cover. Management will continue to be in accordance with the Montana- Dakotas Drought Policy (see Appendix H, Drought Policy, in North Dakota Greater Sage-Grouse Proposed RMPA/Final EIS).	Completely Revised – revised by rangewide direction
Riparian Areas and Wet Meadows	
Action LG-1.12: Where riparian and wetland areas are already meeting standards, they will be maintained in that condition or better. Where a site's capability is less than proper functioning condition (PFC), BLM will manage to achieve or move towards capability. Within PHMA and GHMA, manage wet meadows to maintain a component of perennial forbs with diverse species richness relative to site potential (e.g., reference state) to facilitate brood rearing.	Partially Revised - revised by rangewide and state specific direction to clarify

GRSG Management from North Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Action LG-1.13: In PHMA, where riparian areas and wet meadows meet PFC, strive to move towards GRSG habitat objectives within capabilities of the reference state vegetation relative to the ESD. Example: Within PHMA reduce, where necessary, hot season grazing on riparian and meadow complexes to promote recovery or maintenance of appropriate vegetation and water quality. Utilize fencing/herding techniques, seasonal use, or livestock distribution changes where necessary to reduce pressure on riparian or wet meadow vegetation used by GRSG in the hot season (summer).	Partially Revised - revised by rangewide and state specific direction to clarify
Action LG-1.14: Authorize new water development for diversion from spring or seep source only when PHMA will be maintained or benefit from the development. This includes developing new water sources for livestock as part of an AMP/Conservation Plan to improve GRSG habitat.	Partially Revised - revised by rangewide and state specific direction to clarify
Action LG-1.15: Analyze springs, seeps and associated pipelines at time of grazing lease renewal to determine if modifications are necessary to maintain the continuity of the predevelopment riparian area within PHMA. Make modifications where necessary, considering impacts on other water uses when such considerations are neutral or beneficial to GRSG.	Partially Revised - revised by rangewide and state specific direction to clarify
Treatments to Increase Forage for Livestock/Wild Ungulates	
Action LG-1.16: In PHMA, allow treatments that conserve, enhance or restore GRSG habitat as well as other priority species habitat (this includes treatments that benefit livestock as part of an AMP/Conservation Plan to improve GRSG habitat).	Partially Revised - revised by rangewide and state specific direction to clarify
Action LG-1.17: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to PHMA to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings are part of an AMP/Conservation Plan or if they provide value in conserving or enhancing the rest of the PHMA, then no restoration will be necessary. Assess the compatibility of these seedings for GRSG habitat or as a component of a grazing system during the land health assessments.	Partially Revised - revised by rangewide and state specific direction to clarify
Structural Range Improvement and Livestock Management Tools	
Action LG-1.18: In PHMA, design any new structural range improvements and location of supplements (salt or protein blocks) to conserve, enhance, or restore GRSG habitat through an improved grazing management system relative to GRSG objectives. Structural range improvements, in this context, include but are not limited to: cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. Potential for invasive species establishment or increase following construction must be considered in the project planning process and monitored and treated post-construction.	Completely Revised – revised by rangewide direction
Action LG-1.19: When developing or modifying water developments in PHMA, use applicable RDFs (Appendix C) to mitigate potential impacts from West Nile virus.	Completely Revised - revised by rangewide and state specific direction

GRSG Management from North Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Action LG-1.20: In PHMA, evaluate existing structural range improvements and location of supplements (salt or protein blocks) during grazing lease renewal process to make sure they conserve, enhance or restore GRSG habitat. To reduce outright GRSG strikes and mortality, remove, modify or mark fences in high risk areas within PHMA based on proximity to lek, lek size, and topography. Monitor for, and treat invasive species associated with existing range improvements.	Completely Revised - revised by rangewide direction
Mineral Resources (MR)	
Fluid Minerals	
Objective MR-1.1: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non- habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 US Code 226(p) and 43 CFR, Part 3162.3-1(h).	Completely Revised – revised by rangewide direction
Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, minimize, and apply compensatory mitigation for adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an application for permit to drill for the lease to avoid and minimize impacts on GRSG or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such Federal leases.	Completely Revised – revised by rangewide direction
Unleased Federal Fluid Mineral Estate	
Action MR-1.1: Open to oil and gas leasing and development; however, surface occupancy and use will be prohibited within PHMA (NSO). Upon expiration or termination of existing leases, apply NSO. See Figure 2-4, North Dakota Fluid Minerals (Oil, Gas, and Geothermal) (Appendix A).	Completely Revised - revised by rangewide and state specific direction
No waivers or modifications to a fluid mineral lease no-surface-occupancy stipulation will be granted. The BLM Authorized Officer may grant an exception to a fluid mineral lease no-surface-occupancy stipulation only where the proposed action: Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or, Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and will provide a clear conservation gain to GRSG. Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMPA. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the	Completely Revised - revised by rangewide and state specific direction

GRSG Management from North Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
duration of the proposed action's impacts. Any exceptions to this lease stipulation may be approved by the BLM Authorized Officer only with the concurrence of the State Director. The BLM Authorized Officer may not grant an exception unless the state wildlife agency (NDGF), the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and NDGF Director for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publically available at least quarterly.	
Action MR-1.2: In GHMA, surface occupancy and use will be subject to special operating constraints (CSU) (Appendix G, Oil and Gas Stipulations).	Completely Revised - revised by rangewide and state specific direction
Action MR-1.3: Allow geophysical exploration within PHMA to obtain exploratory information for areas outside of and adjacent to PHMA.	Completely Revised - revised by state specific direction
Action MR-1.4: Allow geophysical operations by existing roads and trails, or helicopter-portable drilling methods, and in accordance with seasonal timing restrictions and/or other restrictions that may apply.	Completely Revised - revised by state specific direction
Leased Federal Fluid Mineral Estate	
Action MR-1.5: During implementation level review and decisions (e.g., approval of an application for permit to drill and Sundry Notice) and upon completion of the environmental record of review (43 CFR, Part 3162.5), include appropriate documentation of compliance with NEPA. In this process evaluate, among other things: (1) Whether the conservation measure is "reasonable" (43 CFR, Part 3101.1-2) with the valid existing rights; and (2) Whether the action is in conformance with the approved ARMPA.	Completely Revised - revised by rangewide direction
Conservation Measure #1: The following operating constraints will be applied to existing leases as conditions of approval (COAs) in PHMA and GHMA. Exceptions may be granted by the BLM Authorized Officer if an environmental review demonstrates that effects can be mitigated to an acceptable level, habitat for the species is not present in the area, or portions of the area can be occupied without affecting a particular species. Exceptions may also be granted where the short-term effects are mitigated by the long-term benefits. The BLM may add additional site-specific restrictions as deemed necessary by further environmental analysis and as developed through coordination with other federal, state, and local regulatory and resource agencies. • Surface disturbing/disruptive activities will prevent or minimize disturbance to GRSG or their habitat. Except as identified above or during emergency situations, activities will not compromise the functionality of the habitat. • Manage water developments to reduce the spread of West Nile virus within GRSG habitat areas. • Site and/or minimize linear ROW to reduce disturbance to sagebrush habitats. • Maximize placement of new utility developments (power lines, pipelines, etc.) and transportation routes in existing ROWs.	Completely Revised - revised by rangewide direction

GRSG Management from North Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
• Power lines will be buried, eliminated, designed or sited in a manner which does not impact GRSG. • Placement of other high profile structures, exceeding 10 feet in height, will be eliminated, designed or sited in a manner which does not impact GRSG. • Remote monitoring of production facilities must be utilized and all permit applications must contain a plan to reduce the frequency of vehicle use. • Maximize the area of interim reclamation on long-term access roads and well pads including reshaping, top-soiling and re-vegetating cut and fill slopes. Utilize native grass species mix which includes sagebrush and forbs. • Restore disturbed areas at final reclamation to pre-disturbance conditions or desired plant community. Utilize native grass species mix which includes sagebrush and forbs. • Permanent (longer than 2 months) structures which create movement must be designed or sited to minimize impacts on GRSG. • As reasonable (43 CFR, Part 3101.1-2), in consideration of valid existing rights, and to achieve a net conservation gain, the BLM will require compensatory mitigation when impacts cannot be adequately avoided and minimized, and residual impacts will result in habitat loss and degradation. Compensatory mitigation actions will align with the recommendations in the Regional Mitigation Strategy (see Appendix F), as appropriate. A priority may be given to compensatory mitigation actions in the same PHMA as is being impacted, unless a greater benefit can be achieved elsewhere. Compensatory mitigation will be considered when no feasible options remain to adequately avoid and minimize impacts within and immediately adjacent to the impacted site.	
Conservation Measure #2: Make applicable RDFs (Appendix C) mandatory as COA within PHMA.	Completely Revised - revised by rangewide direction
Solid Minerals	
Coal	
Action MR-1.6: At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1). See Figure 2-13, North Dakota Coal (Appendix A).	Completely Revised – revised by rangewide direction
Action MR-1.7: Subsurface mines - Grant no new mining leases unless all surface disturbances (appurtenant facilities) are placed outside of PHMA.	No change (same as 2015)
Action MR-1.8: In GHMA, apply minimization of surface-disturbing or disrupting activities (including operations and maintenance) where needed to reduce the impacts of human activities on important seasonal GRSG habitats. Apply these measures during activity level planning. Use additional, effective mitigation to offset impacts as appropriate (determined by local options/needs).	No change (same as 2015)

GRSG Management from North Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Locatable Minerals	
Action MR-1.9: In PHMA, proposed actions under Plan of Operations and Notices will be analyzed on a case-by-case basis in cooperation with the State of North Dakota, and RDFs (Appendix C) will be applied to the extent consistent with applicable law. See Figure 2-5, North Dakota Locatable Minerals (Appendix A).	No change (same as 2015)
Mineral Materials	
Action MR-1.10: Close PHMA to mineral material sales. See Figure 2-6, North Dakota Salable Minerals (Mineral Materials) (Appendix A).	Completely Revised - revised by rangewide and state specific direction
Action MR-1.11: In PHMA, restore salable mineral pits no longer in use to meet GRSG habitat conservation objectives. Note: Although there are no authorized mineral pits in the planning area, any trespass pits found in the planning area will be subject to restoration.	No change (same as 2015)
Nonenergy Leasable Minerals	
Action MR-1.12: Close PHMA to nonenergy leasable mineral leasing. See Figure 2-7, North Dakota Nonenergy Leasables (Appendix A). This includes not permitting any new leases to expand an existing mine.	Completely Revised – revised by rangewide direction
Action MR-1.13: For existing nonenergy leasable mineral leases in PHMA, follow the same RDFs applied to fluid minerals (Appendix C), when wells are used for solution mining.	No change (same as 2015)
Mineral Split Estate	
Action MR-1.14: Where the federal government owns the mineral estate in PHMA and GHMA, and the surface is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.	Partially Revised - revised by state specific direction to clarify HMA language
Action MR-1.15: Where the federal government owns the surface and the mineral estate is in non- federal ownership in PHMA and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.	Partially Revised - revised by state specific direction to clarify HMA language
Lands and Realty (LR)	
Objective LR-1.1: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available.	No change (same as 2015)
Rights-of-Way	
Action LR-1.1: PHMA will be managed as ROW avoidance area for high-voltage transmission lines (100 kilovolt [kV] and over) and large pipelines (24 inches in width and over). See Figure 2-10a, North Dakota Major Rights-of-Way (Appendix A).	Completely Revised - revised by rangewide and state specific direction
Where new ROWs are required, co-locate new ROW within existing ROWs or where it best minimizes impacts on GRSG and GRSG habitat.	Completely Revised - revised by rangewide and state specific direction
Action LR-1.2: PHMA will be managed as ROW avoidance area for minor ROWs (including communication sites and towers). See Figure 2-10b, North Dakota Minor Rights-of-Way (Appendix A).	Completely Revised - revised by rangewide and state specific direction
Action LR-1.3: Make PHMA exclusion area for new ROW wind and solar energy authorizations. See Figure 2-8, North Dakota Wind, and Figure 2-9, North Dakota Solar (Appendix A).	Completely Revised - revised by rangewide and state specific direction

GRSG Management from North Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Action LR-1.4: When addressing ROW authorizations in PHMA identify and evaluate opportunities to remove, bury or modify existing power lines within PHMA.	No change (same as 2015)
Action LR-1.5: In PHMA, where existing leases or ROWs have had some level of development (road, fence, well, etc.) and are no longer in use, reclaim the site by removing these features and restoring the habitat.	No change (same as 2015)
Action LR-1.6: GHMA will be managed as ROW avoidance area for high-voltage transmission lines (100kV and over) and large pipelines (24 inches in width and over).	Completely Revised - revised by rangewide and state specific direction
Action LR-1.7: Minor ROWs will be allowed in GHMA with appropriate mitigation and conservation measures identified within the terms of the authorization to minimize surface disturbing and disruptive activities.	Completely Revised - revised by rangewide and state specific direction
Action LR-1.8: Make GHMA avoidance area for new wind and solar energy authorizations. See Figure 2-8 and Figure 2-9 (Appendix A).	Completely Revised - revised by rangewide and state specific direction
Action LR-1.9: Where new ROWs are necessary in GHMA, co-locate new ROWs within existing ROWs where possible.	No change (same as 2015)
Action LR-1.10: PHMA will be avoidance areas for leases/land use authorizations, which can be for agricultural, occupancy, or filming. Leases/land use authorizations will be allowed in GHMA with appropriate mitigation and conservation measures identified within the terms of the authorization to minimize surface disturbing and disruptive activities.	No change (same as 2015)
Action LR-1.11: Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in Table 2 of the Monitoring Framework (Appendix D)−under valid existing rights prior to authorizing new projects in PHMA.	Partially revised (move to PHMA section, update MF ref)
Land Tenure Adjustment	
Action LR-1.12: Lands classified as PHMA and GHMA for GRSG will be retained in federal management unless: (1) the BLM can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to GRSG or (2) the BLM can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of GRSG. See Figure 2-11, North Dakota Land Tenure (Appendix A).	No change (same as 2015)
Action LR-1.13: PHMA will be a priority in consideration of land acquisitions. Consider GRSG for all land tenure actions.	No change (same as 2015)
Recommend Land Withdrawals	
Action LR-1.14: No areas are currently withdrawn from minerals on BLM surface.	No change (same as 2015)
Action LR-1.15: In PHMA, do not recommend lands withdrawals (i.e., those not associated with mineral activity) unless the land management is consistent with GRSG conservation measures. (For example, in a proposed withdrawal for a military training range buffer area, manage the buffer area with GRSG conservation measures.)	No change (same as 2015)
Recreation (REC)	
Action REC-1.1: Only allow Special Recreation Permits that will have neutral or beneficial effects on PHMA.	No change (same as 2015)
Action REC-1.2: In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, and staging areas) unless the development will have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from important areas, etc.), or unless the development is required for visitor health and safety or resource protection.	Partially Revised - revised by state specific direction, see mitigation and SSS sections.

GRSG Management from North Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Travel and Transportation (TTM)	
Action TTM-1.1: In PHMA and GHMA, limit off-high vehicle (OHV) travel to existing roads, primitive roads, and trails at a minimum, until such time as travel management planning is complete and routes are either designated or closed. See Figure 2-12, North Dakota Trails and Travel Management (Appendix A).	No change (same as 2015)
Action TTM-1.2: In PHMA, travel management will evaluate the need for permanent, or seasonal, road or area closures where vehicle use is causing or will cause adverse effects upon habitat.	No change (same as 2015)
Action TTM-1.3: In PHMA and GHMA, complete activity level travel plans within 5 years of the ROD. During activity level planning, where appropriate, designate routes in PHMA and GHMA with current administrative/agency purpose or need to administrative access only.	No change (same as 2015)
Action TTM-1.4: In PHMA, limit route construction to realignments of existing designated routes if that realignment has a minimal impact on GRSG habitat, eliminates the need to construct a new road, or is necessary for motorist safety. Allow new routes/realignments in PHMA and GHMA during site-specific travel planning if it improves GRSG habitat and resource conditions.	No change (same as 2015)
Action TTM-1.5: In PHMA, use existing routes, or realignments as described above to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing routes, then build any new route constructed to the absolute minimum standard necessary.	No change (same as 2015)
Action TTM-1.6: In PHMA and GHMA, allow no upgrading of existing routes that will change route category (road, primitive road, or trail) or capacity unless the upgrading will have minimal impact on GRSG habitat, is necessary for motorist safety, or eliminates the need to construct a new road.	No change (same as 2015)
Action TTM-1.7: When travel management plans are complete, conduct restoration of roads, primitive roads and trails in PHMA and GHMA.	No change (same as 2015)
Action TTM-1.8: When reseeding roads, primitive roads and trails in PHMA and GHMA, use appropriate seed mixes and consider the use of transplanted sagebrush.	No change (same as 2015)
Action TTM-1.9: In PHMA and GHMA, temporary closures will be considered in accordance with 43 CFR, subpart 8364 (Closures and Restrictions); 43 CFR, subpart 8351 (Designated National Area); 43 CFR, subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR, subpart 8341 (Conditions of Use).	No change (same as 2015)
Temporary closure or restriction orders under these authorities are enacted at the discretion of the BLM Authorized Officer to resolve management conflicts and protect persons, property, and public lands and resources. Where a BLM Authorized Officer determines that OHVs are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR, Part 8341.2) A closure or restriction order shall be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders shall be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas**.**	No change (same as 2015)

Table 2. North Dakota Habitat Objectives for GRSG

[Note: Table from 2015 Plan, see Appendix 8 for Indicator Tables for Proposed Plan]

Attribute	Indicators	Desired Conditions	Reference
BREEDING AND NESTING (Seasonal Use Period March 1 - June 15)			
Lek Security	Proximity of trees	0.388 miles avoidance of coniferous habitats	Doherty 2008
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 328 feet (ft.) (100 meters [m]) of an occupied lek	Stiver et al. 2015
Cover	Sagebrush cover	≥5-25%	Herman-Brunson 2007 Doherty et al. 2010
	Sagebrush height	7-30 inches	Swanson 2009 Holloran et al. 2005 Herman-Brunson 2007
	Predominant sage brush shape	Predominately spreading shape	Stiver et al. 2015
	Perennial grass cover	≥10% Not Continuous	Doherty et al. 2010 Doherty et al. 2011 Holloran et al. 2005 Hagen et al. 2007
	Perennial grass and forb height	Adequate nest cover based on ecological site potential and seasonal precipitation; 4.4-11.3 inches[1]	Doherty et al. 2014
	Perennial forb cover	≥5% Not Continuous	Doherty et al. 2010 Doherty et al. 2011 Hagen et al. 2007 Holloran et al. 2005
BROOD-REARING/SUMMER (Seasonal Use Period June 16-October 31			
Cover	Sagebrush cover	≥5 %	Herman-Brunson 2007 Swanson 2009 Doherty et al. 2010 Doherty et al. 2011 Hagen et al. 2007
	Sagebrush height	7-30 inches	Herman-Brunson 2007 Doherty et al. 2011 Holloran et al. 2005 Schroeder et al. 1999
	Perennial grass and forbs	≥20% Forbs 6-16%	Doherty et al. 2010 Doherty et al. 2011 Holloran et al. 2005 Herman-Brunson 2007
	Riparian areas/mesic meadows	Proper Functioning Condition	BLM 1997c Prichard et al. 1999 Dickard et al. 2015
	Upland and riparian perennial forb availability	Preferred forbs are common with several preferred species present.	Stiver et al. 2015 Doherty et al. 2011

Attribute	Indicators	Desired Conditions	Reference
WINTER (Seasonal Use Period November 1-February 28)			
Cover and Food	Sagebrush cover above snow	≥10%	Schroeder et al. 1999 Swanson 2009
	Sagebrush height above snow	≥ 6 inches	Schroeder et al. 1999 Doherty et al. 2011 Swanson 2009

[1]Specific height requirements needed to meet the objective will be set at the time of watershed assessments.

2.11.2 Relevant Appendices

The following table shows which appendices from the 2015 plan have management direction that may change through the Proposed RMPA. The appendices can be found on the North Dakota GRSG ePlanning website.

ARMPA Appendix Name	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Approved RMP Amendment Maps	Completely Revised – See new maps in Appendix 1
B: Applying Lek Buffer Distances When Approving Actions	Completely revised – see state-specific language
C: Required Design Features	Partially updated – see state specific and new livestock grazing BMPs
D: The Greater Sage-Grouse Monitoring Framework	Completely revised –see new rangewide management direction
E: Greater Sage-Grouse Disturbance Caps	Removed, see new rangewide management direction
F: Regional Mitigation Strategy	Removed, see new rangewide management direction
G: Oil and Gas Stipulations	Completely revised – revised by rangewide and state-specific, see Appendix 16
H: GRSG Wildfire and Invasive Species Habitat Assessment	Removed

Appendix 2.12
Nevada and Northeastern California RMPs

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2.12 NEVADA AND NORTHEASTERN CALIFORNIA RMPS

This appendix presents the GRSG approved RMP amendment language from the 2015 and 2019 records of decision for Nevada and northeastern California. Changes between 2015 and 2019 are noted. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment, either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMP Amendment include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable 2015 and 2019 appendices that are listed in **Section 2.12.2** of this appendix. For the additional state-specific Nevada/California management direction for the Proposed RMP Amendment, see Chapter 2, Table 2-9.

2.12.1 Nevada and Northeastern California

Table 1. Comparison of Proposed RMP Amendment to Existing GSRG RMP Management Direction in Nevada/California

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
SPECIAL STATUS SPECIES (SSS)	***SPECIAL STATUS SPECIES (SSS)***	—
GOAL:	**GOAL:**	—
Goal SSS 1: Conserve, enhance, and restore the sagebrush ecosystem upon which GRSG populations depend in an effort to maintain and/or increase their abundance and distribution, in cooperation with other conservation partners.	No changes made.	Completely Revised-revised by rangewide.
Objectives	—	—
Objective SSS 1: Manage land resource uses to meet GRSG habitat objectives, as described in Table 2-2. The habitat objectives will be used to evaluate management actions that are proposed in GRSG habitat. Managing for habitat objectives will ensure that habitat conditions are maintained if they are currently meeting objectives or if habitat conditions move toward these objectives in the event that current conditions do not meet these objectives.	No changes made.	Completely Revised-revised by rangewide.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Objective SSS 2: Maintain or improve connectivity between, to, and in PHMAs and GHMAs to promote movement and genetic diversity for GRSG population persistence and expansion.	No changes made.	No change (same as 2015).
Objective SSS 3: Identify and implement GRSG conservation actions that can augment, enhance, or integrate program conservation measures established in agency and state land use and policy plans, to the extent consistent with applicable law.	No changes made.	No change (same as 2015).
Objective SSS 4: In PHMAs and GHMAs, apply the concept of "avoid, minimize, and compensatory mitigation" for all human disturbance in areas not already excluded or closed, so as to avoid adverse effects on GRSG and its habitat. The first priority will be to avoid new disturbance; where this is not feasible, the second priority will be to minimize and mitigate any new disturbance (Appendices F and I).	**Objective SSS 4:** When authorizing third-party actions in designated GRSG HMAs, the BLM will apply avoidance and minimization measures to reduce impacts, while seeking to achieve the planning-level goals and objectives for GRSG and its habitat, consistent with valid existing rights and applicable law. Management will be consistent with the GRSG goals and objectives, and in conformance with BLM Manual 6840, Special Status Species Management. Specifically, the BLM will authorize uses of the public lands that are consistent with the policy in BLM Manual 6840 and therefore "minimize or eliminate threats affecting the status of [GRSG]" or "improve the condition of [GRSG] habitat."	Completely Revised-revised by rangewide.
Management Decisions (MD):	**Management Decisions (MD):**	—
MD SSS 1: In PHMAs and GHMAs, work with the proponent/applicant, whether in accordance with a valid existing right or not, and use the following screening criteria to avoid effects of the proposed human activity on GRSG habitat[l] A. First priority—locate project/activity outside PHMAs and GHMAs B. Second priority—if the project/activity cannot be placed outside PHMAs and GHMAs, locate the surface-disturbing activities in non-habitat	**MD SSS 1:** In PHMAs and GHMAs, work with the proponent/applicant, whether in accordance with a valid existing right or not, and use the following screening criteria to avoid effects of the proposed human activity on GRSG habitat[l]: A. First priority—locate project/activity outside PHMAs and GHMAs; B. Second priority—if the project/activity cannot be placed outside PHMAs and GHMAs, locate the surface-disturbing activities in non-habitat	Partially Revised-revised by state specific.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
areas first, then in the least suitable habitat for GRSG I. In non-habitat, ensure the project/activity will not create a barrier to movement or connectivity between seasonal habitats and populations C. Third priority—collocate the project/activity next to or in the footprint of existing infrastructure	areas first, then in the least suitable habitat for GRSG. I-In non-habitat, ensure the project/activity will not create a barrier to movement or connectivity between GRSG seasonal habitats and populations; C. Third priority—collocate the project/activity next to or in the footprint of existing infrastructure.	
MD SSS 2: In PHMAs, the following conditions will be met in order to avoid, minimize, and mitigate any effects on GRSG and its habitat from the project/activity:[2] A. Manage discrete anthropogenic disturbances, whether temporary or permanent, so they cover less than 3 percent of 1) biologically significant units (BSUs; total PHMA area associated with a GRSG population area (see Appendix A; Figure 2-2)) and 2) in a proposed project analysis area. See Appendix E (Disturbance Cap Guidance) for additional information on implementing the disturbance cap, including what is and is not considered disturbance and how to calculate the proposed project analysis area, as follows: 1. If the 3 percent human disturbance cap is exceeded on all lands (regardless of ownership) in PHMAs in any given BSU, then no further discrete human disturbances (subject to applicable laws and regulations, such as the 1872 Mining Law, as amended, and valid existing rights) will be permitted, by BLM within GRSG PHMA in any given BSU until the disturbance has been reduced to less than the cap (see Nevada exception under MD SSS 2 a. 3. Appendix E).	**MD SSS 2:** In PHMAs, the following conditions will be met in order to avoid and minimize impacts to GRSG and its habitat. The BLM will consider compensatory mitigation actions only when offered voluntarily by a project proponent; when required by law other than FLPMA or as a component of compliance with a States' mitigation plan, program, or authority, such as required by the State of Nevada Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law). A. Manage discrete anthropogenic disturbances, whether temporary or permanent, so they cover less than 3 percent of: 1) biologically significant units (BSUs; total PHMA associated with a GRSG population area [see Appendix A; Figure 2-2]) and 2) in a proposed project analysis area. See Appendix F (Disturbance Cap Guidance) for additional information on implementing the disturbance cap, including what is and is not considered disturbance and how to calculate the proposed project analysis area, as follows: 1. If the 3 percent human disturbance cap is exceeded on all lands (regardless of ownership) in PHMAs in any given BSU, then no further discrete human disturbances	**MD SSS 2A:** Completely Revised-revised by rangewide and state specific.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
2. If the 3 percent disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in a PHMA, then no further anthropogenic disturbance will be permitted by BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap (subject to applicable laws and regulations, such as the 1872 Mining Law, as amended, valid existing rights; see Nevada exception under MD SSS 2 a. 3. Appendix E). a. For BLM land in the state of Nevada only, the following disturbance management protocol (DMP) is intended to provide for a 3 percent limitation on disturbance, except in situations where a biological analysis indicates a net conservation gain to the species. • Such discretionary activities that would cause disturbances in excess of 3 percent at the project or BSU scale (see Appendix E) will be prohibited, unless a technical team described below determines that new or site-specific information indicates the project can be modified to result in a net conservation gain at the BSU level. Factors considered by the team will include GRSG abundance and trends, habitat amount and quality, extent of project disturbance, location and density of existing disturbance, project design options and other biological factors. • Any exceptions to the 3 percent disturbance limitation may be approved by the Authorized Officer only with the	(subject to applicable laws and regulations, such as the 1872 Mining Law, as amended, and valid existing rights) will be permitted, by the BLM within PHMA in any given BSU until the disturbance has been reduced to less than the cap (see Nevada exception under MD SSS 2 A. 2a). 2. If the 3 percent disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in PHMA, then no further anthropogenic disturbance will be permitted by the BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap (subject to applicable laws and regulations, such as the 1872 Mining Law, as amended, valid existing rights; see Nevada exception under MD SSS 2 A. 2a.). a. For BLM land in the state of Nevada only, the following disturbance management protocol is intended to provide for a 3 percent limitation on disturbance, except in situations where a net conservation gain to the species is achieved as a component of compliance with a state mitigation plan, program, or authority, such as required by the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law). 3. For BLM land in the state of California only, subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in	

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
concurrence of the State Director. The Authorized Officer may not grant an exception unless the NDOW, the USFWS, and the BLM unanimously find that the proposed action satisfies the conditions stated in the above paragraph. Such finding shall initially be made by the technical team, which consists of a field biologist or other GRSG experts from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the BLM State Director, USFWS State Ecological Services Director and NDOW Director for final resolution. In the event their finding is not unanimous, the exception will not be granted (Appendix E). 3. For BLM land in the state of California only, subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in the PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is co-located into an existing disturbed area. Energy and mining facilities to which this action applies are: • Oil and gas wells and development facilities. • Wind towers	PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by the BLM: 1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or 2) unless the energy or mining facility is co-located into an existing disturbed area. Energy and mining facilities to which this action applies are: • Oil and gas wells and development facilities. • Wind towers • Geothermal wells/developments, and • Active locatable, leasable, and salable developments. 4. For proposed projects to be located, within existing designated utility corridors, the 3 percent disturbance cap may be exceeded at the project scale if a net conservation gain to the species will be achieved, as a component of compliance with a State's mitigation plan, program, or authority, such as required by the State of Nevada Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law). This exception is limited to projects which fulfill the use for which the corridors were designated (e.g., transmission lines, pipelines, etc.) and the designated width of a corridor will not be exceeded as a result of any project co-location.	

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
• Geothermal wells/developments, and • Active locatable, leasable, and salable developments. 4. For proposed projects to be located, within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location.		
B. In PHMA, in undertaking BLM management actions, and consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species, including accounting for any uncertainty associated with the effectiveness of such mitigation. The project/activity with associated mitigation (such as the use of the State of Nevada Conservation Credit System) will result in an overall net conservation gain to GRSG (see Appendix F).	B. See **MD MIT 1**.	**MD SSS 2B:** Completely Revised-revised by rangewide.
C. Authorized/permitted activities are implemented by adhering to the RDFs described in Appendix C, consistent with applicable law. At the site-specific scale, if an RDF is not implemented, at least one of the following must be demonstrated in the NEPA analysis associated with the project/activity:	C. Authorized/permitted activities are implemented by adhering to the Required Design Features (RDFs) described in Appendix C, consistent with applicable law. At the site-specific scale, if an RDF is not implemented, at least one of the following must be demonstrated in the NEPA analysis associated with the project/activity:	**MD SSS 2C:** No change (same as 2019).

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1. A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to the site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. 2. An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. 3. A specific RDF will provide no additional protection to GRSG or its habitat.	1. A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to the site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. 2. An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. 3. A specific RDF will provide no additional protection to GRSG or its habitat.	
D. In management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS report, Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review Open File-Report 2014-1239 (Manier et al. 2014), in accordance with Appendix B.	D. In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will utilize the lower end of the interpreted range of lek buffer-distances and guidance identified in Mainer et al. (2014) to establish the evaluation area around leks that will be used to analyze impacts during project-specific NEPA, including scientifically justifiable departures based on local data, topography, and other factors, in accordance with **Appendix B**.	**MD SSS 2D:** No change (same as 2019).
E. Seasonal restrictions will be applied during the periods specified below to manage discretionary surface-disturbing activities and uses on public lands (i.e., anthropogenic disturbances) that are disruptive to GRSG, to prevent disturbances to GRSG during seasonal life-cycle periods: 1. In breeding habitat within 4 miles of active and pending GRSG leks from March 1 through June 30: a. Lek—March 1 to May 15 b. Lek hourly restrictions—6 p.m. to 9 a.m. c. Nesting—April 1 to June 30 2. Brood-rearing habitat from May 15 to September 15	E. Seasonal restrictions will be applied during the period specified below to manage discretionary surface-disturbing activities and uses on public lands (i.e., anthropogenic disturbances) that are disruptive to GRSG, to prevent disturbances to GRSG during seasonal life-cycle periods: 1. In breeding habitat within 4 miles of active and pending GRSG leks from March 1 through June 30 a. Lek—March 1 to May 15 b. Lek hourly restrictions—6 p.m. to 9 a.m. c. Nesting—April 1 to June 30 2. Brood-rearing habitat from May 15 to September 15	**MD SSS 2E:** No change (same as 2019).

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a. Early—May 15 to June 15 b. Late—June 15 to September 15 3. Winter habitat from November 1 to February 28 • The seasonal dates may be modified due to documented local variations (e.g., higher/lower elevations) or annual climatic fluctuations (e.g., early/late spring, long/heavy winter), in coordination with NDOW and California Department of Fish and Wildlife (CDFW), in orderto better protect GRSG and its habitat.	a. Early—May 15 to June 15 b. Late—June 15 to September 15 3. Winter habitat from November 1 to February 28. The seasonal dates could be modified or waived (in coordination with NDOW and/or CDFW) based on site-specific information that indicates: i. A project proposal's NEPA document and/or project record, and correspondence from NDOW and/or CDFW demonstrates that any modification (shortening/extending seasonal timeframes or waiving the seasonal timing restrictions altogether) is justified on the basis that it serves to better protect or enhance GRSG and its habitat than if the seasonal timing restrictions are implemented. Under this scenario modifications can occur if: a. A proposed activity will have beneficial or neutral impacts on GRSG. b. Topography or other factors eliminate direct and indirect impacts from visibility and audibility to GRSG and its habitat c. There are documented local variations (e.g., higher/lower elevations) and/or annual climatic fluctuations (e.g., early/late spring, long/heavy winter) that indicate the seasonal Life cycle periods are different than presented, or that GRSG are not using the area during a given seasonal life cycle period. ii. Modifications are needed to address an immediate public health and safety concern in a timely manner (e.g., maintaining a road impacted by flooding).	

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	iii. The proposed action is determined to be a routine administrative function conducted by federal, state or local governments, including prior existing uses, authorized uses, valid existing rights and existing infrastructure (i.e., rights-of-way for roads) that serve a public purpose and will have no adverse impacts on GRSG or its habitat.	
F. Authorizations and permits will limit noise from discretionary activities (during construction, operation, and maintenance) to not exceed 10 decibels above ambient sound levels at least 0.25 mile from active and pending leks, from 2 hours before to 2 hours after sunrise and sunset during the breeding season. See Appendix M, Greater Sage-Grouse Noise Protocol.	F. Authorizations and permits will limit noise from discretionary activities (during construction, operation, and maintenance) to not exceed 10 decibels above ambient sound levels at least 0.25 mile from active and pending leks, from 2 hours before to 2 hours after sunrise and sunset during the breeding season. See **Appendix G**, Greater Sage-Grouse Noise Protocol.	**MD SSS 2F:** No change (same as 2019).
MD SSS 3: In GHMAs, the following conditions will be met in order to avoid, minimize, and mitigate any effects on GRSG or its habitat from the project/activity: A. In GHMAs, in undertaking BLM management actions, and consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species, including accounting for any uncertainty associated with the effectiveness of such mitigation. The project/activity with associated mitigation (such as the use of the State of Nevada Conservation Credit System) in GHMAs will result in an overall net conservation gain to GRSG (see Appendix F, Regional Mitigation Strategy).	**MD SSS 3**: In GHMAs, the following conditions will be met: A. See MD MIT 1.	**MD SSS 3A:** Completely Revised-revised by rangewide.

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B. Authorized/permitted activities are implemented adhering to the RDFs described in Appendix C, consistent with applicable law. At the site-specific scale, if an RDF is not implemented, at least one of the following must be demonstrated in the NEPA analysis associated with the project/activity: 1. A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to the site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. 2. An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. 3. A specific RDF will provide no additional protection to GRSG or its habitat.	B. Authorized/permitted activities are implemented adhering to the RDFs described in Appendix C, consistent with applicable law. At the site-specific scale, if an RDF is not implemented, at least one of the following must be demonstrated in the NEPA analysis associated with the project/activity: 1. A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to the site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. 2. An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. 3. A specific RDF will provide no additional protection to GRSG or its habitat.	**MD SSS 3B:** No change (same as 2019).
C. In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS report, Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review Open File Report 2014-1239 (Manier et.al 2014]), in accordance with Appendix B.	C. In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will utilize the lower end of the interpreted range of lek buffer-distances and guidance identified in Mainer et al. (2014) to establish the evaluation area around leks that will be used to analyze impacts during project-specific NEPA, including scientifically justifiable departures based on local data, topography, and other factors, in accordance with Appendix B.	**MD SSS 3C:** No change (same as 2019).
D. Seasonal restrictions will be applied during the periods specified below to manage discretionary surface-disturbing activities and uses on public lands (i.e., anthropogenic disturbances) that are disruptive to GRSG, to prevent disturbances to GRSG during seasonal life-cycle periods:	D. Seasonal restrictions will be applied during the period specified below to manage discretionary surface-disturbing activities and uses on public lands (i.e., anthropogenic disturbances) that are disruptive to GRSG, to prevent disturbing GRSG during seasonal life cycle periods, as follows:	**MD SSS 3D:** No change (same as 2019).

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1. In breeding habitat within 4 miles of active and pending GRSG leks from March 1 through June 30 a. Lek—March 1 to May 15 b. Lek hourly restrictions—6 p.m. to 9 a.m. c. Nesting—April 1 to June 30 2. Brood-rearing habitat from May 15 to September 15 a. Early—May 15 to June 15 b. Late—June 15 to September 15 3. Winter habitat from November 1 to February 28 The seasonal dates may be modified due to documented local variations (e.g., higher/lower elevations) or annual climatic fluctuations (e.g., early/late spring, long/heavy winter), in coordination with NDOW and CDFW, in order to better protect GRSG and its habitat.	1. In breeding habitat within 4 miles of active and pending GRSG leks from March 1 through June 30 a. Lek—March 1 to May 15 b. Lek hourly restrictions—6 p.m. to 9 a.m. c. Nesting—April 1 to June 30 2. Brood-rearing habitat from May 15 to September 15 a. Early—May 15 to June 15 b. Late—June 15 to September 15 3. Winter habitat from November 1 to February 28. The seasonal dates could be modified or waived (in coordination with NDOW and/or CDFW) based on site-specific information that indicates: i. A project proposal's NEPA document and/or project record, and correspondence from NDOW and/or CDFW, demonstrates that any modification (shortening/extending seasonal timeframes or waiving the seasonal timing restrictions altogether) is justified on the basis that it serves to better protect or enhance GRSG and its habitat than if the seasonal timing restrictions are implemented. Under this scenario modifications can occur if: a. A proposed activity will have beneficial or neutral impacts on GRSG. b. Topography or other factors eliminate direct and indirect impacts from visibility and audibility to GRSG and its habitat. c. There are documented local variations (e.g., higher/lower elevations) and/or annual climatic fluctuations (e.g., early/late spring, long/heavy winter) that	

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
	indicate the seasonal life cycle periods are different than presented, or that GRSG are not using the area during a given seasonal life cycle period. ii. Modifications are needed to address an immediate public health and safety concern in a timely manner (e.g., maintaining a road impacted by flooding). iii. The proposed action is determined to be a routine administrative function conducted by federal, state or local governments, including prior existing uses, authorized uses, valid existing rights and existing infrastructure (i.e., rights-of-way for roads) that serve a public purpose and will have no adverse impacts on GRSG or its habitat.	
E. Authorizations and permits will limit noise from discretionary activities (during construction, operation, and maintenance) to not exceed 10 decibels above ambient sound levels at least 0.25 mile from active and pending leks from 2 hours before to 2 hours after sunrise and sunset during the breeding season. See Appendix M, Greater Sage-Grouse Noise Protocol.	D. Authorizations and permits will limit noise from discretionary activities (during construction, operation, and maintenance) to not exceed 10 decibels above ambient sound levels at least 0.25 mile from active and pending leks from 2 hours before to 2 hours after sunrise and sunset during the breeding season. See Appendix G, Greater Sage-Grouse Noise Protocol.	**MD SSS 3E:** No change (same as 2019).
MD SSS 4: In OHMAs, authorized/permitted activities are implemented adhering to the RDFs described in Appendix C, consistent with applicable law. At the site-specific scale, if an RDF is not implemented, at least one of the following must be demonstrated in the NEPA analysis associated with the project/activity: • A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g., due to the site limitations or engineering considerations). Economic	No changes made.	No change (same as 2015).

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considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable. • An alternative RDF is determined to provide equal or better protection for GRSG or its habitat. • A specific RDF will provide no additional protection to GRSG or its habitat.		
MD SSS 5: Designate SFA, as shown on Figure 1-3 (2,797,400 acres). SFA will be managed as PHMAs, with the following additional management: • Recommended for withdrawal from the General Mining Act of 1872, subject to valid existing rights • Managed as NSO, without waiver, exception, or modification, for fluid mineral leasing • Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration (see specific management sections).	**MD SSS 5 (Allocation Exception Criteria):** In PHMA, GHMA, and OHMA, the State Director may grant an exception to the allocations and stipulations described in **Table 2-1**: Comparative Summary of Alternatives if one of the following applies (in coordination with NDOW, SETT, and/or CDFW): i. The location of the proposed activity is determined to be unsuitable (by a biologist with GRSG experience using methods such as Stiver et. al. 2015) and lacks the ecological potential to become marginal or suitable habitat; and will not result in direct, indirect, or cumulative impacts on GRSG and its habitat. Management allocation decisions will not apply to those areas determined to be unsuitable if the area has passed a threshold and lacks the ecological potential to become marginal or suitable habitat. ii. The proposed activities impacts will be offset to result in no adverse impacts on GRSG or its habitat, through use of the mitigation hierarchy and the State's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law). In cases where exceptions may be granted for projects with a residual impact, voluntary compensatory mitigation consistent with the State's mitigation policies and programs, such as the State of	Completely Revised-revised by rangewide for mitigation (ii), and state specific for the rest of the bullets.

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	Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law) will be one mechanism by which a proponent achieves the Approved RMPA goals, objectives, and exception criteria. When a proponent volunteers compensatory mitigation as their chosen approach to address residual impacts, the BLM will incorporate those actions into the rationale used to grant an exception. The final decision to grant a waiver, exception, or modification will be based, in part, on criteria consistent with the State's GRSG management plans and policies. iii. The proposed activity will be authorized to address public health and safety concerns, specifically as they relate to federal, state, local government and national priorities. iv. Renewals or re-authorizations of existing infrastructure in previously disturbed sites or expansions of existing infrastructure that do not result in direct, indirect, or cumulative impacts on GRSG and its habitat. v. The proposed activity is determined to be a routine administrative function conducted by federal, state or local governments, including prior existing uses, authorized uses, valid existing rights and existing infrastructure (i.e., rights-of-way for roads) that serve a public purpose and will have no adverse impacts on GRSG and its habitat, consistent with the State's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law).	

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	vi. Exceptions to non-disposal or exchange of lands that are identified for retention in **Appendix A, Figure 2-12** could be considered if (a) they are identified for disposal through previous planning efforts or address a Congressional Act (e.g., the respective Lincoln and White Pine County Conservation, Recreation, and Development Acts), (b) the agency can demonstrate that the disposal, including land exchanges, will have no adverse direct, indirect or cumulative impacts on GRSG and its habitat, or (c) adverse impacts on GRSG or its habitat will be offset, through use of voluntary compensatory mitigation, consistent with the States' mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law).	
MD SSS 6: Cooperate with federal and state agencies, universities, and other organizations to establish and maintain a GRSG telemetry database.	No changes made.	No change (same as 2015).
MD SSS 7: Work with project proponents to limit project-related noise, seasonally or annually (see MDs SSS 2 and SSS 3), in GRSG habitat where it would be expected to reduce functionality of habitats that support associated GRSG populations. Support the establishment of ambient baseline noise levels for leks in PHMAs and GHMAs. • As additional noise-related research and information emerge, specific new limitations appropriate to the type of projects being considered will be evaluated and appropriate measures will be implemented where necessary to minimize the potential for noise impacts on GRSG populations.	No changes made.	No change (same as 2015).

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MD SSS 8: As determined by BLM in coordination with NDOW or CDFW, for any surface-disturbing activities involving mineral activities (to the extent possible under existing law) and rights-of-way actions proposed in PHMAs and GHMAs, the proponent will use the services of a qualified biologist approved by the BLM to conduct surveys for GRSG breeding activity during the GRSG breeding season before project activities begin. The surveys must encompass all suitable GRSG habitats within a minimum of 4 miles of the proposed activities. Surveys will be conducted following protocols established by state fish and wildlife agencies during planning operations and during project activities. GRSG seasonal habitat delineations will also be required within a minimum of 4 miles of project activities.	No changes made.	No change (same as 2015).
MD SSS 9a: In Nevada only, the BLM will consult with the Sagebrush Ecosystem Technical Team (SETT) for application of the "avoid, minimize, and compensate" mitigation strategy and the Conservation Credit System developed by the Nevada Natural Heritage Program and the SETT (2014a, 2014b) or other applicable mitigation system such as outlined in Appendix I. This will be to ensure that a net conservation gain of GRSG habitat is achieved in mitigating human disturbances in PHMAs and GHMAs (see Appendix F) on all agency-authorized activities. The specifics of the coordination will be identified in an MOU between the agencies.	See **MD MIT 1**	Partially Revised- updates to align with rangewide mitigation language.
MD SSS 9b: In California only, the BLM will follow the BLM mitigation strategy outlined in Appendix F.	See **MD MIT 1**	Partially Revised- updates to align with rangewide mitigation language.

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MD SSS 10: When necessary or as new data becomes available, site-specific NEPA analysis on use authorizations in PHMA and GHMA will include project level adaptive management responses to address changed conditions in GRSG habitat and population trends (see Appendix J, Adaptive Management Plan).	No changes made.	No change (same as 2015).
MD SSS 11: Design and construct fences consistent with BLM H-1741-1, Fencing Standards Manual (BLM 1990), and apply the Sage-Grouse Fence Collision Risk Tool to Reduce Bird Strikes (NRCS 2012). Bring existing fencing into compliance as opportunities arise.	No changes made.	No change (same as 2015).
2015 BLM GRSG Approved RMP Amendment	**2019 BLM GRSG Approved RMP Amendment**	**Proposed Plan**
Disease	**Disease**	—
Objective SSS 5: Coordinate with state agencies to monitor trends of diseases, such as West Nile virus, in the subregion to determine if mitigation or additional RDFs need to be applied (consistent with applicable law) to use authorizations.	No changes made.	No change (same as 2015).
Management Decisions (MD):	**Management Decisions (MD):**	—
MD SSS 12: When developing or modifying water developments on BLM-administered lands in PHMAs, GHMAs, and OHMAs and in accordance with state water law and subject to valid existing rights, use applicable RDFs consistent with applicable law to mitigate potential impacts from West Nile virus. Bring existing water developments into compliance as opportunities arise.	No changes made.	No change (same as 2015).
Predation	**Predation**	—
Objective SSS 6: Manage human uses on public lands to reduce the effects of predation on GRSG.	No changes made.	Completely Revised-revised by rangewide.

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Management Decisions (MD):	**Management Decisions (MD):**	—
MD SSS 13: Require authorizations to include stipulations and RDFs consistent with applicable law to reduce or eliminate opportunities to attract and provide nesting, cover, or perches for predators in PHMAs and GHMAs.	No changes made.	Completely Revised-revised by rangewide.
MD SSS 14: Coordinate with other federal, state, county, and tribal governments and local working groups to reduce GRSG deaths due to predation where it is determined to be additive or is a limiting factor influencing GRSG populations.		Completely Revised-revised by rangewide.
MD SSS 15: Reduce and eliminate artificial hunting perches and nesting surfaces for aerial predators (e.g., remove fences, nonworking fences, and power lines and install anti-perch devices on existing and new power lines).	No changes made.	Completely Revised-revised by rangewide.
Adaptive Management (Also see Appendix J)	—	—
Management Decisions (MD):	**Management Decisions (MD):**	—
No similar action.	**MD SSS 16:** PHMA, GHMA, and OHMA boundaries are based on composite management categories contained within USGS's *Spatially Explicit Modeling of Annual and Seasonal Habitat for Greater Sage-Grouse (Centrocercus urophasianus) in Nevada and Northeastern California—an updated decision-support tool for management* (Coates et al. 2016), (see **Appendix A: Maps**). • Manage 9,265,800 acres as PHMA • Manage 5,748,000 acres as GHMA • Manage 4,868,900 acres as OHMA BLM recognizes that landscape level mapping may not accurately reflect on-the-ground conditions. Therefore, the HMAs (**Figure 2-1**) do not constitute a land use plan decision but rather a landscape level reference of relative habitat suitability. When a proposed project is thought to be in an area that is unsuitable for GRSG	Partially Revised – update acreages and references to new published model results; update non-habitat text based on rangewide and state-specific language.

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	within PHMA, GHMA, and/or OHMA, habitat assessments of the project site and its surrounding areas will be conducted by a biologist with GRSG experience using BLM-approved methods such as Stiver et al. 2015 and compliant with current BLM policy, to identify suitable, marginal, or unsuitable GRSG habitats at multiple scales. This habitat assessment process will inform criteria (i) under Issue: Allocation Exception Process, Management Alignment Alternative and Proposed Plan Amendment. The BLM will track all on-the-ground assessments and share this information with USGS and the States of Nevada and California to consider when updating HMA maps in the future.	
MD SSS 17: As site-specific GRSG data (habitat assessments, lek counts, telemetry, etc.) is collected, the information will be included into future modeling efforts using the "*Spatially Explicit Modeling of Greater Sage-Grouse Habitat in Nevada and Northeastern California*" (Coates et al. 2014) to reflect the most up-to-date spatial representation of GRSG habitat categories. Through plan maintenance or plan amendment/revision, as appropriate, and in consultation with the Nevada Department of Wildlife and USFWS, based on the best scientific information, the updated modeling efforts may be adopted and appropriate allocation decisions and management actions will be applied to PHMA, GHMA, and OHMA. Future modeling efforts to incorporate site-specific GRSG data will utilize the same modeling methods (as described under *Methods and Results* in Coates et al. 2014) used to develop the current Nevada and Northeastern California Subregions' GRSG habitat management categories. The addition of site-specific GRSG data will allow for the refinement of	**MD SSS 17:** Consistent with the State of Nevada's Greater Sage-Grouse Conservation Plan (2014, as amended) and CDFW's management recommendations, the HMA mapping process will be reviewed and refined every 3 to 5 years, or when new data are incorporated in the model. New or improved spatial data (e.g., additional GRSG telemetry data, updated or improved vegetation community data) will be incorporated during the refinement process. The review and refinement process will be scientifically based and include review and input from the Sagebrush Ecosystem Technical Team (SETT), NDOW, BLM, USFS, USFWS, and local agencies as appropriate. For refinements on California BLM managed lands, this process will also include CDFW. Other stakeholders will be encouraged to participate in the process by submitting relevant information to the listed agencies. The USGS' habitat suitability modeling processes (Coates et al. 2016) will be the basis for future refinements, which may include results of BLM habitat suitability determinations shared with the USGS for their consideration. As	Completely Revised-adopt language from 2015, but updated to reference to new published model

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the spatial representation of the GRSG habitat management categories.	these HMAs boundaries are adjusted and approved by the States of Nevada and California, adjustments to the BLM's PHMA, GHMA, and/or OHMA boundaries (along with the existing allocation decisions and management actions tied to these areas) will be made by the BLM through plan maintenance or amendment, as appropriate.	
MD SSS 18: A BSU (see Appendix A; Figure 2-2) that has hit a soft trigger due to vegetation disturbance will be a priority for restoration treatments consistent with Fire and Invasives Assessment Tool (FIAT) (Appendix J).	**MD SSS 18:** The BLM will implement the Adaptive Management Strategy as described in **Appendix D**. The revised soft and hard population triggers, warnings, and new BSU and lek cluster boundaries were derived from USGS's *Hierarchical Population Monitoring of Greater Sage-Grouse (Centrocercus urophasianus) in Nevada and California— Identifying Populations for Management at the Appropriate Spatial Scale: U.S. Geological Survey Open-File Report 2017– 1089* (Coates et al. 2017). These triggers, warnings, BSU boundaries, and lek cluster boundaries can be found in **Appendix D**. Soft and hard trigger responses will be removed when the criteria for recovery have been met (see **Appendix D**, Longevity of Responses). Removal of the soft and hard trigger responses returns management direction in the affected lek cluster and/or BSU to the management directions that were in place prior to reaching a trigger.	Completely Revised-revised by rangewide.
MD SSS 19: If a soft trigger is reached, the BLM will identify the causal factor and apply additional project-level adaptive management and/or mitigation measures contained in the authorization (and for future similar authorizations), to alleviate the specific or presumptive causes in the decline of GRSG populations or its habitats and include the following: • The adjustment in management would be based on the causal factor and would affect only the area being impacted in the lek cluster or other appropriate scale (e.g., BSU)	No similar action. (MD SSS 19 was removed)	No change (same as 2019).MD SSS 19 Remains Removed

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• GRSG populations and habitat would continue to be monitored annually • If the causal factor were not readily discernable, then an interdisciplinary team, including the BLM, Forest Service (as applicable), and state wildlife agency representatives, would identify the appropriate mitigation or adjusted management actions in a timely manner		
MD SSS 20: Once a hard trigger has been reached, all responses in Table J-1 and Table J-2 in Appendix J will be implemented. This includes where soft triggers have been reached for both population and habitat.	No similar action. (MD SSS 20 was removed)	No change (same as 2019).MD SSS 20 Remains Removed
MD SSS 21: When a hard trigger is hit in a PAC that has multiple BSUs, including those that cross state lines, the WAFWA Management Zone GRSG Conservation Team will convene to determine the cause, will put project level responses in place, as appropriate, and will discuss further appropriate actions to be applied. The team will also investigate the status of the hard triggers in other BSUs in the PAC and will invoke the appropriate plan response. Adopting any further actions at the plan level may require initiating a plan amendment process.	No similar action. (MD SSS 21 was removed)	No change (same as 2019).MD SSS 21 Remains Removed
MD SSS 22: As determined by BLM in coordination with NDOW, for any surface-disturbing activities involving mineral activities and rights-of-way actions (with the possible exception of short duration activities outside of seasonal GRSG habitats) BLM will require that active and pending leks be monitored annually within 4 miles of disturbance until the use terminates and all disturbances have been restored. The proponent will fund the services of an independent qualified biologist approved by the BLM, in coordination with NDOW or CDFW, consistent with applicable law.	**MD SSS 22:** As determined by the BLM in coordination with the state wildlife agencies, for any surface-disturbing activities involving mineral activities and rights-of-way actions (with the possible exception of short duration activities outside of seasonal GRSG habitats) BLM will require that active and pending leks be monitored annually within 4 miles of disturbance until the use terminates and all disturbances have been restored. The proponent will fund the services of an independent qualified biologist approved by the BLM, in coordination with NDOW or CDFW, consistent with applicable law.	No change (same as 2019).

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MD SSS 23: In making amendments to this plan, the BLM will coordinate with the FWS as BLM continues to meet its objective of conserving, enhancing and restoring GRSG habitat by reducing, minimizing or eliminating threats to GRSG and its habitat.	No changes made.	No change (same as 2019).
MD SSS 24: The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter.	No similar action. (MD SSS 24 was removed)	No change (same as 2019).MD SSS 24 Remains Removed
No similar action.	No similar action.	Completely Revised-State Specific - New state-specific MD
VEGETATION (VEG) ***SAGEBRUSH-STEPPE***	***VEGETATION (VEG)***	—
Objectives:	**Objectives:**	—
Objective VEG 1: In all SFA and PHMAs, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).	**Objective VEG 1**: In PHMAs, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).	No change (same as 2019).
Objective VEG 2: On public lands, establish, maintain, and enhance a resistant and resilient sagebrush vegetative community and restore sagebrush vegetation communities to reduce GRSG habitat fragmentation and maintain or reestablish GRSG habitat connectivity over the long term (Chambers et al. 2014).	No changes made.	No change (same as 2015).
Objective VEG 3: Manage PHMAs and GHMAs for vegetation composition and structure, consistent with ecological site potential and to achieve GRSG habitat objectives (**Table 2-2**).	No changes made.	Partially Revised, state specific circumstance and remove reference to Table 2-2.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Management Decisions (MD):	**Management Decisions (MD):**	—
MD VEG 1: Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.	No changes made.	No change (same as 2015).
MD VEG 2: Incorporate GRSG habitat objectives (**Table 2-2**) in the design of habitat restoration projects and manage treated areas to meet GRSG habitat objectives.	No changes made.	Partially Revised (remove reference to Table 2-2).
MD VEG 3: Use BLM GRSG habitat maps, habitat objectives (see Table 2-2 for GRSG habitat objectives), ecological site potential, state and transition models, and concepts of resistance and resilience (Appendix H) to prioritize habitat restoration projects, including those following wildfire, to address the most limiting GRSG habitat vegetation components and to connect seasonal ranges. Habitat restoration includes the following: i. Restoring sagebrush canopy in PHMAs and GHMAs to meet GRSG habitat objectives (Table 2-2) ii. Reestablishing perennial grasses and native forbs in PHMAs and GHMAs iii. Reducing or removing pinyon or juniper in PHMAs and GHMAs to enhance seasonal range connectivity and to maintain sagebrush canopy and understory integrity iv. Restore areas affected by wildfire and the continuing invasive annual fire cycle to meet GRSG habitat objectives (Table 2-2) iv. Prioritize restoration in areas that have not crossed an ecological threshold	No changes made.	Partially Revised (remove reference to Table 2-2).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD VEG 4: Plan vegetation treatments (including GRSG habitat treatments) in a landscape-scale context to address habitat fragmentation, effective patch size, invasive species presence, and intact sagebrush community protection, consistent with the GRSG habitat objectives identified in **Table 2-2**.	No changes made.	Partially Revised (remove reference to Table 2-2).
MD VEG 5: For Wyoming, mountain, and basin big sagebrush communities in PHMAs and GHMAs: i. Prioritize treatments that focus on enhancing, reestablishing, or maintaining the most limiting GRSG habitat component ii. Reestablish sagebrush to meet GRSG habitat objectives (Table 2-2) iii. Manage sagebrush communities to achieve age-class, structure, cover, and species composition objectives in GRSG habitat (Table 2-2) iv. Restore herbaceous understory in brush-dominated areas to meet GRSG habitat objectives (Table 2-2) iv. Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species (Table 2-2) v. Treat disturbed areas in accordance with FIAT (see Appendix H), including implementation-level assessments	No changes made.	Partially Revised (remove reference to Table 2-2).
MD VEG 6: Manage for establishment of sagebrush in unmaintained nonnative seedings (e.g., crested wheatgrass seedings) in or next to GRSG habitat to meet habitat objectives (**Table 2-2**).	No changes made.	Partially Revised (remove reference to Table 2-2).
MD VEG 7: In PHMAs and GHMAs, give preference to native seeds for restoration, based on availability, adaptation (ecological site potential), and probability of success. Where the probability of success or adapted seed availability is low, nonnative seeds may be used, as long as they support GRSG habitat objectives. Choose native	No changes made.	No change (same as 2015).

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plant species outlined in Ecological Site Descriptions (ESDs), where available, to revegetate sites. Emphasize use of local seed collected from intact stands or greenhouse cultivation. If the commercial supply of appropriate native seeds and plants is limited, work with the BLM Native Plant Materials Development Program, Natural Resource Conservation Service (NRCS) Plant Material Program, or State Plant Material Programs. If currently available supplies are limited, use the materials that provide the greatest benefit for GRSG. In all cases, seed must be certified as weed free.		
MD VEG 8: To increase seeding success and to ensure effective soil and seed contact, consider the use of specialized seed drills or other proven and effective methods that may become available based on new science.	No changes made.	No change (same as 2015).
MD VEG 9a: For Nevada BLM-managed lands, before implementation, establish project monitoring sites where vegetation treatment is planned. Treatment areas will be monitored both pre- and post- treatment on a multiple-year basis to ensure that project objectives are achieved.	No changes made.	No change (same as 2015).
MD VEG 9b: For California BLM-managed lands, before implementation, establish project monitoring sites where vegetation treatment is planned. Treatment areas will be monitored both pre- and post- treatment on a multiple-year basis to ensure that project objectives are achieved. Juniper treatments will be monitored in accordance with the Sage Steppe Ecosystem Restoration FEIS (BLM 2008).	No changes made.	No change (same as 2015).

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MD VEG 10: On public lands, where the attributes, quality, or lack of GRSG winter habitat has been identified as a limiting factor, emphasize vegetation treatments in known winter habitat to enhance quality or reduce wildfire risk around or in winter habitat.	No changes made.	No change (same as 2015).
MD VEG 11: In perennial grass, invasive annual grass, and conifer-invaded cover types, restore sagebrush steppe with local sagebrush seedings or planted seedlings where feasible.	No changes made.	No change (same as 2015).
MD VEG 12: Continue to coordinate with NDOW, CDFW, and NRCS for all development or habitat restoration proposals in PHMAs and GHMAs. Also, coordinate with the Nevada SETT, tribes, and local working groups on projects proposed in sagebrush ecosystems.	No changes made.	No change (same as 2015).
VEGETATION (VEG)	***VEGETATION (VEG)***	—
Conifer Encroachment	***Conifer Encroachment***	—
Objectives:	**Objectives:**	—
Objective VEG 4: In accordance with the vegetation dynamic development tool (VDDT; Appendix L), improve GRSG habitat by removing invading conifers in the number of acres shown in **Table 2-2** by decade for the next 50 years.	No changes made.	Partially Revised- minor update reference from Table 2-2 to Habitat Objectives
Management Decisions (MD):	**Management Decisions (MD):**	—
MD VEG 13: Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied GRSG habitats and near occupied leks and where juniper encroachment is phase 1 and phase 2. Use of site-specific analysis and tools like VDDT and FIAT (see Appendix L for VDDT and Appendix H for FIAT) will help refine the location for specific areas to be treated.	No changes made.	Partially Revised- update lek terminology and state specific circumstances.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD VEG 14: Do not construct or create new roads (temporary or permanent), skid trails, or landings in phase I pinyon or juniper removal areas during project implementation for vegetation treatments. Administrative access, including off-road travel with heavy equipment and vehicles, will be allowed during implementation.	No changes made.	No change (same as 2015).
MD VEG 15: Only treat habitats in late phase II or phase III pinyon or juniper condition to create movement corridors, connect habitats, or reduce the potential for catastrophic fire (see **Table 2-3**).	No changes made.	No change (same as 2015).
Vegetation (VEG)	***Vegetation (VEG)***	—
Invasive Species	***Invasive Species***	—
Objectives:	**Objectives:**	—
Objective VEG 5: Reduce the amount of GRSG habitat loss due to wide-spread wildfires and invasion by nonnative species.	No changes made.	No change (same as 2015).
Objective VEG 6: Control invasive species infestations in GRSG habitat already compromised by invasion.	No changes made.	No change (same as 2015).
Objective VEG 7: In accordance with the VDDT (Appendix L), improve GRSG habitat by treating annual grasses in the number of acres shown in **Table 2-4** by decade using the FIAT (Appendix H).	No changes made.	No change (same as 2015).
Management Decisions (MD):	**Management Decisions (MD):**	—
MD VEG 16: Prevent the establishment of invasive species into uninvaded areas in PHMAs and GHMAs through properly managed grazing and by conducting systematic and strategic detection surveys, collecting data, mapping these areas, and engaging in early response to contain and eradicate invasion if it occurs.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD VEG 17: Control the spread and introduction of noxious weeds listed by the Nevada Department of Agriculture and California Department of Food and Agriculture (NAC 555.010, Classes A through C, inclusive and 3 CCR 4500, Noxious Weed Species Pest Rating A, B, C, and Q) and undesirable nonnative plant species (Gelbard and Belnap 2003; Bergquist et al. 2007). Work with federal, state, local, and tribal groups, such as Weed Control Districts, Cooperative Weed Management Areas, and Conservation Districts, in detecting and treating nonnative species.	No changes made.	No change (same as 2015).
MD VEG 18: Where scientific support is lacking, carefully construct treatments to rigorously assess the value or detriment of untested methods to determine their value for future application to GRSG habitats.	No changes made.	No change (same as 2015).
MD VEG 19: The BLM will cooperate with other federal, state, tribal and local agencies along with academia in researching the development of biological control agents and deploying emerging technologies as they become available.	No changes made.	No change (same as 2015).
MD VEG 20: Monitor and adjust treatment sites and methods as needed to ensure effectiveness of efforts to prevent and control invasive species and restore GRSG habitat.	No changes made.	No change (same as 2015).
MD VEG 21: Assess invasive annual grass presence and distribution before implementing vegetation restoration projects to determine if treatments are required to treat invasive annual grasses.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD VEG 22: Treat sites in PHMAs and GHMAs that contain invasive species infestations through an integrated pest management (IPM) approach, using fire, chemical, mechanical, and biological (e.g., targeted grazing) methods, based on site potential and in accordance with FIAT (Appendix H). Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species.	No changes made.	No change (same as 2015).
No similar action	No similar action	New: refer to state specific MD VEG (new MD)
Vegetation (VEG) ***Riparian and Wetlands Habitat***	***Vegetation (VEG)*** ***Riparian and Wetlands Habitat***	—
Objectives:	**Objectives:**	—
Objective VEG 8: Manage riparian areas in PHMAs and GHMAs for vegetation composition and structure, consistent with ecological site potential and to achieve GRSG habitat objectives (**Table 2-2**).	No changes made.	Partially Revised (remove reference to Table 2-2).
Objective VEG 9: Manage upland habitat associated with riparian areas to promote cover relative to site potential to facilitate brood-rearing habitat (**Table 2-2**).	No changes made.	Partially Revised- update reference from Table 2-2 to Habitat Objectives
Objective VEG 10: Where riparian function has been compromised or lost, manage to restore riparian function and meet GRSG habitat objectives (**Table 2-2**).	No changes made.	Partially Revised (remove reference to Table 2-2)
Objective VEG 11: In riparian and wet meadow areas, inventory, monitor, and control invasive species in PHMAs and GHMAs.	No changes made.	No change (same as 2015).
Management Decisions (MD):	**Management Decisions (MD):**	—
MD VEG 23: Design and implement vegetation treatments in PHMAs and GHMAs to restore, enhance, and maintain riparian areas (**Table 2-2**).	No changes made.	Partially Revised- update reference from Table 2-2 to Habitat Objectives
MD VEG 24: Consider an array of vegetation treatments to increase edge and expand mesic areas in PHMAs and GHMAs where riparian extent is limited by shrub encroachment (**Table 2-2**).	No changes made.	Partially Revised- update reference from Table 2-2 to Habitat Objectives

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MD VEG 25: Manage lotic riparian habitats in conjunction with adjacent terraces and valley bottoms as natural fuel breaks to reduce the size and frequency of wildfires in PHMAs and GHMAs.	No changes made.	No change (same as 2015).
Vegetation (VEG) ***Climate Change***	***Vegetation (VEG)*** ***Climate Change***	—
Objectives:	**Objectives:**	—
Objective VEG 12: Use the landscape approach and promote landscape-scale, ecosystem-based actions to enhance resiliency and sustainability of PHMAs and GHMAs to climate stress.	No changes made.	No change (same as 2015).
Objective VEG 13: In PHMAs and GHMAs, manage risks of GRSG habitat degradation or loss from landscape stressors of drought, invasive species, and wildfire exacerbated by climate change to maintain existing GRSG populations and habitats.	No changes made.	No change (same as 2015).
Management Decisions (MD):	**Management Decisions (MD):**	—
MD VEG 26: As climate change data become available through Rapid Ecoregional Assessments or other ecological studies, identify areas of unfragmented GRSG habitat and corridors that provide the life-cycle and genetic transfer needs for GRSG and adjust resource management practices, as needed.	No changes made.	No change (same as 2015).
MD VEG 27: Cooperate with multiple agencies and stakeholders to establish and maintain a network of climate monitoring sites and stations.	No changes made.	No change (same as 2015).

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FIRE AND FUELS MANAGEMENT (FIRE) ***WILDFIRE MANAGEMENT***	***FIRE AND FUELS MANAGEMENT (FIRE)*** ***WILDFIRE MANAGEMENT***	—
OBJECTIVE	***OBJECTIVE***	—
Objective FIRE 1: The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. GRSG habitat will be prioritized commensurate with property values and other critical or sensitive habitats to be protected, with the goal to restore, enhance, and maintain areas suitable for GRSG.	No changes made.	No change (same as 2015).
Management Decisions (MD):	**Management Decisions (MD):**	—
MD FIRE 1: Support the conservation of GRSG habitat objectives (**Table 2-2**) through appropriate wildfire management planning, coordination, staffing, resource allocations, training, equipment, and management oversight.	No changes made.	Partially Revised (remove reference to Table 2-2).
MD FIRE 2: Prioritize fire operations and fuels management decisions in SFA first, followed by PHMAs outside of SFA in accordance with the implementation-level FIAT assessments, and then GHMAs for conservation and protection during fire operations and fuels management decision-making. When suppression resources are widely available, place maximum efforts on limiting fire growth in GHMAs as well.	**MD FIRE 2:** Prioritize fire operations and fuels management decisions in PHMA in accordance with the implementation-level FIAT assessments, and then GHMAs for conservation and protection during fire operations and fuels management decision-making. When suppression resources are widely available, place maximum efforts on limiting fire growth in GHMAs as well.	No change (same as 2019).
MD FIRE 3: BLM planning units, in coordination with the USFWS and relevant state agencies, will annually review the GRSG landscape wildfire and invasive species habitat assessments (FIAT). Based on this review, revised actions to ameliorate invasive species must be incorporated into the assessment.	No changes made.	No change (same as 2015).

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MD FIRE 4: Compile relevant field office- and district-level information into the statewide GRSG Annual Operating Handbook for use by resource advisors, wildfire crews, and agency administrators. The handbook will contain GRSG maps (including habitat and fuels treatment maps) and lists of state and local GRSG resource advisors and their contact information, local guidance, and other relevant information for each field office and district, aggregated into a statewide document.	No changes made.	No change (same as 2015).
MD FIRE 5: Coordinate and collaborate with federal, tribal, state, and local governments and associations sanctioned through either California or Nevada that meet fire standards for effective and efficient wildfire response.	No changes made.	No change (same as 2015).
MD FIRE 6: Strengthen and improve interagency wildfire prevention statewide through targeted wildfire prevention messages, including providing education on GRSG habitat loss, updating interagency agreements, and conducting wildfire prevention workshops and demonstration projects.	No changes made.	No change (same as 2015).
FIRE AND FUELS MANAGEMENT (FIRE) ***Pre-Suppression***	***FIRE AND FUELS MANAGEMENT (FIRE)*** ***Pre-Suppression***	—
OBJECTIVE		—
Objective FIRE 2: Use pre-suppression efforts to reduce the size and impact of wildfires in SFA, PHMAs, and GHMAs.	**Objective FIRE 2:** Use pre-suppression efforts to reduce the size and impact of wildfires in PHMAs and GHMAs.	No change (same as 2019).
Objective FIRE 3: Protect post-fire treatments in SFA first, followed by PHMAs outside of SFA, and then GHMAs from subsequent wildfires.	**Objective FIRE 3:** Protect post-fire treatments in PHMAs first, followed by GHMAs from subsequent wildfires.	Completely Revised-revised by state specific.
Management Decisions (MD):	**Management Decisions (MD):**	—
MD FIRE 7: Identify and prioritize areas that are vulnerable to wildfires and prescribe actions important for GRSG protection, in accordance with FIAT (see Appendix H, USDI 2015) and further refined in the implementation-level FIAT assessments.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD FIRE 8: Create fire management plans to guide wildfire suppression in order to protect PHMAs and GHMAs.	No changes made.	No change (same as 2015).
MD FIRE 9: Before the fire season, train GRSG resource advisors on wildfire suppression organization, objectives, tactics, and procedures to develop a cadre of qualified individuals. Involve state wildlife agency experts in fire operations through the following: • Instruction of resource advisors during preseason trainings • Qualification as resource advisors • Coordination with resource advisors before fire season • Contribution to incident planning with information, such as habitat features or other key data useful in fire decision-making	No changes made.	No change (same as 2015).
FIRE AND FUELS MANAGEMENT (FIRE) ***Suppression***	***FIRE AND FUELS MANAGEMENT (FIRE)*** ***Suppression***	—
OBJECTIVE	***OBJECTIVE***	—
Objective FIRE 4: Use suppression to reduce the size and impact of wildfires in SFA, PHMAs, and GHMAs.	**Objective FIRE 4:** Use suppression to reduce the size and impact of wildfires in PHMAs and GHMAs.	No change (same as 2019).
Management Decisions (MD):	**Management Decisions (MD):**	—
MD FIRE 10: Provide local GRSG habitat maps to dispatch offices and extend attack incident commanders to prioritize wildfire suppression resources and design suppression tactics. Ensure GRSG habitat maps and suppression strategies are uploaded and updated in WFDSs.	No changes made.	No change (same as 2015).
MD FIRE 11: Assign a resource advisor with GRSG habitat expertise or with access to GRSG habitat expertise to all extended attack fires in or near SFA, PHMAs, and GHMAs.	**MD FIRE 11:** Assign a resource advisor with GRSG habitat expertise or with access to GRSG habitat expertise to all extended attack fires in or near PHMAs and GHMAs.	No change (same as 2019).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD FIRE 12: In advance of critical fire weather, station additional federal fire suppression resources to optimize a quick and efficient response in SFA, PHMAs, and GHMAs.	**MD FIRE 12:** In advance of critical fire weather, station additional federal fire suppression resources to optimize a quick and efficient response in PHMAs and GHMAs.	No change (same as 2019).
MD FIRE 13: During periods of multiple fires, ensure line officers prioritize decisions by coordinating with resource advisors.	No changes made.	No change (same as 2015).
MD FIRE 14: To the extent possible, locate wildfire suppression facilities (e.g., base camps, spike camps, drop points, staging areas, and helicopter bases) in areas to avoid disturbing PHMAs and GHMAs. These include disturbed areas, grasslands, roads and trails, or in other areas with existing disturbance or minimal sagebrush cover.	No changes made.	No change (same as 2015).
MD FIRE 15: Document fire operations (e.g., disturbance) in PHMAs and GHMAs for potential follow- up coordination and restoration.	No changes made.	No change (same as 2015).
MD FIRE 16: Use indirect attack tactics (including burn-out operations) when: Direct attack is not effective in stopping fires with the potential of becoming significantly larger due to fuel loading, weather conditions, and fire behavior. If firefighter and public safety would be threatened or compromised	No changes made.	No change (same as 2015).
MD FIRE 17: Use retardant, mechanized equipment, and other available resources to minimize burned acreage during initial attack. As safety allows, conduct mop-up where the black adjoins unburned islands, dog legs, or other habitat features to minimize sagebrush loss.	No changes made.	No change (same as 2015).
MD FIRE 18: Minimize unnecessary cross-country vehicle travel during fire operations in GRSG habitat.	No changes made.	No change (same as 2015).

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FIRE AND FUELS MANAGEMENT (FIRE) ***Fuels Management***	***FIRE AND FUELS MANAGEMENT (FIRE)*** ***Fuels Management***	—
OBJECTIVE	***OBJECTIVE***	—
Objective FIRE 5: Protect and enhance PHMAs and GHMAs and areas of connectivity that support GRSG populations, including large contiguous blocks of sagebrush, through fuels management and incorporation of the FIAT assessment (Appendix H).	No changes made.	No change (same as 2015).
MANAGEMENT DECISIONS (MD):	***MANAGEMENT DECISIONS (MD):***	—
MD FIRE 19: Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.	No changes made.	No change (same as 2015).
MD FIRE 20: In PHMAs and GHMAs, apply fuels treatments on a landscape level to modify fire behavior, intensity, complexity (fire patchiness), size, and effects in which fire management efforts are enhanced.	No changes made.	No change (same as 2015).
MD FIRE 21: Establish and maintain fuel breaks to protect GRSG and its habitat to limit fire size and mitigate fire behavior to increase suppression effectiveness. When possible, establish fuel breaks next to roads or other previously disturbed areas.	No changes made.	No change (same as 2015).
MD FIRE 22: Use a full range of fuels management strategies and tactics within acceptable risk levels across the range of GRSG habitat consistent with land use plan direction.	No changes made.	No change (same as 2015).
MD FIRE 23: If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address: • Why alternative techniques were not selected as a viable option • How GRSG goals and objectives will be met by its use • How the COT report objectives will be addressed and met	No changes made.	Completely Revised-revised by state specific.

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• A risk assessment to address how potential threats to GRSG habitat will be minimized. Allow prescribed fire as a vegetation or fuels treatment, and it shall only be considered after the NEPA analysis for the burn plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect GRSG habitat in PHMAs (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Allow prescribed fire in known winter range, and it shall only be considered after the NEPA analysis for the burn plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.		
MD FIRE 24: In coordination with the USFWS and relevant state agencies and in accordance with FIAT (see Appendix H), develop a fuels management strategy for the BLM with large blocks of GRSG habitat. The strategy shall include an up-to-date fuels profile, land use plan direction, current and potential habitat fragmentation, sagebrush and GRSG ecological factors, and active vegetation management steps to provide critical breaks in fuel continuity. When developing this strategy, consider the risk of increased habitat fragmentation from a proposed action versus the risk of large-scale fragmentation posed by wildfires if the action were not taken.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD FIRE 25: Design fuels treatments through an interdisciplinary team process to expand, enhance, maintain, and protect PHMAs and GHMAs. Fuel reduction techniques, such as prescribed fire and chemical, biological (including targeted grazing), and mechanical treatments, are acceptable. Use green strips and fuel breaks, where appropriate, to protect seeding from subsequent fires.	No changes made.	Completely Revised-revised by state specific.
MD FIRE 26: In coordination with the USFWS and relevant state agencies and in accordance with FIAT (see Appendix H), BLM will identify treatment needs for wildfire and invasive species management. Ongoing treatment needs will be coordinated on state and regional scales and across jurisdictional boundaries for long-term conservation of GRSG and its habitat.	No changes made.	No change (same as 2015).
MD FIRE 27: On project completion, monitor and manage fuels projects to ensure long-term success, including persistence of seeded species and other treatment components. Control invasive vegetation post-treatment.	No changes made.	No change (same as 2015).
MD FIRE 28: Design fuels treatments to protect sagebrush ecosystems, modify fire behavior, restore ecological function, and create landscape patterns that most benefit PHMAs and GHMAs and promote use by GRSG.	No changes made.	No change (same as 2015).
MD FIRE 29: Train fuels treatment personnel on GRSG biology, habitat requirements, and identification of areas used locally.	No changes made.	No change (same as 2015).
MD FIRE 30: Use burning prescriptions that minimize undesirable effects on vegetation or soils (e.g., minimize killing desirable perennial plant species and reduce risk of annual grass invasion) and incorporate FIAT assessment (Chambers et. al 2014) in PHMAs and GHMAs.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD FIRE 31: Ensure proposed sagebrush treatments are planned with interdisciplinary input from the BLM and coordinated with USFWS and state fish and wildlife agencies to meet GRSG habitat objectives (**Table 2-2**).	No changes made.	Partially Revised (remove reference to Table 2-2).
MD FIRE 32: Design vegetation treatments in areas of high fire frequency to facilitate firefighter safety, reduce the potential acres burned, and reduce the fire risk to GRSG habitat.	No changes made.	No change (same as 2015).
MD FIRE 33a: For Nevada BLM-administered lands, before implementation, establish project monitoring sites where fuels management projects are planned. Monitor treatment areas both pre- and post-treatment on a multiple-year basis to ensure that project objectives are achieved.	No changes made.	No change (same as 2015).
MD FIRE 33b: For California BLM-managed lands, before implementation, establish project monitoring sites where fuels management projects are planned. Monitor treatment areas both pre- and post- treatment on a multiple-year basis to ensure that project objectives are achieved. Juniper treatments will be monitored in accordance with the Sage Steppe Ecosystem Restoration FEIS (BLM 2008).	No changes made.	No change (same as 2015).
FIRE AND FUELS MANAGEMENT (FIRE) ***Post Fire Management***	***FIRE AND FUELS MANAGEMENT (FIRE)*** ***Post Fire Management***	—
OBJECTIVE	***OBJECTIVE***	—
Objective FIRE 6: Retain, protect, and improve intact unburned sagebrush communities in burned areas by incorporating the FIAT assessment (Chambers et. al 2014).	No changes made.	No change (same as 2015).
Management Decisions (MD):	***Management Decisions (MD):***	—
MD FIRE 34: Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD FIRE 35: Prioritize post-fire treatments in PHMAs and GHMAs to maximize benefits to GRSG and its habitat. Focus post-fire treatments on replacing or reestablishing burned sagebrush habitat with the appropriate cover and structure to support GRSG habitat objectives (**Table 2-2**).	No changes made.	Partially Revised (remove reference to Table 2-2).
MD FIRE 36: In post-fire rehabilitation plans in PHMAs and GHMAs, design revegetation projects to accomplish the following: • Maintain and enhance unburned intact sagebrush communities when at risk from adjacent threats • Stabilize soils • Reestablish hydrologic function • Maintain and enhance biological integrity • Promote plant resiliency • Limit expansion or dominance or invasive species • Reestablish native species	No changes made.	No change (same as 2015).
MD FIRE 37: Implement post-fire treatments in PHMAs and GHMAs that emphasize stabilizing, rehabilitating, and restoring sagebrush ecosystems damaged by wildfires, including controlling invasive species.	No changes made.	No change (same as 2015).
MD FIRE 38: Increase post-fire treatment activities in PHMAs and GHMAs through the use of integrated funding opportunities with other resource programs and partners.	No changes made.	No change (same as 2015).
MD FIRE 39: Following post-fire treatments, monitor and implement management actions in PHMAs and GHMAs that promote healthy perennial grass, shrub and forb communities, and lentic (slow-moving freshwater) and lotic (rapid freshwater) riparian habitats so as to further restoration and ensure long- term persistence of seeded or pre-burn native plants, in accordance with GRSG habitat objectives (**Table 2-2**).	No changes made.	Partially Revised (remove reference to Table 2-2).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD FIRE 40: Evaluate the potential for sagebrush island plantings based on ESDs in large burn areas that may lack sufficient sagebrush seed sources in order to ensure the reestablishment of sagebrush in GRSG habitat.	No changes made.	No change (same as 2015).
MD FIRE 41: Monitor post-fire rehabilitation treatments on a multiple-year basis to ensure that project objectives are achieved.	No changes made.	No change (same as 2015).
MD FIRE 42: Use GRSG habitat objectives (**Table 2-2**) and emphasize the use of native plant species in post-fire rehabilitation (e.g., reseeding), recognizing that nonnative species may be necessary, depending on the availability of native seed and prevailing site conditions. Selected species shall maintain site ecological function based on pre-burn conditions and anticipated threat of invasive and noxious weed establishment. Use ESDs and state and transition models if available.	No changes made.	Partially Revised (remove reference to Table 2-2).
No similar action.	No similar action.	New: refer to state specific MD FIRE (new MD).
LIVESTOCK GRAZING (LG)	***LIVESTOCK GRAZING (LG)***	***LIVESTOCK GRAZING (LG)***
OBJECTIVE	***OBJECTIVE***	—
Objective LG 1: Manage permitted livestock grazing to maintain and/or enhance PHMAs and GHMAs to meet or make progress towards meeting all GRSG life-cycle requirements and habitat objectives (**Table 2-2**), based on site potential.	No changes made.	Completely Revised-revised by rangewide.
Management Decisions (MD):	***Management Decisions (MD):***	—
MD LG 1: When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperation and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential	**MD LG 1:** When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperation and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation and consistent with 43 CFR 4160.1 and IM-2018-023. Potential	Completely Revised-revised by rangewide.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
modifications include, but are not limited to, changes in: • Season or timing of use; • Numbers of livestock; • Distribution of livestock use; • Duration and/or level of use; • Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); • Grazing schedules (including rest or deferment); • Class of livestock; • Grazing schedules (including rest or deferment) • Making allotment unavailable to grazing • *Not in priority order	modifications include, but are not limited to, changes in: • Season or timing of use; • Numbers of livestock; • Distribution of livestock use; • Duration and/or level of use; • Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); • Grazing schedules (including rest or deferment); • Class of livestock; • Grazing schedules (including rest or deferment) • Making allotment unavailable to grazing • *Not in priority order	
MD LG 2: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in SFA followed by PHMAs outside of the SFA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting land health standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.	**MD LG 2:** The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMAs. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting land health standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.	Completely Revised-revised by rangewide.
MD LG 3: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMAs will include specific management thresholds based on GRSG Habitat Objectives Table (**Table 2-2**), Land Health Standards (43 CFR, Part 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.	**MD LG 3:** The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMAs will include specific management thresholds based on GRSG Habitat Objectives Table (**Table 2-2**), Land Health Standards (43 CFR, Part 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.	Completely Revised-revised by rangewide.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD LG 4: Complete land health assessments in PHMAs and GHMAs to identify whether or not GRSG habitat objectives (**Table 2-2**) are being met. The priority order for completing land health assessments in GRSG habitat is: • Allotments containing SFA that have never been evaluated; • Allotments containing SFA that have not been re-evaluated in 10 or more years; • Allotments containing PHMAs that have never been evaluated; • Allotments containing PHMAs that have not been re-evaluated in 10 or more years; • Allotments containing GHMAs that have never been evaluated; • Allotments containing GHMAs that have not been re-evaluated in 10 or more years.	**MD LG 4:** Complete land health assessments in PHMAs and GHMAs to identify whether or not GRSG habitat objectives (**Table 2-2**) are being met. The priority order for completing land health assessments in GRSG habitat is: • Allotments containing PHMAs that have never been evaluated; • Allotments containing PHMAs that have not been re-evaluated in 10 or more years; • Allotments containing GHMAs that have never been evaluated; • Allotments containing GHMAs that have not been re-evaluated in 10 or more years.	Completely Revised-revised by rangewide.
MD LG 5: If results from a land health assessment indicate that GRSG habitat objectives (**Table 2-2**) are not met in SFA, PHMAs, or GHMAs and grazing is a causal factor, and until appropriate modifications (MD LG 1) are incorporated through the permit renewal process, implement management strategies that may include, but are not limited to, the following: • Provide periods of rest or deferment during critical growth periods of key vegetation species • Limit grazing duration and intensity to allow plant growth sufficient to meet GRSG habitat objectives (**Table 2-2**) • Employ herd management techniques to minimize impacts of livestock on breeding, nesting, and brood-rearing habitat during the breeding season (March 1 to June 30; Lek—March 1 to May 15, and Nesting—April 1 to June 30)	**MD LG 5:** If results from a land health assessment indicate that GRSG habitat objectives (**Table 2-2**) are not met in PHMAs or GHMAs and grazing is a causal factor, and until appropriate modifications (MD LG 1) are incorporated through the permit renewal process, then, consistent with applicable law and regulations, implement management strategies that may include, but are not limited to, the following: • Provide periods of rest or deferment during critical growth periods of key vegetation species • Limit grazing duration and intensity to allow plant growth sufficient to meet GRSG habitat objectives (**Table 2-2**) • Employ herd management techniques to minimize impacts of livestock on breeding, nesting, and brood-rearing habitat during the breeding season (March 1 to June 30; Lek—	Completely Revised-revised by rangewide.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
• Consider any temporary projects that can mitigate livestock impacts (e.g., temporary fencing or temporary water hauling locations; • Work with permittees to avoid concentrated turn-out locations for livestock within 4 miles of active and pending leks from March 1 to June 30 • Avoid domestic sheep use and bedding areas and herder camps within 2 miles of active and pending leks from March 1 to June 30 • Utilizing land features and roads on maps provided to the permittee to help delineate livestock use avoidance areas • Considering no grazing from May 15 – Sept. 15 in riparian areas and wet meadows. • Removing livestock within 3-7 days for the remainder of the grazing year once the allowable use levels are reached (BLM 1996, Burton et. al 2011, Cagney et. al, 2010, Connelly et. al 2000, France et. al 2008, Hagen et. al 2007, Holechek 1988, Platts 1990, and Tanaka et. al 2014): ▪ In riparian areas and wet meadows the allowable percent utilization is 35% woody species, and a minimum stubble height of 4-6 inches (10-15 cm) for herbaceous riparian vegetation based on site. ▪ In mountain big sage habitat, the allowable percent utilization is 40 % herbaceous key species and/or 35 % shrub key species. ▪ In Wyoming Basin big sage habitat, the allowable percent utilization is 35% herbaceous key species and/or 35 % shrub key species. ▪ In black sage habitat, the allowable percent utilization is 35% herbaceous key species and/or 35 % shrub key species.	March 1 to May 15, and Nesting—April 1 to June 30) • Consider any temporary projects that can mitigate livestock impacts (e.g., temporary fencing or temporary water hauling locations; • Work with permittees to avoid concentrated turn-out locations for livestock within 4 miles of active and pending leks from March 1 to June 30 • Avoid domestic sheep use and bedding areas and herder camps within 2 miles of active and pending leks from March 1 to June 30 • Utilizing land features and roads on maps provided to the permittee to help delineate livestock use avoidance areas • Considering no grazing from May 15 – Sept. 15 in riparian areas and wet meadows. • Removing livestock within 3-7 days for the remainder of the grazing year once the allowable use levels are reached (BLM 1996, Burton et. al 2011, Cagney et. al, 2010, Connelly et. al 2000, France et. al 2008, Hagen et. al 2007, Holechek 1988, Platts 1990, and Tanaka et. al 2014): ▪ In riparian areas and wet meadows, the allowable percent utilization is 35% woody species, and a minimum stubble height of 4-6 inches (10-15 cm) for herbaceous riparian vegetation based on site. ▪ In mountain big sage habitat, the allowable percent utilization is 40 % herbaceous key species and/or 35 % shrub key species. ▪ In Wyoming Basin big sage habitat, the allowable percent utilization is 35% herbaceous key species and/or 35 % shrub key species. ▪ In black sage habitat, the allowable percent utilization is 35% herbaceous key species and/or 35 % shrub key species.	

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
	To the extent that the implementation of these strategies would be in conflict with the terms and conditions of any applicable livestock grazing permit or lease, then the BLM would complete a new decision-making process before implementing the strategies.	
MD LG 6: Appropriate allowable utilization levels will be defined through the grazing permit renewal process. At least one alternative in the NEPA process will consider the utilization levels identified in MD LG 5.	No changes made.	Completely Revised-revised by rangewide.
MD LG 7: In pastures where post livestock removal use monitoring results in utilization levels that exceed allowable use levels and livestock are identified as a causal factor, reduce animal unit months (AUMs) grazed the following year accordingly. AUMs cannot be applied to another pasture that is already being used by livestock or is being purposefully rested.	**MD LG 7:** In pastures where post livestock removal use monitoring results in utilization levels that exceed allowable use levels and livestock are identified as a causal factor, reduce animal unit months (AUMs) grazed the following year in accordance with 43 CFR 4160.1 and IM 2018-023. AUMs cannot be applied to another pasture that is already being used by livestock or is being purposefully rested.	Completely Revised-revised by rangewide.
MD LG 8: Within PHMAs and GHMAs, incorporate terms and conditions into grazing permits to meet GRSG habitat objectives (**Table 2-2**), specific terms and conditions will be based on rangeland health assessments (and subsequent monitoring data).	No changes made.	Completely Revised-revised by rangewide.
MD LG 9: When a transfer application is received for preference on an allotment within GRSG habitat: • Transfer of Preference: A transfer of preference will be approved unless the applicant does not meet qualifications (43 CFR, Part 4110.1 and 4110.2). A transfer will be approved to an unqualified applicant if 4110.2-3(e) applies. • Issuing the permit: In accordance with Section 402(c)(2) of FLPMA, a new permit will be issued to the new preference holder with the same	No changes made.	Completely Revised-revised by rangewide.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
terms and conditions as the terminated permit unless: ▪ A NEPA analysis of alternative terms and conditions has been completed. If changes in terms and conditions are needed to meet sage-grouse habitat needs or otherwise make progress toward meeting land health standards, issue a decision offering a permit with the new terms and conditions • If a new permit is issued as required by Section 402(c)(2) of FLPMA, then determine priority for completing land health evaluations, habitat assessments and NEPA analysis as described in MD LG 1.		
MD LG 10: In any allotment where land health standards were not met and livestock grazing was found to be a significant causal factor, compliance monitoring will be conducted annually until GRSG habitat objectives (**Table 2-2**) are met. If compliance monitoring finds that the implemented management strategies identified in MD LG 5 are not achieving the desired results, a change in action will be required.	**MD LG 10:** In any allotment where land health standards were not met and livestock grazing was found to be a significant causal factor, compliance monitoring will be conducted annually until GRSG habitat objectives (**Table 2-2**) are met or making progress towards meeting habitat objectives. If compliance monitoring finds that the implemented management strategies identified in MD LG 5 are not achieving the desired results, a change in action will be required in compliance with CFR 43 CFR 4160.1 and IM 2018-023.	Completely Revised-revised by rangewide.
MD LG 11: Allotments within SFA, followed by those within PHMAs, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.	**MD LG 11:** Allotments within PHMAs, focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.	Completely Revised-revised by rangewide.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD LG 12: Grazing management strategies for riparian areas and wet meadows will, at a minimum, maintain or achieve proper functioning condition (PFC) and promote GRSG brood-rearing habitat objectives (**Table 2-2**) within PHMAs and GHMAs.	No changes made.	Completely Revised-revised by rangewide.
MD LG 13: For range improvement projects, review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.	No changes made.	Completely Revised-revised by rangewide.
MD LG 14: Build or modify livestock exclosures so that they are large enough to provide hiding cover to GRSG and other wildlife and to reduce the possibility of wildlife collisions with fences (Christiansen 2009; Stevens 2011; NRCS 2012).	No changes made.	Completely Revised-revised by rangewide.
MD LG 15: In accordance with state water law and subject to valid existing rights, remove or modify water developments that are negatively impacting GRSG habitats.	No changes made.	Completely Revised-revised by rangewide.
MD LG 16: Authorize new water developments for diversion from spring or seep source, in accordance with state water law and subject to valid existing rights when PHMAs and GHMAs will benefit from or not be negatively impacted by the new development. This includes developing new water sources for livestock as part of a grazing management plan to improve GRSG habitat.	No changes made.	Completely Revised-revised by rangewide.
MD LG 17: Modify water development projects to ensure riparian habitats in PHMAs and GHMAs are being maintained or improved in compliance with valid existing rights and in accordance with state water law.	No changes made.	Completely Revised-revised by rangewide.
MD LG 18: Locate salting and supplemental feeding locations, temporary or mobile watering, and new handling facilities (e.g., corrals and chutes) at least 1 mile from riparian areas, springs, and meadows. The distance can be greater based on site-specific conditions.	No changes made.	Completely Revised-revised by rangewide.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD LG 19: In PHMAs and GHMAs, remove livestock ponds built in perennial channels that are negatively impacting riparian habitats, either directly or indirectly, unless riparian access is able to be controlled and negative impacts effectively mitigated (e.g.; water gap fence to pond), and do not permit new ones to be built in these areas subject to valid existing rights. Prior to pond removal, offsite watering options will be examined and considered.	No changes made.	Completely Revised-revised by rangewide.
MD LG 20: In PHMA and GHMA, rest areas that have received vegetative treatments from livestock grazing until resource monitoring data verifies the treatment objectives are being met and an appropriate grazing regime has been developed. Any livestock grazing temporary suspended use or other management changes per 43 CFR, Part 4110.3-2a for the purpose of a vegetation treatment will be done through the grazing decision, prior to treatment.	No changes made.	Completely Revised-revised by rangewide.
MD LG 21: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized shall remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments and fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3.	No changes made.	Completely Revised-revised by rangewide.
MD LG 22: After grazing rest associated with vegetation treatments in PHMAs and GHMAs, monitor annually for a minimum of 5 years to ensure project objectives are being maintained.	No changes made.	Completely Revised-revised by rangewide.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD LG 23: Fences shall not be constructed or reconstructed within 1.2 miles from the perimeter of occupied leks, unless the collision risk can be mitigated through design features or markings (e.g., mark, laydown fences, and design).	No changes made.	Completely Revised-revised by rangewide.
WILD HORSES AND BURROS (WHB)	***WILD HORSES AND BURROS (WHB)***	—
Management Decisions (MD):	***Management Decisions (MD):***	—
MD WHB 1: For WHB management activities (e.g., gathers), review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.	No changes made.	No change (same as 2015).
MD WHB 2: Manage herd management areas (HMAs) in GRSG habitat within established AML ranges to achieve and maintain GRSG habitat objectives (**Table 2-2**).	No changes made.	Completely Revised-revised by rangewide.
MD WHB 3: Complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g., range, wildlife, and riparian). The priorities for conducting assessments are: 1. HMAs containing SFA; 2. HMAs containing PHMAs, which include riparian areas; 3. HMAs containing only GHMAs; 4. HMAs containing sagebrush habitat outside of PHMAs and GHMAs mapped habitat; 5. HMAs without GRSG habitat.	**MD WHB 3:** Complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g., range, wildlife, and riparian). The priorities for conducting assessments are: 1. HMAs containing PHMAs, which include riparian areas; 2. HMAs containing only GHMAs; 3. HMAs containing sagebrush habitat outside of PHMAs and GHMAs mapped habitat; 4. HMAs without GRSG habitat.	Completely Revised-revised by rangewide.
MD WHB 4: Prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts. Place higher priority on herd areas not allocated as HMAs and occupied by wild horses and burros in SFA, followed by PHMAs.	**MD WHB 4:** Prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts. Place higher priority on herd areas not allocated as HMAs and occupied by wild horses and burros in PHMAs.	Completely Revised-revised by rangewide.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD WHB 5: In SFA and PHMAs outside SFA, assess and adjust AMLs through the NEPA process within HMAs when wild horses or burros are identified as a significant causal factor in not meeting rangeland health standards, even if current AML is not being exceeded.	**MD WHB 5:** In PHMAs, assess and adjust AMLs through the NEPA process within HMAs when wild horses or burros are identified as a significant causal factor in not meeting rangeland health standards, even if current AML is not being exceeded.	Completely Revised-revised by rangewide.
MD WHB 6: In SFA and PHMAs outside of SFA, monitor the effects of WHB use in relation to GRSG habitat objectives (**Table 2-2**) on an annual basis to help determine future management actions.	**MD WHB 6:** In PHMAs, monitor the effects of WHB use in relation to GRSG habitat objectives (**Table 2-2**) on an annual basis to help determine future management actions.	Completely Revised-revised by rangewide.
MD WHB 7: Develop or amend herd management area plans (HMAPs) to incorporate GRSG habitat objectives (**Table 2-2**) and management considerations for all HMAs within GRSG habitat, with emphasis placed on SFA and PHMAs outside of SFA.	**MD WHB 7:** Develop or amend herd management area plans (HMAPs) to incorporate GRSG habitat objectives (**Table 2-2**) and management considerations for all HMAs within GRSG habitat, with emphasis placed on PHMAs.	Partially Revised (remove reference to Table 2-2).
MD WHB 8: Consider removals or exclusion of WHB during or immediately following emergency situations (such as fire, floods, and drought) to facilitate meeting GRSG habitat objectives (**Table 2-2**) where HMAs overlap with GRSG habitat.	No changes made.	Partially Revised (remove reference to Table 2-2).
MD WHB 9: When conducting NEPA analysis for wild horse/burro management activities, water developments, or other rangeland improvements for wild horses, address the direct and indirect effects to GRSG populations and habitat. Implement any water developments or rangeland improvements using the criteria identified for domestic livestock.	No changes made.	No change (same as 2015).
MD WHB 10: Coordinate with professionals from other federal and state agencies, researchers at universities, and others to utilize and evaluate new management tools (e.g., population growth suppression, inventory techniques, and telemetry) for implementing the WHB program.	No changes made.	No change (same as 2015).

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MINERALS RESOURCES (MR)	***MINERALS RESOURCES (MR)***	—
Leasable Minerals	***Leasable Minerals***	—
Objectives	***Objectives***	—
Objective MR 1: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMAs and GHMAs. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMAs and GHMAs, that are subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 C.F.R. 3162.3-1(h).	**Objective MR 1 Removed**	Completely Revised-revised by rangewide.
Objective MR 2: Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an application for permit to drill (APD) for the lease to avoid and minimize impacts on GRSG or its habitat and will ensure that the best information about GRSG and its habitat informs and helps to guide development of such federal leases.	No changes made.	Completely Revised-revised by rangewide.
Management Decisions (MD): ***Unleased Fluid Minerals***	***Management Decisions (MD):*** ***Unleased Fluid Minerals***	—
MD MR 1: Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD MR 2: Manage SFA as NSO without waivers, exceptions, or modifications (see Appendix A; Figure 2-4).	**MD MR 2 Removed**	No change (same as 2019).
MD MR 3: In PHMAs outside of SFA, no waivers or modifications to an oil and gas lease no-surface-occupancy stipulation will be granted. In PHMAs, the Authorized Officer may grant an exception to an oil and gas lease no-surface-occupancy stipulation only where the proposed action: MD MR 1: Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. i. Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or, ii. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and will provide a clear conservation gain to GRSG. Exceptions based on conservation gain (ii) may only be considered in (a) PHMAs of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) Areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid federal oil and gas lease existing as of the date of this RMP amendment. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts (see Appendix G). Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the	**MD MR 3:** In PHMAs, manage oil and gas with major constraints (no-surface occupancy) and timing limitations. See **MD SSS 5 (Allocation Exceptions)** and **Appendix E** regarding waivers, exceptions, and modifications for oil and gas lease stipulations.	No text changes (same as 2019), but MD SSS 5 and Appendix E are completely revised.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publicly available at least quarterly.		
MD MR 4a: For BLM land in the state of Nevada only, in the portions of the PHMAs outside of SFA, geothermal projects may be considered for authorization if all of the following conditions are met: • A team comprised of BLM, FWS, and NDOW specialists advises the BLM State Director on appropriate mitigation measures for the project and its ancillary facilities, including lek buffer distances using the best available science; • Mitigation actions are consistent with this Plan's mitigation strategy such as the Nevada Conservation Credit System, and; • The footprint of the project is consistent with the disturbance management protocols identified in this plan (see MD SSS 2 and Appendix E)	**MD MR 4a:** In PHMAs, manage geothermal fluid minerals with major constraints (no-surface occupancy) and timing limitations. See **MD SSS 5 (Allocation Exceptions)** and **Appendix E** regarding waivers, exceptions, and modifications for oil and gas lease stipulations.	No text changes (same as 2019), but MD SSS 5 and Appendix E are completely revised.
MD MR 4b: For BLM lands in California only, manage geothermal leasing in PHMAs in accordance with MD MR 3 (see Appendix G).	**MD MR 4b Removed**	Completely Revised-revised by rangewide.
MD MR 5: In GHMAs, manage oil and gas and geothermal fluid minerals with moderate constraints, timing limitations, and controlled surface use stipulations (see Appendix A; Figure 2-4).	No changes made.	Partially Revised- minor updates to language.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD MR 6: In PHMAs and GHMAs, allow only geophysical exploration that does not crush sagebrush or create new or additional surface disturbance. Examples of technologies that may meet this requirement are drilling methods using helicopters, articulated rubber-tired vehicles that leave no trace, and vibroseis geophysical operations on roads and bladed shoulders.	No changes made.	No change (same as 2015).
MD MR 7: Prohibit surface shot methods in PHMAs.	No changes made.	No change (same as 2015).
Leased Federal Fluid Mineral Estate Actions	***Leased Federal Fluid Mineral Estate Actions***	—
Management Decisions (MD):	***Management Decisions (MD):***	—
MD MR 8: Review Objective SSS 4, and to the extent allowed by law, apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.	No changes made.	No change (same as 2015).
MD MR 9: Use directional and horizontal drilling to reduce surface disturbance.	No changes made.	No change (same as 2015).
MD MR 10: On leased federal fluid mineral estate, where no APD or geothermal drilling permit (GDP) has been issued, apply RDFs consistent with applicable law and other conditions of approval (COAs) that conserve GRSG. Manage existing fluid mineral leases through COAs applied at the time APD or GDP is approved.	No changes made.	Completely Revised-revised by rangewide.
MD MR 11: On leased federal fluid mineral estate in PHMAs, complete master development plans for oil and gas in lieu of APD-by-APD, or operations/utilization plans for geothermal processing for all but exploration wells.	No changes made.	No change (same as 2015).
MD MR 12: On leased, federal, fluid mineral estate in PHMAs, require a full reclamation bond specific to the site. Ensure bonds are sufficient for reclamation costs for full restoration. Base the reclamation costs on the assumption that BLM contractors will perform the work.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD MR 13: In PHMAs and GHMAs, place infrastructure in already disturbed locations to the extent feasible.	No changes made.	Completely Revised-revised by rangewide.
MD MR 14: Locate new compressor stations outside PHMAs and GHMAs and design them to reduce noise that may be directed toward PHMAs and GHMAs (see MDs SSS 2 and SSS 3 and Appendix M).	No changes made.	No change (same as 2015).
Locatable Minerals	***Locatable Minerals***	—
Management Decisions (MD):	***Management Decisions (MD):***	—
MD MR 15: Review Objective SSS 4, and to the extent allowed by law, apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.	No changes made.	No change (same as 2015).
MD MR 16: Recommend for withdrawal SFA under the General Mining Act of 1872, as amended, subject to valid existing rights (see Appendix A; Figures 2-1 and 2-4).	**MD MR 16 Removed**	No change (same as 2019).
MD MR 17: On public lands, manage disturbances associated with notice-level activity in GRSG habitat on a landscape basis to avoid segmenting a project. Do this by encouraging operators and claimants to consolidate exploration into a plan of operations to reduce the proliferation of mining notices, in accordance with 43 CFR, Part 3809.21(b).	No changes made.	No change (same as 2015).
MD MR 18: Subject to valid existing rights and applicable law, authorize locatable mineral development activity, by approving plans of operation and apply mitigation and best management practices that minimize the loss of PHMAs and GHMAs or that enhance GRSG habitat by applying the "avoid, minimize and compensatory mitigation" process through an applicable mitigation system, such as the Nevada Conservation Credit System and exemplified in the Barrick Nevada Sage-Grouse Bank Enabling Agreement (March 2015).	**MD MR 18:** Subject to valid existing rights and applicable law, authorize locatable mineral development activity, by approving plans of operation and apply mitigation and best management practices that minimize the loss of PHMAs and GHMAs or that enhance GRSG habitat by applying the mitigation strategy outlined in **MD MIT 1** and exemplified in the Barrick Nevada Sage-Grouse Bank Enabling Agreement (March 2015).	No text changes (same as 2019), but MD MIT 1is completely revised.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD MR 19: Close or mitigate abandoned mine sites in PHMAs and GHMAs to reduce GRSG predation by eliminating physical structures that could provide nesting opportunities and perching sites for predators.	No changes made.	No change (same as 2015).
Saleable Materials	***Saleable Materials***	—
Management Decisions (MD):	***Management Decisions (MD):***	—
MD MR 20: Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.	No changes made.	No change (same as 2015).
MD MR 21: PHMAs are closed to new mineral material sales (see Appendix A; Figure 2-6). However, these areas remain open to free use permits and the expansion of existing active pits, if requirements in MD MR 20 can be met.	**MD MR 21:** PHMAs are closed to new mineral material sales **(see Appendix A; Figure 2-6)**. However, these areas remain open to free use permits and the expansion of existing active pits, if requirements in **MD MR 20** are met and/or if the new mineral material sale meets one of the allocation exception criteria outlined in **MD SSS 5**.	Completely Revised-revised by rangewide.
MD MR 22: Manage GHMAs as open to existing and new mineral materials disposal sites (see Appendix A; Figure 2-6).	No changes made.	Completely Revised-revised by rangewide.
MD MR 23: Provide reasonable access and development opportunity to Federal Highway Administration, Nevada Department of Transportation (NDOT), California Department of Transportation (Caltrans), counties, tribes and the public for existing mineral material pits in PHMAs and GHMAs.	No changes made.	No change (same as 2015).
Non-Energy Leasable Minerals	***Non-Energy Leasable Minerals***	—
Management Decisions (MD):	***Management Decisions (MD):***	—
MD MR 24: Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD MR 25: Manage PHMAs as closed to new non-energy leasable mineral leasing (see Appendix A; Figure 2-7).	**MD MR 25:** Manage PHMAs as closed to new non-energy leasable mineral leasing, unless the new non-energy leasable mineral lease meets one of the allocation exception criteria outlined in **MD SSS 5** (see **Appendix A; Figure 2-7**).	Completely Revised-revised by state specific.
MD MR 26: Expansion of existing leases will be considered in PHMA for development.	No changes made.	Completely Revised-revised by rangewide.
MD MR 27: Manage GHMAs as open to new non-energy leasable mineral leasing (see Appendix A; Figure 2-7).	No changes made.	No change (same as 2015).
Mineral Split-Estate	***Mineral Split-Estate***	—
Management Decisions (MD):	***Management Decisions (MD):***	—
MD MR 28: Review Objective SSS 4, and to the extent allowed by law, apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat in split estate situations.	No changes made.	No change (same as 2015).
MD MR 29: Where the federal government owns the mineral estate in PHMAs and GHMAs, and the surface is in non-federal ownership, apply the same stipulations, conditions of approval (COAs), and/or conservation measures and RDFs applied (consistent with applicable law) if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
RENEWABLE ENERGY (WIND AND SOLAR) (RE)	***RENEWABLE ENERGY (WIND AND SOLAR) (RE)***	—
Management Decisions (MD): ***Industrial Solar***	***Management Decisions (MD):*** ***Industrial Solar***	—
MD RE 1: Designate PHMAs and GHMAs as ROW exclusion for utility-scale solar energy facilities (those that generate 20 megawatts or more) (see Appendix A; Figure 2-9).	**MD RE 1:** Manage PHMAs and GHMAs as ROW exclusion for utility-scale solar energy facilities (those that generate 20 megawatts or more), unless the utility-scale solar energy facility meets one of the allocation exception criteria outlined in **MD SSS 5**, (see **Appendix A; Figure 2-9**) and in accordance with the Final Solar Energy Development Programmatic Environmental Impact Statement (BLM 2012).	Completely Revised-revised by rangewide.
MD RE 2: In PHMAs and GHMAs, consider approving solar facilities on existing industrial infrastructure (e.g., a mine site) to generate power on-site. Review Objective SSS 4 and apply MDs SSS 1 through SSS 3 when reviewing and analyzing projects and activities proposed in GRSG habitat. In OHMAs, apply Action SSS 4.	No changes made.	No change (same as 2015).
Management Decisions (MD): ***Wind Energy Development***	***Management Decisions (MD):*** ***Wind Energy Development***	—
MD RE 3: Designate PHMAs as ROW exclusion for utility-scale commercial wind energy facilities (those that generate 20 megawatts or more) (see Appendix A; Figure 2-8).	**MD RE 3:** Manage PHMAs as ROW exclusion for utility-scale commercial wind energy facilities (those that generate 20 megawatts or more), unless the commercial wind energy facility meets one of the allocation exception criteria outlined in **MD SSS 5** (see **Appendix A; Figure 2-8**).	Completely Revised-revised by rangewide.
MD RE 4: Within PHMAs, wind facilities associated with existing industrial infrastructure (e.g., a mine site) to provide on-site power generation could be considered for approval, subject to a net conservation gain. Apply MDs SSS 1 through SSS 2 when reviewing and analyzing projects/activities proposed within GRSG habitat.	**MD RE 4:** Within PHMAs, wind facilities associated with existing industrial infrastructure (e.g., a mine site) to provide on-site power generation could be considered for approval, subject to meeting one of the allocation exception criteria outlined in **MD SSS 5** (see **Appendix A; Figure 2-8**). Apply MDs SSS 1 through SSS 2 when reviewing and analyzing projects/activities proposed within GRSG habitat.	No change (same as 2019).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD RE 5: Designate GHMAs as ROW avoidance for utility-scale commercial wind energy facilities (i.e., facilities that generate 20 megawatts or more) (see Appendix A; Figure 2-8). Review Objective SSS 4 and apply Actions SSS 1 through SSS 3 when reviewing and analyzing projects/activities proposed within GRSG habitat. In OHMAs apply Action SSS 4.	**MD RE 5:** Manage GHMAs as ROW avoidance for utility-scale commercial wind energy facilities (i.e., facilities that generate 20 megawatts or more), unless the commercial wind energy facility meets one of the allocation exception criteria outlined in **MD SSS 5** (see **Appendix A; Figure 2-8**). Review Objective SSS 4 and apply Actions SSS 1 through SSS 3 when reviewing and analyzing projects/activities proposed within GRSG habitat. In OHMAs apply Action SSS 4.	Completely Revised-revised by rangewide.
LANDS AND REALTY (LR)	***LANDS AND REALTY (LR)***	***LANDS AND REALTY (LR)***
Objectives:	**Objectives:**	**Objectives:**
Objective LR 1: Manage land use authorizations, including ROWs, leases, permits, and tenure adjustments, to maintain or enhance PHMAs and GHMAs and connectivity.	No changes made.	No change (same as 2015).
Objective LR 2: Effects of infrastructure projects, including siting, will be minimized using the best available science, and updated as monitoring information on current infrastructure projects becomes available.	No changes made.	No change (same as 2015).
Management Decisions (MD): ***Utility Corridors and Communication Sites***	***Management Decisions (MD):*** ***Utility Corridors and Communication Sites***	—
MD LR 1: Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.	No changes made.	No change (same as 2015).
MD LR 2: Only utility corridors identified in Appendix A, Figure 2-10 remain as designated corridors in PHMAs and GHMAs. All previously designated corridors in PHMAs and GHMAs not shown on the map that were designated through past land use planning efforts have been evaluated and undesignated.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD LR 3: On public lands, keep the designated corridors identified in Appendix A, Figure 2-10 in PHMAs and GHMAs available to new uses, subject to a maximum corridor width of 3,500 feet, unless a narrower width is specified in an existing plan, or a different width is specified for congressionally designated corridors.	No changes made.	No change (same as 2015).
MD LR 4: When issuing new communication site management plans or amending existing plans, include GRSG habitat objectives (**Table 2-2**). Current authorizations will then be amended to reflect the updated communication site management plans.	No changes made.	Partially Revised (remove reference to Table 2-2).
Management Decisions (MD): ***Land Use Authorizations***	***Management Decisions (MD):*** ***Land Use Authorizations***	—
MD LR 5: PHMAs and GHMAs are designated as avoidance areas for high voltage transmission line ROWs (>100 kV) (see Appendix A; Figure 2-11a), except for the transmission projects specifically identified below. All authorizations in these areas, other than the identified projects, must comply with the conservation measures outlined in this proposed plan amendment, including all of the requirements presented in MDs SSS 1 – SSS 4. The BLM is currently processing an application for the TransWest Express transmission line and the NEPA review for this project is well underway. Conservation measures for GRSG are being analyzed through the project's NEPA review process, which should achieve a net conservation benefit for the GRSG.	**MD LR 5:** PHMAs and GHMAs are designated as avoidance areas for high voltage transmission line ROWs (>100 kV) (see **Appendix A; Figure 2-11**), unless the high voltage transmission line meets one of the allocation exception criteria outlined in **MD SSS 5.** Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. In OHMAs, apply MD SSS 4.	Completely Revised-revised by rangewide.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD LR 6: PHMAs and GHMAs are designated as major pipeline (≥24-inch diameter) ROW avoidance areas (see Appendix A; Figure 2-11a). Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. In OHMAs, apply MD SSS 4.	**MD LR 6:** PHMAs and GHMAs are designated as major pipeline (≥24-inch diameter) ROW avoidance areas (see **Appendix A; Figure 2-11**), unless the major pipeline line meets one of the allocation exception criteria outlined in **MD SSS 5.** Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat. In OHMAs, apply MD SSS 4.	Completely Revised-revised by rangewide.
MD LR 7: Issue ROWs only after documenting that they will not adversely affect or disrupt GRSG habitat (independent of disturbance cap), except where such limitation will make accessing valid existing rights impracticable in PHMAs and GHMAs.	No changes made.	Completely Revised-revised by rangewide.
MD LR 8: Manage PHMAs as avoidance areas for ROWs (including permits and leases) (see Appendix A; Figure 2-11b). These do not include the wind, solar, or high-voltage transmission line and major pipeline ROW actions, above.	**MD LR 8:** Manage PHMAs as avoidance areas for ROWs (including permits and leases) (see **Appendix A; Figure 2-11)**, unless the ROW meets one of the allocation exception criteria outlined in **MD SSS 5.** These ROWs do not include the wind, solar, or high-voltage transmission line and major pipeline ROW actions, above.	No change (same as 2019).
MD LR 9: Manage GHMAs as open to ROWs (including for permits and leases) (see Appendix A; Figure 2-11b). These do not include the wind, solar, or high-voltage transmission line and major pipeline ROW actions, above.	No changes made.	No change (same as 2015).
MD LR 10: In PHMAs, bury new distribution power and communication lines in existing disturbed areas, unless it would not be technically feasible, or the cost would prohibit the proponent from providing the service. Where burying transmission lines is not feasible, locate new transmission lines next to existing linear disturbances, when possible; additional mitigation will be required.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD LR 11: When renewing or amending ROWs (including permits and leases), assess the impacts of ongoing use of the ROW on GRSGs and their habitat and minimize such impacts to the extent allowed by law.	No changes made.	No change (same as 2015).
MD LR 12: When renewing or amending ROWs that are undeveloped, work with ROW holders to bury or relocate authorized but undeveloped lines to minimize impacts on PHMAs, unless this would not be technically feasible or would be contrary to policy. Where burying transmission lines is not feasible, locate new transmission lines next to existing linear disturbances, when possible.	No changes made.	No change (same as 2015).
MD LR 13: In PHMAs and GHMAs where existing ROWs, permits, or leases are no longer in use, coordinate with the authorized holder to relinquish the authorization and reclaim the site by removing the infrastructure.	No changes made.	No change (same as 2015).
MD LR 14: Stipulate site relinquishment and reclamation in all new, amended or renewed ROWs, permits, and leases.	No changes made.	No change (same as 2015).
MD LR 15: In PHMAs and GHMAs, site new linear features in designated corridors, as identified in Appendix A, Figure 2-10, or at a minimum, collocate with existing linear features. Construct new ROWs in designated corridors as close as technically feasible to existing linear ROW infrastructure to limit disturbance to the smallest footprint.	No changes made.	Completely Revised-revised by rangewide.
MD LR 16: Manage landfills and transfer stations on public lands to eliminate opportunities to attract and provide nesting, cover, or perches for predators.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD LR 17: Within 4 miles of active and pending leks in GRSG habitat, require ROW, permit, and lease holders to retrofit those portions of power lines and other utility structures with nesting and perch- deterring devices. Do this during the renewal and amendment process if adverse effects, such as increased nest predation, on GRSG populations have been documented. This requirement shall be predicated on research and monitoring studies specific to power lines or other utility structures.	No changes made.	Completely Revised-revised by state specific.
MD LR 18: In PHMAs and subject to valid existing rights, authorize new road ROWs only when necessary for public safety or administrative access, or if it will create no new surface disturbance.	No changes made.	No change (same as 2015).
MD LR 19: In PHMAs and GHMAs, address access to valid existing rights to provide the minimum access necessary to exercise the right and maintain or enhance PHMAs and GHMAs.	No changes made.	No change (same as 2015).
MD LR 20: Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in Table 2 of the Monitoring Framework (Appendix D)−under valid existing rights prior to authorizing new projects in PHMA.	No changes made.	No text changes (same as 2015), but Appendix D has been completely revised.
No similar action.	No similar action.	New: refer to state specific MD LR (new MD)
Management Decisions (MD): ***Land Tenure***	***Management Decisions (MD):*** ***Land Tenure***	—
MD LR 21: Lands classified as PHMAs and GHMAs for GRSG will be retained in federal management, unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to GRSG or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the GRSG (see Appendix A; Figure 2-12).	**MD LR 21:** Exceptions to non-disposal or exchange of lands that are identified for retention in Appendix A, Figure 2-12 could be considered if (a) they are identified for disposal through previous planning efforts or address a Congressional Act (e.g., the respective Lincoln and White Pine County Conservation, Recreation, and Development Acts), (b) the agency can demonstrate that the disposal, including land exchanges, will have no adverse	Completely Revised-revised by state specific (MD SSS 5).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
	direct, indirect or cumulative impacts on GRSG and its habitat, or (c) adverse impacts on GRSG or its habitat will be offset, through use of voluntary compensatory mitigation, consistent with the States' mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law). Also see allocation exception criteria in MD SSS 5.	
MD LR 22: Where significant conservation actions can be achieved in PHMAs and GHMAs, seek to acquire lands with intact subsurface mineral estate by donation, purchase, or exchange in order to best conserve, enhance, or restore GRSG habitat.	No changes made.	No change (same as 2015).
MD LR 23: Manage lands acquired by exchange, purchase or easement as either PHMAs or GHMAs, in consideration of surrounding habitat.	No changes made.	No change (same as 2015).
Management Decisions (MD): ***Withdrawals***	***Management Decisions (MD):*** ***Withdrawals***	—
MD LR 24: Recommend SFA for withdrawal from the General Mining Act of 1872, as amended; subject to valid existing rights (see Appendix A; Figure 2-5).	**MD LR 24 Removed**	No change (same as 2019).
Recreation and Visitor Services (REC)	***Recreation and Visitor Services (REC)***	—
Management Decisions (MD):	***Management Decisions (MD):***	—
MD REC 1: Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when analyzing projects and activities proposed in GRSG habitat.	No changes made.	No change (same as 2015).
MD REC 2: Allow special recreation permits in PHMAs and GHMAs only if their effects on GRSG and its habitat are neutral or result in a net conservation gain.	**MD REC 2:** Allow special recreation permits in PHMAs and GHMAs only if their effects on GRSG and its habitat are neutral or beneficial.	No change (same as 2019).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD REC 3: In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the development will have a net conservation gain to GRSG and its habitat (such as concentrating recreation, diverting use away from critical areas, etc.), or unless the development is required for visitor health and safety or resource protection.	**MD REC 3:** In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the facility meets one of the criteria outlined in **MD SSS 5.**	No change (same as 2019).
MD REC 4: Develop trail mapping and educational campaigns in PHMAs and GHMAs to reduce recreational impacts on GRSG and their habitat, including the effects of cross-country travel.	No changes made.	No change (same as 2015).
TRAVEL AND TRANSPORTATION MANAGEMENT (TTM)	***TRAVEL AND TRANSPORTATION MANAGEMENT (TTM)***	—
OBJECTIVE	***OBJECTIVE***	—
Objective TTM 1: Prioritize and complete transportation planning in PHMAs and GHMAs that provides for reasonable access to public lands for administration and recreation and that minimizes proliferation of user-created routes (e.g., roads, primitive roads, and trails).	No changes made.	No change (same as 2015).
Management Decisions (MD):	***Management Decisions (MD):***	—
MD TTM 1: Review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.	No changes made.	No change (same as 2015).
MD TTM 2: In areas where travel planning has not been completed, limit off-highway vehicle (OHV) travel to existing routes in PHMAs and GHMAs (subject to valid existing rights, such as for a mine under a plan of operations) until subsequent implementation-level travel planning is completed and a designated route system is established. In travel management plans that have been completed and are being implemented (e.g., northeastern California plans), continue to limit OHV travel to designated routes in PHMAs and GHMAs (see Appendix A; Figure 2-13).	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD TTM 3: Allow the goals, objectives, and actions in relevant national OHV guidance to guide subsequent implementation-level travel planning efforts. In addition, the following guidelines will be considered when undertaking future implementation-level travel planning: • Identify, prioritize, and update annually a timeline to complete travel planning in all relevant planning areas to accelerate data collection, route evaluation and selection, and on-the-ground implementation, including signing, monitoring, and rehabilitation. • Consult with interested user groups, federal, state, county, and local agencies, local landowners, and other parties to provide an opportunity for the public to express itself and have its views considered. Consequently, incorporate a public outreach plan to fully engage all interested stakeholders into future travel management plans. • Among other route evaluation criteria, incorporate criteria from 43 CFR, Part 8342.1, and specifically section (b), "areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats." • Evaluate all routes to determine the purpose and need and the potential resource or user conflicts from motorized travel. Where resource or user conflicts outweigh the purpose and need for the route, consider closing the route or relocating it outside of PHMAs and GHMAs. Evaluate for administrative access only routes not required for public access or recreation against current administrative/agency purpose or need.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Consider closing routes that are duplicative, parallel, or redundant. • Consider seasonal restrictions (see Actions SSS 2 and SSS 3) on motorized travel use PHMAs and GHMAs where motorized vehicle use is a threat. Consider limiting over snow vehicles (OSVs) designed for use on a track or tracks or a ski or skis, while in use to designated routes or consider seasonal closures in GRSG wintering areas from November 1 through February 28. • Consider the need for restricting motorized vehicles, including their sound levels (Actions SSS 2 and SSS 3), speed and design (e.g., motorcycles, ATVs, and UTVs). • Consider scheduling road maintenance to avoid disturbance during sensitive GRSG life-cycle periods to the extent practicable. Consider using time of day, seasonal, and noise restrictions (see Actions SSS 2 and SSS 3) to reduce impacts on GRSG seasonal habitat. • In PHMAs and GHMAs, close to motorized travel those roads, primitive roads, and trails not designated in travel management plans. • In PHMAs and GHMAs, prioritize restoring routes not designated in a travel management plan. Obliterate and seed roads, primitive roads, and trails not designated in travel management plans, with appropriate seed mixes and transplanted sagebrush when applicable. Use fire-resistant species as fuel breaks where appropriate. Seed must be certified weed free.		
MD TTM 4: In PHMAs and GHMAs, where new roads are necessary for public safety, administration, or public need, consider limiting route construction to realignments of existing routes where possible.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD TTM 5: In PHMAs and GHMAs, work with local governments to minimize upgrading existing routes that will change route category (e.g., road, primitive road, or trail) or capacity, unless the upgrade will maintain or enhance GRSG habitat, provide a fuel break to protect native vegetation, will be necessary for public safety, or will eliminate the need to construct a new road.	No changes made.	No change (same as 2015)..
MD TTM 6: In PHMAs and GHMAs, temporary closures will be considered in accordance with 43 CFR, Subpart 8364 (Closures and Restrictions), 43 CFR, Subpart 8351 (Designated National Area), 43 CFR, Subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties), and 43 CFR, Subpart 8341 (Conditions of Use). Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. where an authorized officer determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence (43 CFR, Part 8341.2). A closure or restriction order shall be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders shall be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Cultural Resources (CUL)	**Cultural Resources (CUL)**	—
Management Decisions (MD):	***Management Decisions (MD):***	—
MD CUL 1: Do not restrict tribal access to view GRSG breeding behavior for a tribe's traditional lifeways.	No changes made.	No change (same as 2015).
MD CUL 2: Do not prohibit tribal access to traditional locations for cultural practices in PHMAs and GHMAs.	No changes made.	No change (same as 2015).
MD CUL 3: Do not prohibit tribal collection of seeds, vegetation, or medicinal plants related to traditional cultural practices in PHMAs and GHMAs.	No changes made.	No change (same as 2015).
Mitigation (MI)	**Mitigation (MI)**	—
Management Decisions (MD):	***Management Decisions (MD):***	—
MD MIT 1: In Nevada, coordinate with the SETT on the application of a compensatory mitigation program, such as the Nevada Conservation Credit System (CCS) (**Appendix N**) for mitigating activities that result in habitat loss and degradation of GRSG habitat in Nevada, where the application of compensatory mitigation will occur on, or the credit will be applied to disturbance on BLM-administered lands.	**MD MIT 1:** When authorizing third-party actions in GRSG HMAs, the BLM will seek to achieve the planning-level GRSG management goals and objectives through implementation of mitigation and management actions, consistent with valid existing rights and applicable law. Management will be consistent with the GRSG goals and objectives, and in conformance with BLM Manual 6840, Special Status Species Management. In accordance with BLM Manual 6840, the BLM will undertake planning decisions, actions and authorizations "to minimize or eliminate threats affecting the status of [GRSG] or to improve the condition of [GRSG] habitat" across the planning area. The BLM has determined that FLPMA does not explicitly mandate or authorize the BLM to require public land users to implement compensatory mitigation as a condition of obtaining authorization for the use of BLM-administered lands (IM 2019-018, Compensatory Mitigation, December 6, 2018). Consistent with that determination, compensatory mitigation must be voluntary unless required by other applicable laws, but the BLM recognizes that	Completely Revised-revised by rangewide.

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
	state authorities may also require compensatory mitigation. To align this planning effort with the BLM's compensatory mitigation policy, IM 2019-018, the amended plans clarify that the BLM will consider compensatory mitigation only when offered voluntarily by a project proponent, when required by a law other than FLPMA; or as a component of compliance with a state mitigation plan, program, or authority, such as required by State of Nevada Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law). In accordance with the State's goals for managing Greater Sage-Grouse, the plans modify the net conservation gain standard for compensatory mitigation to clarify that the BLM would pursue net benefit/net conservation gain as a broader planning goal and objective. This means that the BLM would continue to require avoidance, minimization, and other onsite mitigation to adequately conserve Greater Sage-Grouse and its habitat, while remaining committed to implementing beneficial habitat management actions to reduce the threats of fire and invasive species. In fiscal year 2018, the BLM funded approximately $29 million in sage-grouse management actions resulting in approximately 500,000 acres of treated sage-grouse habitat and expects to invest another $22.5 million of habitat management projects in fiscal year 2019 in the Great Basin Region. The BLM would continue to apply the mitigation hierarchy as described in the CEQ regulations at 40 CFR 1508.20; however, the BLM would focus on avoiding, minimizing, rectifying, and reducing impacts over time. Compensation, which involves	

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
	replacing or providing substitute resources for the impacts (including through payments to fund such work), would be considered only when voluntarily offered by a proponent, required by a law other than FLPMA, or to meet a State requirement. The BLM commits to cooperating with the State to analyze applicant-proposed or state-imposed compensatory mitigation to offset residual impacts. The BLM remains committed to achieving the planning-level management goals and objectives identified in this ROD and the 2015 ARMPA by ensuring Greater Sage-Grouse habitat impacts are addressed through implementing mitigating actions consistent with the governing RMP. In all GRSG habitat, before authorizing third-party actions that result in habitat loss and degradation within the State of Nevada, the BLM will complete the following steps, in alignment with the State of Nevada's Greater Sage-Grouse Conservation Plan (2014, as amended), including avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions: 1. Notify the State of Nevada's Sagebrush Ecosystem Technical Team to determine if the State requires or recommends any mitigation – including avoidance, minimization, or compensatory mitigation – under the States' regulations, policies, or programs, such as required by the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law), related to the conservation of GRSG. 2. Incorporate the States' required or recommended mitigation into the BLM's NEPA decision-making process, if the State of Nevada's Sagebrush Ecosystem Technical Team	

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
	determines that there are unacceptable residual impacts on GRSG or its habitat and compensatory mitigation is required as a part of the State's policy or authorization, such as required by the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law), or if a proponent voluntarily offers mitigation. 3. Verify that the project proponent has coordinated with the State of Nevada's Sagebrush Ecosystem Technical Team to ensure it complies with the State of Nevada's Greater Sage-Grouse Conservation Plan (2014, as amended) and all applicable State requirements relating to its proposal. The BLM will cooperate with the States to determine appropriate project design and alignment with the States' policies and requirements, including those regarding compensatory mitigation, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law). When the BLM is considering compensatory mitigation as a component of the project proponent's submission or based on a requirement of or recommendation from the States, the BLM's NEPA analysis will evaluate the need to avoid or minimize impacts of the proposed project and achieve the goals and objectives of this Approved RMPA. With respect to any State compensatory mitigation requirements, the BLM will defer to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action.	

2015 BLM GRSG Approved RMP Amendment (as maintained)	2019 BLM GRSG Approved RMP Amendment (as maintained)	Type of Change to Existing Management Direction in the Proposed RMP Amendment
	The BLM will not deny a proposed authorization in GRSG habitat solely on the grounds that the proponent has not proposed or agreed to undertake voluntary compensatory mitigation, unless required by an existing States' authority such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law). The BLM will ensure project design is aligned with the States' requirements—including compensatory mitigation—that may be necessary to comply with State's policies and programs for the conservation of GRSG. Where compensatory mitigation is required as part of a States' plan, program, or authority, such as Nevada State Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law), the BLM will include the required mitigation in all of its action alternatives in a NEPA analysis.	
MD MIT 2: Identify compensatory mitigation areas in PHMAs and GHMAs with the potential to achieve GRSG habitat objectives (**Table 2-2**), in accordance with FIAT, the SFA prioritization, and the State of Nevada Strategic Action Plan.	**MD MIT 2:** On BLM-administered lands within Nevada and California, when authorizing third-party actions that will result in direct, indirect, or cumulative impacts on GRSG or their habitat, the BLM will defer to the State of Nevada's most current version of the Habitat Quantification Tool (HQT) to quantify those impacts to ensure consistency in tracking and reporting changes to GRSG habitat quality and quantity.	Completely Revised-revised by rangewide.

2.12.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 plans have management direction that would change by the Proposed RMP Amendment. If 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The 2015 and 2019 Appendices can be found on the Nevada and Northeastern California GRSG ePlanning website.

ARMPA Appendix Name	Year	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Approved RMP Amendment Maps	2015, 2019	Completely Revised-revised by rangewide.
B: Applying Lek Buffer-Distances When Approving Actions	2015, 2019	Partially Revised – Same as 2019 with updated mitigation reference
C: Required Design Features	2015, 2019	No change (same as 2019).
D: Greater Sage-Grouse Monitoring Framework	2015, 2019	Completely Revised-revised by rangewide.
E: Greater Sage-Grouse Disturbance Cap Guidance	2015, 2019	Partially Revised – disturbance cap section of the Proposed Plan
F: Regional Mitigation Strategy; (*Removed in 2019)*	2015	No change (still removed) - appendix not carried forward and is described in the mitigation section of the Proposed Plan
G: Fluid Mineral Stipulations, Waivers, Modifications, and Exceptions	2015, 2019	Partially Revised – updated rangewide exceptions, modifications, and waivers
H: Fire and Invasives Assessment Tool	2015	No change (same as 2015).
I: Avoid, Minimize and Apply Compensatory Mitigation; (*Removed in 2019)*	2015	No change (still removed) - appendix not carried forward and is described in the mitigation section of the Proposed Plan
J: Adaptive Management Plan	2015, 2019	Completely Revised-revised by rangewide.
M: Greater Sage-Grouse Noise Protocol	2015	No change (same as 2015).
New		New: Grazing BMP Appendix

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Appendix 2.13
Oregon RMPs

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2.13 OREGON RMPS

This appendix presents the GRSG approved RMP amendment language from the 2015 and 2019 records of decision for Oregon. Changes between 2015 and 2019 are noted. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment, either partially or completely, and which existing decisions would not be amended at all. The types of changes to existing management direction from the Proposed RMP Amendment include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable 2015 and 2019 appendices that are listed in **Section 2.13.2** of this appendix. For additional state-specific Oregon management direction for the Proposed RMP Amendment, see Chapter 2, Table 2-11.

2.13.1 Oregon

Note that in 2015 and 2019 Oregon used the ODFW definitions for leks with management directions that used a combination of "occupied" and "pending" leks. In the 2024 Proposed RMP Amendment Oregon BLM is adopting the WAFWA lek definitions (Cook et. al., 2022). In addition to using the WAFWA "active leks" Oregon has a state-specific difference (refer to Chapter 2 Table 2-9) to also use "pending active lek" and continue to be in coordination with ODFW. All management directions in the 2015 and 2019 Approved ARMPAs referring to occupied and pending leks are replaced with active and pending active leks.

Table 1: Comparison of Proposed RMP Amendment to Existing GRSG RMP Management Direction in Oregon

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Special Status Species (SSS)	**Special Status Species (SSS)**	
Goal	**Goal**	
Goal SSS 1: Conserve, enhance, and restore the sagebrush ecosystem upon which GRSG populations depend in an effort to maintain and/or increase their abundance and distribution, in cooperation with other conservation partners.	No changes made.	Completely Revised-revised by rangewide.
Objective	**Objective**	
Objective SSS 1: Protect PHMA necessary to conserve 90 percent of Oregon's Greater Sage-grouse population with emphasis on highest density and important use areas that provide for breeding, wintering, and connectivity corridors. Protect GHMA necessary to conserve occupied seasonal or year-round habitat outside of PHMA.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Objective SSS 2: Maintain or improve habitat connectivity between PHMA within Oregon and adjoining states to promote Greater Sage-grouse movement and genetic diversity.	No changes made.	No change (same as 2015)
Objective SSS 3: In addition to the net conservation gain mitigation requirement, manage Oregon PACs so that discrete anthropogenic disturbances, whether temporary or permanent, cover less than 3 percent of the total available Greater Sage-grouse habitat, regardless of ownership.	No changes made.	Partially Revised-revised by rangewide (Net conservation gain replaced by "minimum standard of no net loss" except where state of Oregon rules apply.)
Per Oregon Maintenance Action 2: Objective SSS 4: The habitat objectives for GRSG (Table 2-2) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site. The seasonal habitat descriptions in Table 2-2 vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing	No changes made.	Completely Revised-revised by rangewide

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sage-grouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area. The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards. The Habitat Objectives Tables are to be used: • To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments • To evaluate land use plan effectiveness for sage-grouse conservation, and		

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
• As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential, and local information. References: U.S. Department of the Interior, Bureau of Land Management. 2001. Rangeland health standards handbook H-4180-1. https://www.blm.gov/sites/blm.gov/files/uploads/Media_Library_BLM_Policy_h4180-1.pdf		
Objective SSS 5: Manage anthropogenic uses and GRSG predator subsidies on public lands (landfills, transfer stations, predator perches and nest sites) to reduce the effects of predation on GRSG.	No changes made.	No change (same as 2015)
Objective SSS 6: The BLM will coordinate with the State of Oregon regarding proposed management changes, the implementation of conservation measures, mitigation, and site-specific monitoring related to adaptive management and anthropogenic disturbance.	No changes made.	No change (same as 2015)
Management Direction	**Management Direction**	
MD SSS 1: Designate PHMA on 4,578,518 acres and designate GHMA on 5,628,628 acres.	No changes made.	Partially Revised- updated acres
MD SSS 2: Designate Sagebrush Focal Areas (SFA) (1,929,580 acres) as shown on Figure 1-2: Oregon Decision Area, Greater Sage-Grouse Habitat Management Areas for BLM-Administered Lands (with SFA). SFAs will be managed as PHMA, with the following additional management:A. Recommended for withdrawal from the General Mining Law of 1872, as amended, subject to valid existing rights. B. Managed as NSO, without waiver, exception, or modification, for fluid mineral leasing.C. Prioritized for vegetation management and conservation actions in these	No changes made.	Completely Revised-revised by rangewide (SFA's not carried forward)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration (see specific management sections).		
MD SSS 3: If the 3% anthropogenic disturbance cap, not to exceed 1% increase per decade, is exceeded on lands (regardless of landownership) within GRSG Priority Habitat Management Areas in the affected Oregon PAC, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the General Mining Law of 1872, as amended, valid existing rights, etc.) will be permitted by BLM within GRSG Priority Habitat Management Areas in the affected Oregon PAC until the disturbance has been reduced to less than the cap.	No changes made.	Completely Revised-rangewide and state specific direction (Oregon keeps decadal disturbance cap)
MD SSS 4: If the 3% disturbance cap, not to exceed 1% increase per decade, is exceeded on all lands (regardless of landownership) within a proposed project analysis area in Priority Habitat Management Areas, then no further anthropogenic disturbance will be permitted by BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap (subject to applicable laws and regulations, such as General Mining Law of 1872, as amended, valid existing rights, etc.). Within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location.	No changes made.	Completely Revised-revised by rangewide

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD SSS 5: Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in the Priority Habitat Management Area within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is co-located into an existing disturbed area, as described in Appendix E.	No changes made.	No change (same as 2015)
MD SSS-6: Using the habitat disturbance cap calculation methodology (Appendix E), in cooperation with ODFW, measure the direct area of influence of infrastructure, facilities, energy, and mining within Oregon PACs (Figure 2-2 in Appendix A) and maintain a current database of anthropogenic disturbance.	No changes made.	Completely Revised-rangewide
MD SSS 7: Verify the accuracy of Greater Sage-grouse habitat data layers at the site/project scale. Consider ecological site potential when assessing habitat suitability for Greater Sage-grouse. Periodically update PHMA and GHMA in cooperation with ODFW using the best available information.	No changes made.	No change (same as 2015)
MD SSS 8: When fine and site-scale Greater Sage-grouse habitat assessment and monitoring is needed or required, (e.g., as a component of a rangeland health assessment), measure the Greater Sage-grouse habitat suitability indicators for seasonal habitats identified in Table 2-2. Site suitability values may be adjusted regionally where there is scientific justification for doing so. When using the indicators to guide management actions or during land health assessments, consider that	No changes made.	Completely Revised-rangewide (new Application of Habitat Objectives section; also Table 2-2 replaced by Appendix 8, inclusive of Table 8-1.E. Oregon GRSG Habitat Indicators)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
the indicators are sensitive to the ecological processes operating at the scale of interest and that a single habitat indicator does not necessarily define habitat suitability for an area or particular scale.		
MD SSS 9: Apply buffers and seasonal restrictions in Table 2-4 to all occupied or pending leks in PHMA and GHMA to avoid direct disturbance to Greater Sage-grouse. In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the USGS Report Conservation Buffer Distance Estimates for Greater Sage-Grouse—A Review (Open File Report 2014-1239) (Manier et al. 2014; Appendix B).	No changes made.	No change (same as 2015)
See Table 2-3 Greater Sage-Grouse Buffers (text included in table 2-3 after this comparison table)	No changes made.	No change (same as 2015)
MD SSS 10: In undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions.	No changes made.	Completely Revised-revised by rangewide (new Mitigation section; Net conservation gain replaced by "a minimum standard of no net loss" except where state of Oregon rules apply.)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD SSS 11: Anthropogenic disturbances or activities disruptive to GRSG (including scheduled maintenance activities) shall not occur in seasonal GRSG habitats unless the project plan and NEPA document demonstrate the project will not impair the life-cycle or behavioral needs of GRSG populations. Seasonal avoidance periods vary by GRSG seasonal habitat as follows: • In breeding habitat within four (4) miles of occupied and pending leks from March 1 through June 30. Lek hourly restrictions are from two hours before sunset to two hours after sunrise at the perimeter of an occupied or pending lek. • Brood-rearing habitat from July 1 to October 31 • Winter habitat from November 1-February 28 The seasonal dates may be modified due to documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) in coordination with ODFW, in order to better protect GRSG.	No changes made.	No change (same as 2015)
MD SSS 12: Identify Greater Sage-grouse habitat outside of PHMA that can function as connecting habitat. Consider the habitat connectivity map developed by The Nature Conservancy and BLM for Oregon (Jones and Schindel, 2015). When conducting analysis for project level NEPA, include Greater Sage-grouse habitat and populations in adjoining states within 4 miles of leks in Oregon.	No changes made.	No change (same as 2015)
MD SSS 13: All authorized actions in Greater Sage-grouse habitat are subject to RDFs and BMPs in Appendix C and these disturbance screening criteria:	No changes made.	Partially Revised-revised by rangewide (Revised calculation method to disturbance cap. Net conservation gain replaced by "a minimum standard of no net loss" except where state of Oregon rules apply.)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Where avoidance is not possible, disturbance will be allowed under the following conditions: • Development in each Oregon PAC and PHMA does not exceed the disturbance cap at either the Oregon PAC scale or the project scale (Appendix E). • New anthropogenic disturbance does not occur within 1.0 mile of an occupied or pending lek in PHMA or GHMA. • Development meets noise restrictions in PHMA and GHMA. • Analyze through implementation level NEPA seasonal protection and timing limitations of occupied and pending leks in PHMA and GHMA. • All disturbance is subject to net conservation gain mitigation to Greater Sage-grouse and its habitat (see Appendix F, Mitigation) in PHMA and GHMA. • All new permitted activities will follow Required Design Features (Appendix C) in PHMA and GHMA. • To the extent feasible, development should only occur in non-habitat areas. If this is not possible, then development must occur in the least suitable habitat for Greater Sage-grouse. • Apply buffers and seasonal restrictions in Table 2-4 to all occupied or pending leks in PHMA and GHMA to avoid direct disturbance to Greater Sage-grouse. Screening criteria and conditions will not be applicable to vegetation treatments being conducted to enhance GRSG habitat, except noise and seasonal restrictions will apply.		

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD SSS 14: Assist ODFW and other partners with surveillance and, where appropriate, control of West Nile virus. Report observations of dead or sick Greater Sage-grouse or other bird deaths that could be attributed to disease or parasites.	No changes made.	No change (same as 2015)
MD SSS 15: Implement adaptive management responses to hard and soft triggers established in the Adaptive Management Strategy (Appendix J). Hard trigger responses will be removed, either through a plan amendment or when the criteria for recovery have been met (see Appendix J - Longevity of Responses). Removal of the hard trigger responses returns management direction in the affected Oregon PAC to the plan decisions that are in force within those Oregon PACs that have not tripped a hard trigger.	No changes made.	Completely Revised-revised by rangewide (new Adaptive Management section)
Predation		
No similar action	No similar action	New: rangewide predation actions added
Vegetation (VEG)	**Vegetation (VEG)**	
Goal	**Goal**	
Goal VEG 1: Increase the resistance of Greater Sage-grouse habitat to invasive annual grasses and the resiliency of Greater Sage-grouse habitat to disturbances such as fire and climate change to reduce habitat loss and fragmentation.	No changes made.	No change (same as 2015)
Goal VEG 2: Within Greater Sage-grouse habitat, re-establish sagebrush cover, native grasses, and forbs in areas where they have been reduced below desired levels or lost. Use ecological site descriptions to determine appropriate levels of sagebrush cover and appropriate native grasses and forbs.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Goal VEG 3: Use integrated vegetation management to control, suppress, and eradicate invasive plant species per BLM Handbook H-1740-2. Apply ecologically based invasive plant management principles in developing responses to invasive plant species.	No changes made.	No change (same as 2015)
Objective	**Objective**	
Objective VEG 1: Within the boundaries of each Field Office establish a mix of sagebrush classes as identified in Table 2-4, Desired Mix of Sagebrush Classes by Sagebrush Type on BLM-administered lands in Greater Sage-grouse habitat. Evaluate progress toward the objective every 10 years.	No changes made.	No change (same as 2015)
Table 2-4 Desired Mix of Sagebrush Classes by Sage Brush Type (text included in table 2-4 after this comparison table)	No changes made.	No change (same as 2015)
Objective VEG 2: Reduce encroaching conifer cover to zero within 1.0 mile of all occupied or pending leks and to less than 5 percent within 4.0 miles of such leks at a rate at least equal to the rate of encroachment. Priorities for treatment are phase I and phase II juniper, and phase III juniper with a grass-forb understory. Retain all old trees, culturally significant trees, and trees in active use by special status species (e.g. nest, den, and roost trees) and all old growth stands of juniper within 4.0 miles of occupied or pending leks. See OSU Technical Bulletin 152, or its successor, for the key characteristics of old trees. Old growth stands are those where the dominant trees in the stand meet the key characteristics for old trees. Pending occupied leks and pending unoccupied leks are hereafter collectively referred to as "pending leks" (see Glossary).	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Objective VEG 3: Reduce the area dominated by invasive annual grasses to no more than 5 percent within 4.0 miles of all occupied or pending leks. Manage vegetation to retain resistance to invasion where invasive annual grasses dominate less than 5 percent of the area within 4.0 miles of such leks.	No changes made.	No change (same as 2015)
Objective VEG 4: Thin sagebrush stands that exceed 30 percent cover in cool-moist sagebrush and 25 percent cover warm-dry sagebrush to no less than 15 percent cover within 4.0 miles of all occupied or pending leks.	No changes made.	No change (same as 2015)
Objective VEG 5: Increase native plant diversity (number of species) to at least 50 percent of the potential diversity listed for the relevant ecological site description and sagebrush cover where it is less than 15 percent in half of crested wheatgrass seedings in PHMA. If existing diversity equals or exceeds 50 percent of the potential diversity, no forb restoration is needed.	No changes made.	No change (same as 2015)
Objective VEG 6: Conduct vegetation treatments based on the following 10-year (decadal) acreage objectives within four miles of occupied and pending leks, using results of the fire and invasives assessment tool (FIAT; Fire and Invasive Assessment Team 2014) to establish the priority PACs and treatments within PACs:	No changes made.	No change (same as 2015)
Objective VEG 7: Each Oregon PAC has at least 5 percent sagebrush cover on a minimum of 70 percent of the area within the Oregon PAC that is capable of supporting sagebrush plant communities. Use ecological site descriptions to determine which sites are capable of supporting sagebrush plant communities.	No changes made.	No change (same as 2015)
Objective VEG 8: Coordinate vegetation management activities with adjoining landowners.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Objective VEG 9: In all Sagebrush Focal Areas and Priority Habitat Management Areas, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6) and in Table 2-5.	No changes made.	Partially Revised- SFA's not carried forward
Table 2-5 Decadal Treatment Objectives for GRSG Habitat (text included in table 2-5 after this comparison table)	No changes made.	No change (same as 2015)
Management Direction	**Management Direction**	
Habitat Restoration:	—	
MD VEG 1: Priority areas for Greater Sage-grouse habitat restoration and maintenance projects are*: • Sites with a higher probability of success. • Seasonal habitats thought to be limiting to Greater Sage-grouse populations. • Connectivity corridors between Greater Sage-grouse populations and subpopulations. • Following stand-replacing events at least 100 acres in size. *Not in priority order. Incorporate these priorities in the assessments conducted using the FIAT process detailed in Appendix H.	No changes made.	No change (same as 2015)
MD VEG 2: Base species composition, function, and structure of sagebrush communities on ecological site descriptions. Use climate change science concerning projected changes in species ranges and changes in site capability to adjust expected and desired native species compositions as that information becomes available.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD VEG 3: Do not treat sagebrush during nesting and early brood-rearing within 4.0 miles of occupied or pending leks. Conduct pre-treatment lek surveys to determine if the lek is active. Breeding and brood-rearing typically occur from March 1 to June 30; use local information to further refine this period.	No changes made.	No change (same as 2015)
MD VEG 4: Cutting of juniper can occur within 4.0 miles of an occupied or pending lek during the breeding season from two hours after sunrise and two hours before sunset.	No changes made.	No change (same as 2015)
MD VEG 5: Vegetation management activities that are timing-sensitive for maximum effectiveness, such as herbicide application or seeding operations, can occur during the breeding season within 4.0 miles of occupied or pending leks. Limit operations to no more than 5 days and to the period beginning two hours after sunrise and ending two hours before sunset during the breeding and early brood rearing period. Conduct pre-treatment surveys for nests and do not damage or destroy identified nests during treatment operations. Conduct operations so as to minimize the risk of accidentally killing chicks. Breeding and early-brood-rearing typically occur from March 1 through June 30; use local information to further refine this period.	No changes made.	No change (same as 2015)
MD VEG 6: Use adaptive management principles (for example, monitoring and adjusting seed mixes, planting methods or timing of planting to increase success rates) to provide for persistence of seeded or planted species important to Greater Sage-grouse.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD VEG 7: Do not use non-specific insecticides in brood-rearing habitat during the brood-rearing period. Use instar-specific insecticides to limit impacts on Greater Sage-grouse chick food sources.	No changes made.	No change (same as 2015)
MD VEG 8: Use native plant materials for restoration and rehabilitation based on availability, adaptive capacity, and probability of successful establishment (see Appendix I). Where native plant material availability or probability of successful establishment is low, use desirable non-native plant materials that are of a similar functional/structural group as native plant species (e.g. deep-rooted, tall perennial bunchgrass, tap-rooted perennial forb).	No changes made.	No change (same as 2015)
MD VEG 9: When sufficient native plant materials are available, use native plant materials unless the area is immediately threatened by invasive plant species spread or dominance. Use non-native plant materials as necessary to: 1. Limit or control invasive plant species spread or dominance. 2. Create fuel breaks along roads and ROWs. 3. Create defensible space within 0.5 mile of human residences.	No changes made.	No change (same as 2015)
MD VEG 10: When seedings include non-native plant materials, evaluate post-planting within 10 years to determine the need to increase native species populations or compositions to be more representative of the ecological site description and capability. When existing native herbaceous diversity is less than 50 percent of the potential diversity for the applicable ecological site description, conduct treatments to increase the diversity.	No changes made.	No change (same as 2015)
MD VEG 11: Do not conduct forage enhancement solely for domestic livestock in PHMA.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD VEG 12: Adjust discretionary land uses, such as active use for livestock grazing or recreational uses or seasons, as needed to facilitate attainment and persistence of vegetation restoration objectives.	No changes made.	No change (same as 2015)
MD VEG 13: Use provisional and established seed zones identified by the Great Basin Native Plant Project (http://www.fs.fed.us/rm/grassland-shrubland-desert/research/projects/gbnpsip/) to determine appropriate seed sources for grasses, forbs, and shrubs. Identify sagebrush seed collection areas to provide locally adapted sagebrush seed sources.	No changes made.	No change (same as 2015)
MD VEG 14: Allowable methods for vegetation treatment include mechanical, biological (including targeted grazing), chemical, or wildland fire or combinations of these general treatment categories.	No changes made.	No change (same as 2015)
MD VEG 15: Create mosaics of varying sagebrush density using spot treatments within the treatment area. Sagebrush density shall be equivalent to Classes 1 through 4 in cool-moist sagebrush and Classes 1 through 3 in warm-dry sagebrush (see Table 2-4). Maximum stand-replacement patch size shall not exceed 25 acres and total stand-replacement patches shall not exceed 15 percent of the treatment block. See Required Design Features for additional details.	No changes made.	No change (same as 2015)
MD VEG 16: Test new potential restoration methods in areas with a sagebrush overstory and an annual grass understory.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD VEG 17: Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use site-specific analysis and tools such as VDDT and the FIAT process (Appendix H), or their successors, to refine the specific locations to be treated.	No changes made.	No change (same as 2015)
MD VEG 18: Apply additional restoration treatments, such as seeding or planting, in conjunction with juniper removal in areas with more than trace amounts of invasive annual grasses or where the pre-treatment understory has less than 2 healthy bunchgrass plants per 10 square feet in cool-moist sagebrush or less than 4 healthy bunchgrass plants per 10 square feet in warm-dry sagebrush.	No changes made.	No change (same as 2015)
MD VEG 19: Conduct jackpot burning of cut juniper when soils are frozen or snow-covered and moisture content of felled trees is low enough to promote complete or near complete consumption of branches. Leaving the bole portion is acceptable.	No changes made.	No change (same as 2015)
Integrated Invasive Species:	—	
MD VEG 20: In priority treatment areas for invasive annual grasses, apply early detection-rapid response principles on*: • New infestations. • Satellite populations. • Isolated populations. • Where invasive annual grasses are still sub-dominant. • Edges of large infestations • Where sites are frequently or commonly used for temporary infrastructure such as incident	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
base camps, spike camps, staging areas, and helicopter landing areas. *Not in priority order. Incorporate these priorities in the assessments conducted using the process detailed in Appendix H (FIAT process).		
MD VEG 21: Allowable methods of invasive plant control include mechanical, chemical, biological (including targeted grazing, biocides, and bio-controls), or prescribed fire or combinations of these methods. Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species.	No changes made.	No change (same as 2015)
MD VEG 22: Use of approved herbicides, biocides, and bio-controls is allowed on all land allocations currently providing or reasonably expected to provide Greater Sage-grouse habitat. Follow the guidance in the 2010 Record of Decision for Vegetation Treatments Using Herbicides on BLM Lands in Oregon and subsequent step-down decision records, when complete, or successor/subsequent decisions governing the use of additional herbicides and biocides.	No changes made.	No change (same as 2015) (2024 Record of Decision for Programmatic Approval Addressing Vegetation Treatments Using Herbicides; still requires state or district-level step-down NEPA)
MD VEG 23: On Type I through Type III wildfires provide and require the use of weed washing stations and acceptable disposal of subsequent waste water and material to minimize the risk of further spread. Wash all vehicles and equipment arriving from outside the local area before initial use in the fire area and during post-fire emergency stabilization and rehabilitation operations. Wash all vehicles and equipment prior to release from the incident to reduce the probability of transporting invasive plant materials to other locations.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD VEG 24: Wash vehicles and equipment used in field operations prior to use in areas without known infestations of invasive plants. Wash vehicles and equipment used in areas with known infestations prior to use in another area to limit the further spread of invasive species to other locations.	No changes made.	No change (same as 2015)
MD VEG 25: Locate base camps, spike camps, coyote camps, or other temporary infrastructure in areas that lack invasive plant populations. Where no such options are available provide for post-operation invasive plant treatments.	No changes made.	No change (same as 2015)
Fire and Fuels Management (FIRE)	**Fire and Fuels Management (FIRE)**	
Objective	**Objective**	
Objective FIRE 1: Manage wildland fire and hazardous fuels to protect, enhance, and restore Greater Sage-grouse habitat.	No changes made.	No change (same as 2015)
Objective FIRE 2: Use a combination of vegetation management and wildfire response to minimize the probability of a wildfire tripping an adaptive management trigger for habitat within an Oregon PAC. (See Appendix J for adaptive management triggers).	No changes made.	No change (same as 2015)
Objective FIRE 3: Within 4.0 miles of occupied or pending leks, maintain or develop a mosaic of structure and species of sagebrush consistent with site potential and vegetation management objectives. See Vegetation Objectives section for desired outcomes and conditions.	No changes made.	No change (same as 2015)
Management Direction	**Management Direction**	
MD FIRE 1: Complete an interagency landscape-scale assessment (Appendix H) to prioritize at-risk habitats and identify fuels management, preparedness, suppression, and restoration priorities based on the quality of habitat at risk as directed in the Secretarial Order for Rangeland	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Fire SO3336. Update these assessments as necessary or when major disturbances occur. Within Greater Sage-grouse habitat, prioritize suppression and fuels management activities based on an assessment of the quality of habitat at risk.		
MD FIRE 2: The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. Prioritize Greater Sage-grouse habitat commensurate with property values and other habitat to be protected, with the goal to restore, enhance, and maintain these areas.	No changes made.	No change (same as 2015)
MD FIRE 3: Within PHMA and GHMA, prioritize fire management activities in order to protect and restore Greater Sage-grouse habitat and reduce the impacts of large wildfires as follows: 1. Habitat within 4.0 miles of an occupied or pending lek. 2. Greater Sage-grouse winter range.	No changes made.	No change (same as 2015)
MD FIRE 4: Incorporate locations of priority Greater Sage-grouse protection areas into the dispatch system. Provide local Greater Sage-grouse habitat maps to dispatch offices and initial attack Incident Commanders for use in prioritizing wildfire suppression resources and designing suppression tactics.	No changes made.	No change (same as 2015)
MD FIRE 5: During fire management operations, retain unburned areas of sagebrush, including interior islands and patches between roads and the fire perimeter unless there is a compelling safety, resource protection, or wildfire management objective at risk.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD FIRE 6: Follow established direction in the current Interagency Standards for Fire Operations (Red Book) with respect to use of resource advisors, annual review of fire management plans for updates relevant to Greater Sage-grouse habitat, and contents of the Delegation of Authority letters.	No changes made.	No change (same as 2015)
MD FIRE 7: Allow retardant and other fire suppressant chemicals use on all land allocations except where expressly prohibited by land allocation direction. Use of retardant and other fire suppressant chemicals can be specifically allowed by the authorized official when prohibited by land allocation direction. Allow retardant use on all land allocations regardless of management direction when there is imminent threat to human life.	No changes made.	No change (same as 2015)
MD FIRE 8: Allow mechanical fire line except: • Where prohibited by other resource direction (e.g., wilderness, soils, hydrology, and riparian management) • Where inconsistent with direction for specific land allocations The authorized official may approve exceptions.	No changes made.	No change (same as 2015)
MD FIRE 9: Allow use of naturally ignited wildfires to meet resource management objectives to improve Greater Sage-grouse habitat such as reducing juniper encroachment and creating mosaics of sagebrush classes. When natural ignitions occur, utilize an interdisciplinary process (including a wildlife biologist familiar with GRSG habitat requirements) to determine if the fire could be managed to meet GRSG and vegetation objectives.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD FIRE 10: Locate base camps, spike camps, drop points, staging areas, helicopter landing areas, and other temporary wildfire infrastructure in areas where physical disturbance to Greater Sage-grouse habitat can be minimized, to the extent feasible.	No changes made.	No change (same as 2015)
MD FIRE 11: Develop a system of fuel breaks to protect larger intact blocks of Greater Sage-grouse habitat. Locate these fuel breaks along existing roads and ROWs, where possible.	No changes made.	No change (same as 2015)
MD FIRE 12: In Greater Sage-grouse habitat, reduce hazardous fuels created by other management actions, such as establishment of new roads, trails, or ROWs within 3 years of project completion. The reduction should be sufficient to limit fire spread or undesirable fire behavior or fire effects in sagebrush ecosystems.	No changes made.	No change (same as 2015)
MD FIRE 13: Use interagency- coordinated fire restrictions and public service announcements to reduce the number of human starts in or near Greater Sage-grouse habitat during periods of elevated fire danger.	No changes made.	No change (same as 2015)
MD FIRE 14: Develop annual treatment and fire management programs in coordination with interagency partners and across jurisdictional boundaries based on priorities identified in the local District Landscape Wildfire and Invasive Species Assessment.	No changes made.	No change (same as 2015)
MD FIRE 15: Complete an annual review of landscape assessment implementation efforts with interagency partners.	No changes made.	No change (same as 2015)
MD FIRE 16: Implement appropriate fire operations and fuels management RDFs identified in Appendix C.	No changes made.	No change (same as 2015)
MD FIRE 17: Include information on the resource value of Greater Sage-grouse habitat in existing prevention plans.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD FIRE 18: If prescribed fire is used in Greater Sage-grouse habitat, the NEPA analysis for the Burn Plan will address: • why alternative techniques were not selected as a viable options; • how Greater Sage-grouse goals and objectives would be met by its use; • how the COT Report objectives would be addressed and met; • a risk assessment to address how potential threats to Greater Sage-grouse habitat would be minimized. Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect Greater Sage-grouse habitat in PHMA (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat would need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Livestock Grazing/Range Management (LG)	**Livestock Grazing/Range Management (LG)**	
Objective	**Objective**	
Objective LG 1: Manage livestock grazing to maintain or improve Greater Sage-grouse habitat by achieving Standards for Rangeland Health (SRH).	No changes made.	Completely Revised-revised by rangewide. (minor wording changes from 2015)
Objective LG 2: On BLM-managed lands, 12,083,622 acres will continue to be available for livestock grazing in Greater Sage-grouse habitat. In key RNAs, 22,765 acres will be unavailable to livestock grazing. See Table 2-6, Key ACECs and RNAs for ARMPA.	Objective LG2: On BLM-managed lands, 12,105,581 acres will continue to be available for livestock grazing in Greater Sage-Grouse habitat. Table 2-6 is no longer applicable and is therefore deleted.	Completely Revised-revised by state specific direction
Table 2-6 Key ACECs and RNAs (text included in table 2-5 after this comparison table)	Table 2-6 is no longer applicable and is therefore deleted.	Completely Revised-revised by state specific direction
Objective LG 3: Complete rangeland health assessments for grazing permits/leases that have not been renewed and prioritized by Allotment Categories I, M, and C. The priority order for completing rangeland health assessments in Greater Sage-grouse habitat is: 1. Allotments containing SFA that have never been evaluated. 2. Allotments containing SFA that have not been re-evaluated in 10 or more years. 3. Allotments containing PHMA that have never been evaluated. 4. Allotments containing PHMA that have not been re-evaluated in 10 or more years. 5. Allotments containing GHMA that have never been evaluated. 6. Allotments containing GHMA that have not been re-evaluated in 10 or more years.	No changes made.	Completely Revised-revised by rangewide

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Management Direction	**Management Direction**	
MD LG 1: All or portions of key RNAs will be unavailable to grazing (Table 2-6). Determine whether to remove fences, corrals, or water storage facilities (e.g. reservoirs, catchments, ponds).	MD LG 1 is deleted. Livestock grazing management in the 13 key RNAs returns to being governed by applicable district RMPs as amended by the 2015 Oregon Greater Sage-Grouse ROD/ARMPA goals, objectives, and management decisions.	Completely Revised-revised by state specific direction
MD LG 2: When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperating and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications include, but are not limited to, changes in: 1. Season or timing of use; 2. Numbers of livestock; 3. Distribution of livestock use; 4. Duration and/or level of use; 5. Locations of bed grounds, sheep camps, trail routes, and the like; 6. Extended rest or temporary closure from grazing through BLM administrative actions; 7. Make allotment unavailable to grazing; 8. Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); and 9. Grazing schedules (including rest or deferment). *Not in Priority Order When SRH are being met no changes in current management or activity plans or permits/leases are required, but could occur to meet other resource management objectives.	No changes made.	Completely Revised-revised by rangewide (RM-1 and Appendix 15. Livestock Grazing Management Best Management Practices and Design Features and Supplemental Information completely replaces Oregon's 2015 Appendix C Livestock Grazing RDFs and BMPs)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD LG 3: The timing and location of livestock turnout and trailing shall not contribute to livestock congregation on occupied or pending leks during the Greater Sage-grouse breeding season of March 1 through June 30.	No changes made.	Completely Revised-revised by rangewide (Appendix 15. Livestock Grazing Management Best Management Practices and Design Features and Supplemental Information)
MD LG 4: When fine and site-scale Greater Sage-grouse habitat assessment and monitoring is needed or required, (e.g., as a component of a rangeland health assessment), measure the Greater Sage-grouse habitat suitability indicators for seasonal habitats identified in Table 2-2. Site suitability values may be adjusted regionally where there is scientific justification for doing so. When using the indicators to guide management actions or during land health assessments, consider that the indicators are sensitive to the ecological processes operating at the scale of interest and that a single habitat indicator does not necessarily define habitat suitability for an area or particular scale.	No changes made.	Completely Revised-revised by rangewide (RM-1; also refer to the Application of Habitat Objectives section)
MD LG 5: During drought conditions use a recognized drought indicator, such as the Drought Monitor or Palmer Drought Severity Index, to determine when abnormally dry or drought conditions are developing, present, or easing. When such conditions are developing or present: 1. Conduct pre-season assessments prior to livestock turn out. 2. Monitor vegetation conditions during authorized livestock use periods to determine need for early removal or other changes to meet seasonal PHMA and GHMA objectives. If livestock grazing is deferred due to drought, reevaluate vegetation and Greater Sage-grouse habitat indicators that measure Greater Sage-grouse habitat prior to reauthorization of grazing.	No changes made.	Completely Revised-revised by rangewide (Appendix 15. Livestock Grazing Management Best Management Practices and Design Features and Supplemental Information)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD LG 6: Authorize new, relocate, or modify existing range improvements that use seeps or springs as a water source to enhance their year round functionality. Install or retrofit wildlife escape ramps in all livestock water troughs or water storage facilities (e.g., catchments, storage tanks). Maintain, enhance, or reestablish riparian areas in PHMA and GHMA	No changes made.	Completely Revised-revised by rangewide (Appendix 15. Livestock Grazing Management Best Management Practices and Design Features and Supplemental Information)
MD LG 7: Identify playas, wetlands, and springs that have been modified for livestock watering within PHMA and GHMA. Identify those water improvements that have Greater Sage-grouse population limiting implications, and develop projects for rehabilitation. Further actions should be instigated for development of water off site; new water should be available before existing water is eliminated.	No changes made.	Completely Revised-revised by rangewide
MD LG 8: Design new and maintain existing water projects to avoid standing pools of shallow water that would spread West Nile Virus.	No changes made.	Completely Revised-revised by rangewide (Appendix 15. Livestock Grazing Management Best Management Practices and Design Features and Supplemental Information)
MD LG 9: Remove, modify, or mark fences identified as high risk for collisions, generally within 1.2 miles of occupied or pending leks.	No changes made.	Completely Revised-revised by rangewide (RM-5)
MD LG 10: Avoid construction of livestock facilities and supplemental feeding of livestock within 1.2 mile of occupied or pending leks in Greater Sage-grouse habitat unless it is part of an approved habitat improvement project or approved by the authorized officer to improve ecological health or to create mosaics in dense sagebrush stands that are needed for optimum Greater Sage-grouse habitat. Supplemental feeding in Greater Sage-grouse habitat must be part of an approved habitat improvement plan or approved by the authorized officer.	No changes made.	Completely Revised-revised by rangewide (Appendix 15. Livestock Grazing Management Best Management Practices and Design Features and Supplemental Information)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD LG 11: Sagebrush Focal Areas will be prioritized for management and conservation actions, including, but not limited to review of livestock grazing permits/leases.	No changes made.	Completely Revised-revised by rangewide (SFA's not carried forward)
MD LG 12: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in Sagebrush Focal Areas (SFA) followed by PHMA outside of the SFA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g. fire) and legal obligations.	No changes made.	Completely Revised-revised by rangewide
MD LG 13: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMA will include specific management thresholds based on GRSG Habitat Objectives Table 2-2, Land Health Standards (43 CFR, Part 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.	No changes made.	Completely Revised-revised by rangewide (RM-3; Also Table 2-2 replaced by Appendix 8, Table 8-1.E. Oregon GRSG Habitat Indicators)
MD LG 14: Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.	No changes made.	Completely Revised-revised by rangewide

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD LG 15: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3.	No changes made.	Completely Revised-revised by rangewide (RM-7)
Wild Horses and Burros (WHB)	**Wild Horses and Burros (WHB)**	
Objective	**Objective**	
Objective WHB 1: Manage wild horses and burros as components of BLM-administered lands in a manner that preserves and maintains a thriving natural ecological balance in a multiple use relationship.	No changes made.	Completely Revised-revised by rangewide
Objective WHB 2: Manage wild horse and burro population levels within established appropriate management levels (AML).	No changes made.	Completely Revised-revised by rangewide (Management Action 1)
Objective 3: Complete assessments of Greater Sage-grouse habitat indicators for HMAs containing PHMA and GHMA. The priorities for conducting evaluations are:1. HMAs containing SFA.2. HMAs containing PHMA. 3. HMAs containing GHMA. 4. HMAs without GRSG Habitat.	No changes made.	Completely Revised-revised by rangewide
Management Direction	**Management Direction**	
MD WHB 1: Manage herd management areas (HMAs) in GRSG habitat within established AML ranges to achieve and maintain GRSG habitat objectives (Table 2-2).	No changes made.	Completely Revised-revised by rangewide (Table 2-2 replaced by Appendix 8, Table 8-1.E. Oregon GRSG Habitat Indicators)

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MD WHB 2: Complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g. range, wildlife, and riparian). The priorities for conducting assessments are: 1. HMAs containing SFA; 2. HMAs containing PHMA; 3. HMAs containing only GHMA; 4. HMAs containing sagebrush habitat outside of PHMA and GHMA mapped habitat; 5. HMAs without GRSG habitat.	No changes made.	Partially Revised- SFAs not carried forward
MD WHB 3: Prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts. Place higher priority on Herd Areas not allocated as Herd Management Areas and occupied by wild horses and burros in SFA followed by PHMA.	No changes made.	Completely Revised-revised by rangewide
MD WHB 4: In SFA and PHMA outside of SFA, assess and adjust AMLs through the NEPA process within HMAs when wild horses or burros are identified as a significant causal factor in not meeting land health standards, even if current AML is not being exceeded.	No changes made.	Completely Revised-revised by rangewide
MD WHB 5: In SFA and PHMA outside of SFA, monitor the effects of WHB use in relation to GRSG seasonal habitat objectives on an annual basis to help determine future management actions.	No changes made.	Partially Revised- SFAs not carried forward
MD WHB 6: Develop or amend herd management area plans (HMAPs) to incorporate GRSG habitat objectives and management considerations for all HMAs within GRSG habitat, with emphasis placed on SFA and other PHMA.	No changes made.	Partially Revised- SFAs not carried forward

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD WHB 7: Consider removals or exclusion of WHB during or immediately following emergency situations (such as fire, floods, and drought) to facilitate meeting GRSG habitat objectives where HMAs overlap with GRSG habitat.	No changes made.	No change (same as 2015)
MD WHB 8: When conducting NEPA analysis for wild horse/burro management activities, water developments, or other rangeland improvements for wild horses, address the direct and indirect effects on GRSG populations and habitat. Implement any water developments or rangeland improvements using the criteria identified for domestic livestock.	No changes made.	No change (same as 2015)
MD WHB 9: Coordinate with professionals from other federal and state agencies, researchers at universities, and others to utilize and evaluate new management tools (e.g., population growth suppression, inventory techniques, and telemetry) for implementing the WHB program.	No changes made.	No change (same as 2015)
MD WHB 10: When WHB are a factor in not meeting Greater Sage-grouse habitat objectives or influence declining Greater Sage-grouse populations in PHMA, Oregon's gather priority for consideration by the Washington Office is as follows: 1. Response to an emergency. (e.g., fire, insect infestation, disease or other events of unanticipated nature). 2. Greater Sage-grouse habitat. 3. Maintain a thriving natural ecological balance.	No changes made.	Completely Revised-revised by rangewide
MD WHB 11: In PHMA, design any new and modify existing structural WHB improvements to conserve, enhance, or restore Greater Sage-grouse habitat.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Mineral Resources (MR)	—	
Objective	—	
Leasable Minerals	—	
Objective MR 1: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of Greater Sage-grouse, priority will be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 USC 226(p) and 43 CFR 3162.3-1(h).	No changes made.	Completely Revised-revised by rangewide.
Objective MR 2: Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, minimize, and provide compensatory mitigation to reduce adverse impacts on GRSG to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an Application for Permit to Drill (APD) or Geothermal Drilling Permit (GDP) on the lease to avoid and minimize impacts on GRSG or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such Federal leases.	No changes made.	Completely Revised-revised by rangewide

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Management Direction	**Management Direction**	
Unleased Fluid Minerals:	—	
MD MR 1: Stipulate all leases within PHMA as NSO. No waivers or modifications to a fluid mineral lease no-surface-occupancy stipulation will be granted. The authorized officer may grant an exception to a fluid mineral lease no-surface-occupancy stipulation only where the proposed action: i. Would not have direct, indirect, or cumulative effects on Greater Sage-grouse or its habitat; or ii. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to GRSG. Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP amendment. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field	No changes made.	Completely Revised-revised by rangewide and state-specific direction for NSO exception Oregon-specific: No modifications to the PHMA NSO within 3.1 miles of active or pending active leks; exceptions and waivers may be granted.

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publicly available at least quarterly.		
MD MR 2: Stipulate all leases within Sagebrush Focal Areas as NSO, without waiver, exception, or modification.	No changes made.	Completely Revised-revised by rangewide (SFA's not carried forward)
MD MR 3: GHMA is considered open for unleased fluid minerals with moderate constraints, including CSU and TL. Areas within 1.0 mile of an occupied or pending lek within GHMA will be open to leasing fluid minerals subject to NSO stipulations. Apply Fluid Mineral Stipulations, identified in Appendix G.	No changes made.	Partially Revised- revised by rangewide and state specific (Appendix G to be updated) Oregon-specific: No modifications to the GHMA NSO within 3.1 miles of active or pending active leks; exceptions and waivers may be granted.
MD MR 4: Allow geophysical exploration within PHMA and GHMA subject to seasonal restrictions, see Appendix G.	No changes made.	Partially Revised- Appendix G to be updated
Leased Fluid Minerals:	—	
MD MR 5: In PHMA, apply the conservation measures through RMP implementation decisions (e.g., approval of a Geothermal Drilling Permit (GDP)) and upon completion of the environmental record of review (43 CFR, Part 3162.5), including appropriate documentation of compliance with NEPA. In this process evaluate, among other things: 1. Whether the conservation measure is "reasonable" (43 CFR, Part 3101.1-2) with the valid existing rights. 2. Whether the action is in conformance with the approved RMP.	No changes made.	Completely Revised-revised by rangewide

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Additionally, apply the 3 percent disturbance cap for development within Oregon PACs and PHMA (see Appendix E). Issue written orders of the authorized office requiring reasonable protective measures consistent with the lease terms where necessary to avoid or minimize impacts on Greater Sage-grouse populations and its habitat in accordance with the project habitat mitigation plan.		
MD MR 6: Implement RDFs in PHMA and GHMA as detailed in Appendix C, as allowed by law for existing leases.	No changes made.	No Change (same as 2015)
MD MR 7: Complete Master Leasing Plans in lieu of APD/GDP by APD/GDP or Operations/Utilization plans for fluid mineral lease development processing within PHMA.	No changes made.	No Change (same as 2015)
MD MR 8: Within an Oregon PAC, when permitting APDs or GDPs on existing leases that are not yet developed, the proposed anthropogenic disturbance must be under the 3 percent cap for that area, to the extent allowed by law.	No changes made.	No Change (same as 2015)
MD MR 9: Require unitization when the BLM determines it is necessary for proper development and operation of an area according to the Federal Lease Form, 3100-11 Sections 4 and 6. Where 10 percent or less of the land is federal, encourage rather than require unitization to minimize adverse impacts on Greater sage-grouse.	No changes made.	No Change (same as 2015)
MD MR 10: Identify areas where land acquisitions including mineral rights or conservation easements would benefit Greater Sage-grouse habitat. Proceed with acquisition process where appropriate.	No changes made.	No Change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Locatable Minerals:	—	
MD MR 11: To the extent consistent with the rights of a mining claimant under existing laws and regulations, limit surface disturbance, and provide recommendations for net conservation gain of Greater Sage-grouse habitat.	No changes made.	Partially Revised-revised rangewide (Net conservation gain replaced by "a minimum standard of no net loss" except where state of Oregon rules apply.)
MD MR 12: If a 3809 Plan of Operation is filed on mining claims in PHMA or GHMA, identify and evaluate mitigation measures to avoid or minimize adverse effects on PHMA and GHMA, through the Plan of Operation NEPA process, as appropriate and to the extent allowable by law. For notice and casual use levels of activity, apply RDFs (to the extent consistent with applicable law) in Appendix C.	No changes made.	No Change (same as 2015)
MD MR 13: ~~Sagebrush Focal Areas are recommended for withdrawal from the General Mining Law of 1872, as amended, subject to valid existing rights.~~ Per Oregon maintenance action 3 of May 2018: The recommendation for withdrawal of Sagebrush Focal Areas was analyzed and removed. It was determined through an assessment process that the BLM proposal to withdraw 10 million acres was unreasonable in light of data that showed that current and 20 years of anticipated mining would affect less than 0. I percent of occupied sage-grouse range."	No changes made.	Completely Revised-revised by rangewide (SFAs not carried forward)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Salable Minerals:	—	
MD MR 14: PHMA are closed to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met: • The activity is within the Oregon PAC (also called BSU, and is the same footprint as PHMA) and project area disturbance cap. • The activity is subject to the provisions set forth in the mitigation framework in Appendix F. • All applicable required design features are applied and the activity is permissible under screening criteria (see SSS 13). Federal Highway Act material sites are a ROW and not subject to mineral sale requirements. See ROW section for management (MD LR 7).	No changes made.	Partially Revised-revised by rangewide and state-specific
MD MR 15: GHMA remains open subject to stipulations that will protect Greater Sage-grouse and its habitat; see RDFs and BMPs in Appendix C.	No changes made.	No Change (same as 2015)
Nonenergy Leasable Minerals:	—	
MD MR 16: Close PHMA to new leases and permits. Consider expansion of existing operations if the disturbance is within the cap and subject to compensatory mitigation.	No changes made.	Partially revised; revised by rangewide (minor wording change)
MD MR 17: GHMA remains open to new leases subject to stipulations that would protect Greater Sage-grouse and its habitat; see RDFs and BMPs in Appendix C.	No changes made.	Partially revised; revised by rangewide (minor wording change)

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Mineral Split Estate:	—	
MD MR 18: Where the federal government owns the mineral estate in PHMA and GHMA, and the surface is in non-federal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs as applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.	No changes made.	No Change (same as 2015)
MD MR 19: Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMA and GHMA, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.	No changes made.	No Change (same as 2015)
Renewable Energy (Wind and Solar) (RE)	**Renewable Energy (Wind and Solar) (RE)**	
Management Direction	**Management Direction**	
MD RE 1: Designate PHMA as an exclusion area for new utility/commercial scale development of wind or solar ROWs, except in Lake, Harney, and Malheur Counties.	No changes made.	Completely Revised-revised by rangewide and state specific (Oregon PHMA is exclusion with exceptions)
MD RE 2: Designate PHMA outside of sagebrush focal areas (SFA) in Lake, Harney, and Malheur Counties as an avoidance area for new utility/commercial scale wind or solar ROWs. In Harney, Lake and Malheur counties, priority would be placed on locating commercial scale wind and solar energy development in non-habitat areas first (i.e., outside of PHMA and GHMA) before approving development in PHMA. Where an Oregon PAC (PHMA) occurs in more than one county, the allocation for each Oregon PAC is determined by the county in which it occurs. For	No changes made.	Completely Revised-revised by rangewide and state specific (Oregon PHMA is exclusion with exceptions)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
example, the Cow Valley PAC is located in Malheur and Baker Counties; the Baker County portion would be exclusion, and the Malheur portion would be avoidance.		
MD RE 3: Designate Sagebrush Focal Areas as exclusion areas for new utility/commercial scale wind or solar ROWs development.	No changes made.	Completely Revised-revised by rangewide (SFAs not carried forward)
MD RE 4: Designate GHMA as an avoidance area for new utility/commercial scale wind or solar rights-of-way. If new utility/commercial scale wind or solar development in GHMA is unavoidable apply the following measures: 1. If possible, construct meteorological towers without guy wires. 2. If guy wires are necessary, mark with anti-strike devices. 3. Analyze potential alternative site locations with known wind or solar potential outside of Greater Sage-grouse habitat in NEPA documents for ROW applications.	No changes made.	Completely Revised-revised by rangewide and state specific (Oregon GHMA is avoidance with exceptions)
Lands and Realty (LR)	**Lands and Realty (LR)**	
Objective	**Objective**	
Objective LR 1: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available.	No changes made.	No change (same as 2015)
Management Direction	**Management Direction**	
Utility Corridors and Communications Sites:	—	
MD LR 1: All Lands and Realty actions shall comport with SSS 13 disturbance screening criteria.	No changes made.	No change (same as 2015)
MD LR 2: Designated existing utility corridors will remain open in PHMA and GHMA to utility rights-of-way.	No changes made.	Completely Revised-revised by rangewide (Major and Minor ROWs are avoidance with exceptions)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD LR 3: Designate other ROWs (including permits and leases) in PHMA as avoidance areas: Road ROWs: • New road ROWs will be authorized only when necessary for public safety, administrative access, or subject to valid existing rights. If the new ROW is necessary for public safety, administrative access, or subject to valid existing rights and creates new surface disturbance, mitigate the impacts on protect the Greater Sage-grouse or their habitat. New road ROWs will be allowed if the ROW applicant is pursuing a Title V FLPMA ROW grant and will create no new surface disturbance. • Only allow use of existing roads, or realignment of existing roads, when renewing or amending existing authorizations. • Co-locate new ROWs as close as technically possible to existing ROWs or where the ROW best minimize Greater Sage-grouse impacts. Use existing roads, or realignments, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then construct any new road to the minimum standard necessary. • Existing Federal Highway Act (FHWA) appropriation ROWs are valid existing rights and new FHWA ROWs will continue to be considered subject to all disturbance screening criteria. See disturbance screening criteria in SSS 13. New proposals for power lines, access roads, pump storage, and other hydroelectric facilities licensed by FERC will be subject to all Greater Sage-grouse ROW screening criteria.	No changes made.	No Change (same as 2015)

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Communication Sites: Locate new communication towers within an existing communication site where technically feasible. If not feasible, new sites will be considered where necessary for public safety but shall adhere to the ROW disturbance screening criteria as listed in SSS 13.		
MD LR 4: Renewing, Amending or Terminating ROW Grants in PHMA and GHMA: • Conduct rehabilitation when FLPMA ROW grant expires, is relinquished, or terminated, rehabilitation is required in compliance with 43 CFR, Part 2805.12(i). • Remove overhead lines and other infrastructure to eliminate existing avian predator nesting opportunities (e.g. remove power line and communication facilities no longer in service) when a ROW grant expires or is relinquished or terminated. • Add additional stipulations, if necessary, when renewal or amendment of existing ROW grants. Mitigate impacts on GRSG or their habitats during amendment of an existing ROW grant. Mitigation could include the disturbance screening criteria.	No changes made.	No change (same as 2015)
MD LR 5: Designated ROW Corridors in PHMA and GHMA: • Manage existing designated ROW corridors as open. • Allow placement of new ROWs in existing designated corridors. Construct new ROWs as close as technically feasible to existing linear ROW infrastructure to limit disturbance to the smallest footprint. • Within existing designated utility corridors, the 3% disturbance cap may be exceeded at the	No changes made.	Partially Revised – revised by Rangewide (Major and Minor ROWs are avoidance with exceptions. Net conservation gain replaced by "a minimum standard of no net loss" except where state of Oregon rules apply.)

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project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location.		
MD LR 10: Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in Table 2 of the Monitoring Framework (Appendix D) − under valid existing rights prior to authorizing new projects in PHMA.	No changes made.	No change (same as 2015)
Land Use Authorizations:	—	
MD LR 6: Priority Habitat Management Areas (PHMA) and General Habitat Management Areas (GHMA) are designated as avoidance areas for high voltage (100kV or greater) transmission lines and major pipelines (24" or greater in diameter) ROWs (including permits and leases). All authorizations in these areas, other than the following identified projects, shall comply with the conservation measures outlined in this Approved Plan, including the RDFs (Appendix C) and screening criteria (see SSS 13) of this document. The BLM is currently processing an application for Boardman to Hemingway Transmission Line Project and the NEPA review for this project is well underway. Conservation measures for GRSG are being analyzed through the project's NEPA review process, which should achieve a net conservation benefit for the GRSG. Place new high voltage transmission lines in designated utility corridors where technically	No changes made.	Completed Revised- revised by rangewide and state specific

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feasible; where not technically feasible, locate lines adjacent to existing infrastructure. If an existing transmission line is upgraded to a higher voltage the following is required: • The existing transmission line shall be removed within a reasonable amount of time after the new line is installed and energized. • The new line shall be constructed in the same alignment (ROW boundary) as the existing line unless an alternate route would benefit Greater Sage-grouse or its habitat. Outside of designated corridors, bury new transmission lines where technically and financially feasible. • Where burying transmission lines is not technically and financially feasible, locate new transmission lines adjacent to existing transmission lines, and would be subject to Greater Sage-grouse ROW screening criteria. • Where determined to have a negative impact on Greater Sage-grouse or its habitat, remove existing guy wires or mark with bird flight diverters to make them more visible to Greater Sage-grouse in flight. Outside of designated corridors, bury new pipelines where technically and financially feasible. Pipelines should be located adjacent to existing infrastructure.		
MD LR 7: GHMA is open to other ROWs/Land Use Authorization/Permits but must adhere to screening criteria in SSS 13. • Existing Federal Highway Act (FHWA) Appropriation ROWs are valid existing rights. New FHWA ROWs will be subject to all Greater Sage-grouse screening criteria.	No changes made.	Completely Revised- revised by rangewide and state specific (Oregon state specific direction; GHMA is avoidance). Retain language associated with FHWA ROWs.

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
• Construct new high-voltage transmission lines and new pipelines in GHMA as close as technically feasible to existing infrastructure (e.g. roads, distribution/transmission lines and pipelines) to limit disturbance to the smallest footprint.		
Land Tenure:	—	
MD LR 8: Designate PHMA and GHMA as Z-1 and retain public ownership. Lands classified as priority habitat and general habitat for Greater Sage-grouse will be retained in federal management. Exception: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the Greater Sage-grouse or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the Greater Sage-grouse.	No changes made.	Partially revised- Net conservation gain replaced by "a minimum standard of no net loss" except where state of Oregon rules apply.)
Withdrawals:	—	
Per Oregon maintenance action 3 in May of 2018 MD LR 9 from the 2015 plan was deleted. (MD LR 9: Recommend SFAs for withdrawal from the General Mining Act of 1872, as amended; subject to valid existing rights.)	No changes made.	Completely Revised-revised by rangewide (SFAs not carried forward)
Recreation and Visitor Services (REC)	**Recreation and Visitor Services (REC)**	
Management Direction	**Management Direction**	
MD REC 1: Do not issue new non-motorized special recreation permits (SRPs) in PHMA or GHMA within 3.0 miles of occupied or pending leks from March 1 to June 30. Limited exceptions (e.g. river permits) are allowed and shall be based on site-specific rationale that biological impacts on Greater Sage-grouse are being avoided. Evaluate and modify existing SRPs lacking Greater Sage-grouse stipulations in PHMA.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD REC 2: Do not issue motorized and/or race SRPs or competitive SRPs within 4.0 miles of occupied or pending leks during breeding season from March 1 to June 30.	No changes made.	No change (same as 2015)
MD REC 3: Evaluate and modify, if necessary, recreation sites in PHMA and GHMA to reduce avian predator perch sites.	No changes made.	No change (same as 2015)
MD REC 4: In PHMA, do not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the development will have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from important areas, etc.), or unless the development is required for visitor health and safety or resource protection.	No changes made.	Partially revised- Net conservation gain replaced by "a minimum standard of no net loss" except where state of Oregon rules apply.)
MD REC 5: Evaluate recreation SRMAs for consistency with the Adaptive Management Strategy (Appendix J). For existing SRMAs, recreation facilities or sites in all PHMA and GHMA, apply one or more of the following to get a neutral or positive response from Greater Sage-grouse populations using the adaptive management actions. Potential actions include, but are not limited to: • Seasonally close areas from March 1 to June 30 annually, and limit to existing roads, primitive roads, and trails, then designated routes upon completion of travel management plans. • Re-locate SRMAs in whole or in part, through land use plan amendments, in order to reduce negative effects on GRSG.	No changes made.	No change (same as 2015)
MD REC 6: Promote and encourage education and outreach regarding Greater Sage-grouse at kiosks and other public education sites. Promote, publish and engage public regarding the American Birding Association Principles of Birding Ethics.	No changes made.	No change (same as 2015)

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Travel and Transportation (TTM)	**Travel and Transportation (TTM)**	
Objective	**Objective**	
Objective TTM 1: Manage OHV/ORV designations (open, limited, and closed) to conserve Greater Sage-grouse habitat and populations by taking actions that create neutral or positive responses.	No changes made.	No change (same as 2015)
Objective TTM 2: Reduce disturbance to Greater Sage-grouse by evaluating or modifying OHV/ORV designations and route selection in accordance with minimization criteria.	No changes made.	No change (same as 2015)
Management Direction	**Management Direction**	
MD TTM 1: Unless already designated limited or closed all PHMA and GHMA shall be designated as limited to existing roads, primitive roads, and trails, including existing SRMAs. Where areas are currently designated "closed" under existing applicable RMPs the closed designations shall be maintained. Travel management planning will be deferred to future implementation/activity level planning or concurrent with future RMP planning. In addition to the minimization criteria, districts will adopt the following Greater Sage-grouse specific planning elements only for BLM administered roads during implementation level planning. • During travel management planning, avoid designating roads, primitive roads, and motorized trails within 1.0 mile of occupied or pending leks when road traffic volume is greater than 8 vehicle trips per 24 hour period in accordance with the ODFW mitigation framework. • When existing high traffic roads and primitive roads are closer than 1.0 mile to an occupied or	No changes made.	No change (same as 2015)

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pending lek, and are the only access, consider a seasonal restriction from March 1 to June 30. • When an existing road or primitive road is found to have an effect on Greater		
Sage-grouse population trends, work with the interdisciplinary team and ODFW to determine the best reroute or closure point for a section of an existing road. In addition, implementation level travel planning efforts will be guided by the goals, objectives and guidelines outlined in the SSS section, relevant National and Oregon specific guidance, and the following: • A timeline to complete travel planning efforts will be identified, prioritized and updated annually in all relevant planning areas to accelerate the accomplishment of: data collection, route evaluation and selection, and on the ground implementation efforts including signing, monitoring and rehabilitation. • During subsequent travel management planning, consultation "with interested user groups, Federal, State, county and local agencies, local landowners, and other parties in a manner that provides an opportunity for the public to express itself and have its views given consideration." Consequently, a public outreach plan to fully engage all interested stakeholders will be incorporated into future travel management plans. • Among other designation criteria from "areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention would be given to protect endangered or threatened species and their habitats."	*(See above.)*	

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• During subsequent travel management planning, all routes will undergo a route evaluation to determine its purpose and need and the potential resource and/or user conflicts from motorized travel. Where resource and/or user conflicts outweigh the purpose and need for the route, the route will be considered for closure or considered for relocation outside of sensitive GRSG habitat. • During subsequent travel planning, threats to GRSG and their habitat will be considered when evaluating route designations and/or closures.		
• During subsequent travel management planning, routes that do not have a purpose or need would be considered for closure. • During subsequent travel management planning, routes that are duplicative, parallel, or redundant will be considered for closure. • During subsequent travel management planning, seasonal restrictions on OHV use will be considered in important seasonal habitats where OHV use is a threat. During subsequent travel management planning, consider limiting over snow vehicles (OSV) designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow to designated routes or consider seasonal closures in GRSG wintering areas from November 1 through March 31. • During subsequent travel management planning, routes not required for public access or recreation with a current administrative/agency purpose or need will be evaluated for administrative access only.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
• During subsequent travel management planning, consider prioritizing restoration of routes not designated in a Travel Management Plan. • During subsequent travel management plan implementation, consider using seed mixes or transplant techniques that will maintain or enhance GRSG habitat when rehabilitating linear disturbances. During subsequent travel management plan implementation, consider scheduling road maintenance to avoid disturbance during sensitive periods and times to the extent practicable. Consider using time of day limits (exclude activities from 2 hours before sunset to 2 hours after sunrise) to reduce impacts on GRSG during breeding periods.		
MD TTM 2: ORV-OHV designations that are "closed" will be maintained as closed to motorized vehicles. OHV Areas designated as "limited to existing" within PHMA and GHMA will be managed as "limited to existing roads, primitive roads, and trails" until the completion of an implementation level travel planning (travel management planning). Individual route designations will occur during subsequent implementation level travel management planning efforts. Upon the completion of implementation level travel management plans OHV areas designated as "Limited" will transition to "limited to designated roads, primitive roads and trails."	No changes made.	No change (same as 2015)
MD TTM 3: Avoid upgrading existing roads or construction of new roads that are found to contribute to Greater Sage-grouse mortality or lek abandonment.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD TTM 4: In PHMA and GHMA complete transportation plans in accordance with National BLM Travel Management guidance, requiring the BLM to maintain a current action plan and planning schedule to most effectively target available resources. The following GRSG population areas are Oregon's top priority areas to designate comprehensive travel management plans: 1. In Oregon PACs with declining population trends. 2. In all other Oregon PACs. 3. In all GHMA. In PHMA and GHMA, travel systems will be managed with an emphasis on improving the sustainability of the travel network in a comprehensive manner to minimize impacts on GRSG, maintain motorist safety, and prevent unauthorized cross country travel while meeting access needs. To do so, it may be necessary to improve portions of existing routes, close existing routes or create new routes that meet user group needs, thereby reducing the potential for pioneering unauthorized routes. The emphasis of the comprehensive travel and transportation planning will be placed on having a neutral or positive effect on GRSG habitat.	No changes made.	No change (same as 2015)
MD TTM 5: Initiate travel management planning within 5 years of RMP revisions.	No changes made.	No change (same as 2015)
MD TTM 6: In PHMA and GHMA, limit route construction or realignment of existing designated routes to result in net conservation gain for PHMA and GHMA.	No changes made.	Partially Revised- rangewide (change to "a minimum standard of no net loss" mitigation, but state of Oregon "net conservation gain" still applies)
MD TTM 7: Eliminate parallel roads travelling to the same destination when the destination can be accessed from the same direction and topography in PHMA and GHMA.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD TTM 8: Within 4.0 miles of occupied or pending leks, do not allow any upgrading of primitive roads that would change the maintenance level except for public safety, administrative use, and valid existing rights.	No changes made.	No change (same as 2015)
MD TTM 9: Use proactive methods when necessary to reclaim roads. See BMPs in Appendix C.	No changes made.	No change (same as 2015)
MD TTM 10: In PHMA and GHMA, temporary closures will be considered in accordance with 43 CFR, Part 8364 (Closures and Restrictions); 43 CFR, Part 8351 (Designated National Area); 43 CFR, Part 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR, Part 8341 (Conditions of Use). Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR, Part 8341.2) A closure or restriction order shall be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders shall be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Special Designations - Areas of Critical Environmental Concern (SD)	**Special Designations - Areas of Critical Environmental Concern (SD)**	
Objective	**Objective**	
Objective SD 1: Provide for Conservation of Greater Sage-grouse within Key Existing Areas of Critical Environmental Concern (ACECs) (Table 2-6) and Research Natural Areas (RNAs).	No changes made.	Completely Revised- State-specific direction (refer to Appendix 17)
Objective SD 2: Manage all ACECs and RNAs for the values for which they were designated, per district resource management plans, following existing management actions, and consistent with proposed actions for PHMA and GHMA.	No changes made.	No change (same as 2015)
Objective SD 3: Manage habitat maintenance and restoration, and conservation actions in key ACECs for Greater Sage-grouse consistent with the values the areas were designated.	No changes made.	No change (same as 2015)
Objective SD 4: Manage key RNAs, or large areas within the RNAs, as undisturbed baseline reference areas for the sagebrush plant communities they represent that are important for Greater Sage-grouse. Manage key RNAs for minimum human disturbance allowing natural succession to proceed.	Objective SD 4: Manage the Foster Flat and Guano Creek–Sink Lakes RNAs as undisturbed baseline reference areas for the sagebrush plant communities they represent that are important for Greater Sage Grouse. Minimize human disturbance in all 15 key RNAs, allowing natural ecological processes to proceed.	Completely Revised- State-specific direction (refer to Appendix 17)

Note for **Tables 3, 4, 5,** and **6** below: Text did not change between 2015 ARMPA and 2019 RMPA.

Table 2. Habitat Objectives for Greater Sage-grouse (based on 2015 Table 2-2)

Attribute	Indicators	Desired Condition (Habitat Objectives)	Reference
Breeding Including Lekking, Pre-nesting, Nesting, and Early Brood Rearing (Seasonal Use Period March 1 – June 30			
Lek Security	Proximity of trees or other tall structures	No conifers or tall structures within 1.0 mile of lek center, and conifer cover less than 5% within 4.0 miles of lek, excluding old trees, culturally significant, actively used by special status species, and old growth juniper stands.	Connelly et al. 2000; Fresse 2009; Baruch-Mordo et al. 2013; Knick et al. 2013
	Proximity of sagebrush to leks	Lek has adjacent sagebrush cover	Connelly et al. 2000
Cover	Sagebrush cover (%)	10 to 25	Doescher et al. 1986; Gregg et al. 1994; Hanf et al. 1994; Coggins 1998; Crawford and Carver 2000; Bates and Davies 2014; BLM 2016
—	Sagebrush height (inches) Arid sites (warm-dry) Mesic sites (cool-moist)	 11 to 31 15 to 31	Gregg et al. 1994; Hanf et al. 1994; Coggins 1998; Crawford and Carver 2000; Freese 2009.
—	Predominant sagebrush shape	Spreading	Connelly et al. 2000
—	Perennial grass cover (such as bunchgrass) (%) Arid sagebrush Warm-dry Shallow-dry Mesic sagebrush Cool-moist Warm-moist	 10 to 30 10 to 25 — 20 to 45 20 to 50	Gregg at al. 1994; Coggins 1998; Crawford and Carver 2000; Freese 2009; NRCS 2015; Bates and Davies 2014; Jon Bates, USDA ARS, pers.comm. 2/10/2015; BLM 2016; BLM 2015b
—	Perennial grass and forb height (inches, including residual grasses) – most important and appropriately measured in nest areas; excludes shallow-dry sites[1] Arid sites (warm-dry) Mesic sites (cool-moist)	 ≥ 7 ≥ 9	Gregg et al. 1994; Hanf et al. 1994; Crawford and Carver 2000; Hagen et al. 2007; Jon Bates, USDA ARS, pers. comm. 2/10/2015
—	Perennial forb cover (%)[2] Arid sagebrush Warm-dry Shallow-dry Mesic sagebrush Cool-moist Warm-moist	 2 to 10 2 to 10 6 to 12 5 to 15	Drut 1992; Drut et al. 1994; Crawford and Carver 2000; Freese 2009; NRCS 2015; Bates and Davies 2014; BLM 2016; Jon Bates, USDA ARS, pers.comm. 2/10/2015; BLM 2015b

Attribute	Indicators	Desired Condition (Habitat Objectives)	Reference
Food	Preferred forb diversity and availability	Preferred forbs are common with 5 to 10 species present[2]	Hanf et al. 1994; Crawford and Carver 2000; Freese 2009; Bates and Davies 2014; BLM 2016; Jon Bates, USDA ARS, pers.comm. 2/10/2015
Available Suitable Habitat (Landscape Context)	% of seasonal habitat within 4.0 miles of leks meeting a majority of the desired conditions Arid sagebrush Mesic sagebrush	 70 (55-85) 75 (60-90)	Connelly et al. 2000; Karl and Sadowski 2005; Evers 2010; Hagen 2011; NRCS 2015
Brood-rearing/Summer Including Late-brood Rearing, Summering, and Early Autumn (Seasonal Use Period July 1- October 31)			
Cover	Sagebrush cover (%)	10 to 25	Doescher et al. 1986; Drut et al. 1994; Connelly et al. 2000; Crawford and Carver 2000; Bates and Davies 2014; Jon Bates, USDA ARS, pers.comm. 2/10/2015
—	Sagebrush height (inches)	15 to 31	Gregg et al. 1994; Hanf et al. 1994; Crawford and Carver 2000; Freese 2009
—	Perennial herbaceous (grass and forbs) cover (%) Arid sagebrush Warm-dry Shallow-dry Mesic sagebrush Cool-moist Warm-moist Riparian[3]	— — — 15 to 30 10 to 25 — 20 to 45 30 to 55 ≥ 50	Drut et al. 1994; Bates and Davies 2014; NRCS 2015; BLM 2015b; Jon Bates, USDA ARS, pers.comm. 2/10/2015
—	Riparian areas/mesic meadows	Majority of areas are in PFC	Stiver et al. 2010, or as updated
Food	Upland and riparian perennial forb availability	Preferred forbs are common with 5 to 10 species present[4]	Hanf et al. 1994; Freese 2009; Bates and Davies 2014; BLM 2015b; Jon Bates, USDA ARS, pers.comm. 2/10/2015
Available Suitable Habitat (Landscape Context)	% of seasonal habitat within 4.0 miles of leks meeting a majority of the desired conditions Arid sagebrush Mesic sagebrush	 70 (55-85) 75 (60-90)	Connelly et al. 2000; Karl and Sadowski 2005; Evers 2010; Hagen 2011; NRCS 2015

Attribute	Indicators	Desired Condition (Habitat Objectives)	Reference
Winter Including Late Autumn and Winter (Seasonal Use Period November 1 – February 28)			
Cover and Food	Sagebrush cover above snow (%)	≥10	Willis 1990 (in Hagen 2011); Bruce 2011
	Sagebrush height above snow (inches)	≥10	Willis 1990 (in Hagen 2011); Bruce 2011
Available Suitable Habitat (Landscape Context)	% of wintering habitat meeting a majority of the desired conditions Arid sagebrush Mesic sagebrush	 70 (55-85) 85 (68-100)	Connelly et al. 2000; Karl and Sadowski 2005; Evers 2010; NRCS 2015

[1]Perennial grass and forb minimum height may not be achievable in years with below normal precipitation. Other indicators of desired condition may still render the site suitable, however.
[2] In very dry years, forb cover and availability may not be at the desired condition, and in certain plant associations such as Wyoming big sagebrush/Needle and Thread, these indicators may rarely be achieved even in years with normal precipitation.
[3] Riparian includes swales, wet meadows, and intermittent/ephemeral streams.
[4]Sage-grouse preferred forbs are listed in Appendix I.

Table 3. Greater Sage-Grouse Buffers (based on Oregon 2015 Table 2-3)

Resource Program	Activity	Temporal Buffer	Spatial Buffer Miles from Lek PHMA	GHMA	Proposed Plan
Vegetation - Habitat Restoration MD Veg 3	Sagebrush cutting or removal	Nesting and early brood-rearing (March 1 through June 30)	4	4	No change (same as 2015)
Vegetation - Habitat Restoration MD Veg 4	Juniper cutting	Breeding season (March 1 through June 30) - two hours before and after sunrise and sunset.	4	4	No change (same as 2015)
Vegetation – Habitat Restoration MD Veg 5	Vegetation management activities that are timing- sensitive for maximum effectiveness	No more than 5 days during the breeding and early brood-rearing period (Mar 1 –June 30; use local information to further refine this period)	4	4	No change (same as 2015)
Livestock Grazing and Range Management MD LG 9	Reduce collision risk through fence removal, modification, or marking in areas with "high" collision risk	NA	1.2	1.2	Partially revised-revised by rangewide) (refer to RM-6 for further clarification)

Resource Program	Activity	Temporal Buffer	Spatial Buffer Miles from Lek PHMA	GHMA	Proposed Plan
Livestock Grazing and Range Management MD LG 10	Livestock facilities and placement of livestock supplements	NA	1.2	1.2	Partially revised-revised by rangewide (Moved to BMPs in Appendix 8, Table 8-1 E)
Special Status Species MD SSS 13	Infrastructure: New anthropogenic disturbance	NA	1	1	No change (same as 2015)
Leasable Minerals – Unleased Federal Fluid Mineral Estate (MLS) MD MR 3	Fluid minerals development in GHMA	NA	NA	1	Partially revised-revised by rangewide (refer to Table 2-9 for state-specific direction) Oregon: Same as 2015/2019. Appendix G to be updated.
Recreation MD REC 1	New non-motorized SRPs	Breeding season (March 1 to June 30)	3	3	No change (same as 2015)
Recreation MD REC2	Motorized and/or race SRPs, or competitive SRPs	Breeding season (March 1 to June 30)	4	4	No change (same as 2015)
Travel Management MD TM 8	Upgrading primitive roads	NA	4	4	No change (same as 2015)

Table 4. Desired Mix of Sagebrush Classes by Sagebrush Type (based on Oregon 2015 Table 2-4)

Sagebrush Type	General Description	Characteristic Plant Community	Class 1(A)[2]	Class 2(A)[2]	Class 3 (A, B)[2]	Class 4 (A, B)[2]	Class 5(A)[2]
Shallow-Dry	Very shallow soils and very dry sites not capable of producing at least 600 lb/ac of grass on any sites or in any type of year[1].	Low sagebrush/ Sandberg's bluegrass. Includes the driest Wyoming big sagebrush types.	15% (0-25%)	15% (0-25%)	70% (50-90%)	N/A3	N/A[3]
Warm-Dry	Shallow to moderately deep soils and dry sites capable of producing at least 600 lb/ac of grass only on best sites or wet years[1].	Wyoming big sagebrush/bluebunch wheatgrass-Thurber's needlegrass. Includes some moderately productive low sagebrush sites and dry mountain big sagebrush sites.	15% (0-25%)	15% (0-25%)	25% (10-40%)	45% (25-70%)	N/A[3]
Cool-Moist	Moderately deep to deep soils and moist sites capable of producing at least 600 lb/ac of grass on average and high productivity sites or average and wet years[1].	Mountain big sagebrush-Idaho fescue. Includes productive low sagebrush communities and highly productive Wyoming big sagebrush sites. May include antelope bitterbrush as a co-dominant with big sagebrush.	15% (0-25%)	15% (0-25%)	20% (10-30%)	35% (20-60%)	15% (5-25%)

[1]Based on Ecological Site Descriptions

[2]Median value and range

[3] Site not capable of producing this class

Table 5. Decadal Treatment Objectives for Greater Sage-grouse Habitat (based on Oregon 2015 Table 2-5)

Treatment Objective	Average Annual Acres	Average Decadal Acres
Conifer reduction	40,250	402,500
Sagebrush thinning	53,217	532,170
Invasive plant control*	12,700	127,000
Crested wheatgrass restoration	1,844	18,440

*Principally annual grasses

These acreage estimates represent an objective for treatment over a ten-year (decadal) period to support achievement or progress toward GRSG habitat objectives. These estimates account for variability in funding and do not reflect a maximum or minimum acreage for any one treatment objective should funding and site-specific conditions allow for more or less treatment acreage than described in order to meet habitat objectives.

Table 2. From 2015 ARMPA - Key ACECs and RNAs for ARMPA (based on Oregon 2015 Table 2-6)

Completely revised- Refer to Appendix 17

ACEC/RNA Name	Type	District	ACEC/RNA		
			ACEC/RNA Acres	RNA Acres Unavailable to Grazing	Estimated Reduction of AUMs
Abert Rim	ACEC	Lakeview	18,039	0	0
High Lakes	ACEC	Lakeview	38,952	0	0
Red Knoll	ACEC	Lakeview	11,119	0	0
TOTAL KEY ACEC	—	—	**68,110**	**0**	**0**
Black Canyon	RNA	Vale	2,639	2,640	225
Dry Creek Bench	RNA	Vale	1,637	622	101
East Fork Trout Creek	RNA	Burns	361	304	47
Fish Creek Rim	RNA	Lakeview	8,718	2,750	110
Foley Lake	RNA	Lakeview	2,228	1,269	51
Foster Flat *	RNA	Burns	2,687	0	0
Guano Creek—Sink Lakes *	RNA	Lakeview	11,185	0	0
Lake Ridge	RNA	Vale	3,860	769	229
Mahogany Ridge	RNA	Vale	682	155	22
North Ridge Bully Creek	RNA	Vale	1,569	164	46
Rahilly-Gravelly	RNA	Lakeview	18,678	8,282	630
South Bull Canyon	RNA	Vale	790	747	89
South Ridge Bully Creek	RNA	Vale	621	397	166
Spring Mountain	RNA	Vale	996	995	137
Toppin Creek Butte	RNA	Vale	3,998	2,865	504
TOTAL KEY RNA	—	—	**60,652**	**21,957**	**2,388**

(NOTE: The 2019 FEIS and RMPA showed 21,959 acres in 13 key RNAs (corrected math error in the 2015 ARMPA)

2.13.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 have management direction that may change through this RMP amendment. Note that if 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The appendices can be found on the Oregon GRSG ePlanning website.

ARMPA Appendix Name	Year	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Approved RMP Amendment Maps	2015	Completely Revised- updated allocations and HMA boundaries
B: Lek Buffer Distances	2015	No Change (same as 2015)
C: Required Design Features and Best Management Practices	2015	Partially Revised- revised by addition of livestock grazing language in FEIS Appendix 15
D: Greater Sage-Grouse Monitoring Framework	2015	Completely Revised- revised by rangewide (refer to Appendix 7)
E: Disturbance Cap Calculation Method	2015	Completely Revised- revised by rangewide and state specific
F: Mitigation	2015	Partially Revised – incorporate new mitigation language
G: Fluid Mineral Leasing Stipulations	2015	Partially Revised – incorporate updated exceptions, modifications, and waivers
H: Fire and Invasives Assessment Tool	2015	No Change (same as 2015)
I: Sage-grouse Plant List	2015	No Change (same as 2015)
J: Adaptive Management Strategy	2015	Completely Revised- revised by rangewide and state specific
L: Greater Sage-Grouse Noise Protocol	2015	No Change (same as 2015)

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Appendix 2.14
South Dakota RMP

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2.14 SOUTH DAKOTA RMP

This appendix presents the GRSG approved RMP language from the 2015 record of decision for the South Dakota RMP Revision. The South Dakota RMP was not amended in 2019. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment (RMPA), either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMPA include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable 2015 appendices that are listed in **Section 2.14.2** of this appendix. For the additional state-specific Montana/Dakotas management direction for the Proposed RMPA, see Chapter 2, Table 2-7.

2.14.1 South Dakota RMP

Table 1. Summary of Goals, Objectives, and Management Actions in South Dakota RMP

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
GRSG and SSS Goals	
Ensure the long-term and self-sustaining persistence of special status species in South Dakota.	No change (same as 2015)
Protect/maintain populations of special status species by minimizing direct mortality and impacts on habitat.	No change (same as 2015)
Provide suitable habitat condition to allow for movement between large blocks of habitat and seasonal and specialized habitats on a local and landscape scale.	No change (same as 2015)
Maintain or improve specialized habitats on a local and landscape scale.	No change (same as 2015)
Maintain and/or increase GRSG abundance and distribution by conserving, enhancing or restoring the sagebrush ecosystem upon which populations depend in cooperation with other conservation partners.	Completely Revised – revised by rangewide direction
Within GRSG habitat areas, the BLM will maintain habitat for viable GRSG populations.	Completely Revised – revised by rangewide direction
Manage for the biological integrity and habitat suitability to facilitate the conservation, recovery, and maintenance of populations of fish and wildlife to avoid contributing to the listing of or jeopardizing the continued existence or recovery of special status species and their habitats.	No change (same as 2015)
Maintain or enhance areas of ecological importance for special status wildlife species.	No change (same as 2015)
Conserve and recover special status wildlife species by determining and implementing conservation strategies including restoration opportunities, use restrictions, and management decisions.	No change (same as 2015)
Manage specific environmental hazards, risks, and impacts in a manner compatible with special status wildlife species health.	No change (same as 2015)
Identify habitat thresholds necessary to sustain well-distributed healthy populations of special status wildlife species to avoid future listings under the ESA.	No change (same as 2015)
Develop and implement the BMPs, activity plans, or use other mechanisms to protect high priority special status wildlife species.	No change (same as 2015)
Manage special status fish and wildlife species in consideration of the working landscape and the intermingled land ownership pattern that is present.	No change (same as 2015)

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Across the planning area, maintain greater sagebrush cover at levels at or near the full potential for each ecological site.	No change (same as 2015)
Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA.	Completely Revised – revised by rangewide direction
In all PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush canopy cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734- 6).	No change (same as 2015)
Manage wildfire and fuels for the protection of public health, safety, property, and resource values, emphasizing firefighter and public safety as the single overriding priority. The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection.	No change (same as 2015)
Improve the resilience of wildlife habitats to protect wildlife communities from stressors and events such as severe wildfire and climate change.	No change (same as 2015)
Manage PHMA so that discrete anthropogenic (human-caused) disturbances do not adversely impact GRSG distribution or abundance.	No change (same as 2015)
New: rangewide predation management	Added by rangewide direction
New: state-specific sensitive status species management	Added by state specific direction
GRSG GHMA Management	
MD-10 Greater Sage-Grouse GHMA: includes 23,684 surface and 247,771 subsurface oil and gas minerals acres.	Completely Revised – revised by rangewide direction
MD-11 Surface Disturbing and Disruptive Activities and Fluid Minerals: Surface disturbing and disruptive activities will be avoided within 6/10 of a mile of sage-grouse leks. BLM will apply the lek buffer-distances in the US Geological Survey (USGS) Report "Conservation Buffer Distance Estimates for Greater Sage-Grouse-A Review (Open File Report 2014-1239)" in both GHMA and PHMA as detailed in Appendix B, Applying Lek Buffer-Distances When Approving Actions.	Completely Revised - revised by rangewide and state specific direction
Fluid Minerals - NSO: NSO or use within 6/10 of a mile from leks. The Authorized Officer (AO) ay waive this stipulation if no portion of the leasehold is within 6/10 mile of the perimeter of an active lek.	Completely Revised - revised by rangewide and state specific direction
MD-12 Renewable Energy ROWs: Renewable Energy ROWs: 1 mile from leks will be an exclusion area, the rest of the GHMA will be an avoidance area.	Completely Revised - revised by rangewide and state specific direction
Other types of ROWs: Major ROWs (power lines 100 kilovolt (kV) and pipelines 24 inches and over) will be avoided. Minor ROWs within 2 miles of a lek will be avoidance, the rest of the GHMA will be open.	Completely Revised - revised by rangewide and state specific direction
Where new ROWs are necessary, ROWs will be co-located within existing ROWs where possible.	No change (same as 2015)
GHMA and PHMA within the Center of the Nation will be Class 2 land retention areas (Appendix A1: Figure 2-10).	No change (same as 2015)

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
MD-13 Land Disposals: Any land disposals will be limited and subject to specialist review. Refer to the Land Tenure subsection of the Lands section of this table for additional details about Class 2 retention criteria. BLM could also dispose of land in PHMA and GHMA within the Center of the Nation areas in cases where there is mixed ownership, and land exchanges will allow for additional or more contiguous federal ownership patterns and the criteria below are met. Under GRSG habitat areas with minority federal ownership, BLM will develop an additional, effective mitigation agreement for any disposal of federal land. As a final preservation measure, consideration will be given to pursuing a permanent conservation easement. Lands classified as PHMA and GHMA for GRSG will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the GRSG or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the GRSG.	No change (same as 2015)
MD-14 Surface Disturbing and Disruptive Activities and Fluid Minerals: Surface disturbing and disruptive activities will be avoided in winter range for sage-grouse unless the project proponent can clearly demonstrate that the impacts can be adequately mitigated, Conservation Actions, Guidelines or needed design features (Appendices C and F) are included and the goals for sage-grouse are not compromised. Prior to approving any surface disturbance and disruptive activities, the project proponent will be required to provide a plan approved by BLM to maintain suitability of habitat and avoid or minimize habitat loss and disturbance.	Completely Revised - revised by rangewide and state specific direction
Fluid Minerals - NSO: GRSG crucial winter range will be managed as a NSO for oil and gas development and exploration.	Completely Revised - revised by rangewide and state specific direction
MD-15 Renewable Energy/Winter Range: GRSG winter range will be an exclusion area.	Completely Revised - revised by rangewide and state specific direction
Within GHMA, major ROWs are avoidance and minor ROWs are avoidance within two miles of leks with GHMA. The rest of the GHMA is open to minor ROWs. GRSG winter range will be an avoidance area. In cases where avoidance is not possible, BLM may require design features to mitigate impacts or co-location of new ROWs with existing ROWs where possible.	Completely Revised - revised by rangewide and state specific direction
MD-16 Surface Disturbing and Disruptive Activities and Fluid Minerals: Fluid Minerals - A CSU stipulation will apply within 2 miles of leks. The AO may waive this stipulation if no portion of the leasehold is within 2 miles of the perimeter of an active lek. Fluid Minerals: A CSU stipulation will apply within 2 miles of leks. The AO may waive this stipulation if no portion of the leasehold is within 2 miles of the perimeter of an active lek.	Completely Revised - revised by rangewide and state specific direction
MD-17 Greater Sage-Grouse GHMA: Same as MD-12.	Completely Revised - revised by rangewide and state specific direction

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
MD-18 Utility and Power lines: All new utility and power lines (overhead lines) that can be safely buried will be buried within 2 miles of GRSG leks and within GRSG winter range. When burial of power lines is not possible, above ground lines will be located and designed to minimize impacts of predation, collision and other associated stressors to GRSG. Existing overhead lines within 2 miles of leks and within GRSG winter range will be evaluated for threats to GRSG and if necessary, modified to reduce the threat. If modification is not likely to be effective, the overhead line may be relocated. Any requirements for modification or relocation of existing overhead lines will be subject to valid existing rights.	Partially Revised - revised by rangewide and state specific direction to clarify
Oil and Gas (O&G) - CSU: All new utility and power lines that can be safely buried will be buried within 2 miles of sage-grouse leks and within sage-grouse winter range. When burial of power lines is not possible, above ground lines will be located and designed to minimize impacts of predation, collision and other associated stressors to sage-grouse. Existing overhead lines within 2 miles of leks and within sage-grouse winter range will be evaluated for threats to sage-grouse and if necessary, modified to reduce the threat. If modification will not likely be effective, the overhead line may be relocated. Any requirements for modification or relocation of existing overhead lines will be subject to valid existing rights.	Completely Revised - revised by rangewide and state specific direction
MD-19 Weed Treatments: Timing Limit (TL): Herbicide treatments limited to spot weed treatments only within a 3 mile buffer zone, of known sage-grouse leks from March 1-June 30. Exceptions to treatment types and dates of treatments may be allowed to address aggressively spreading weeds or invasive plants that require aggressive and timely treatment during this period following consultation with necessary specialists to minimize impacts on sage-grouse.	No change (same as 2015)
MD-20 Temporary Travel Closures: Temporary travel closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); and 43 CFR subpart 8341 (Conditions of Use). Temporary closure or restriction orders under these authorities are enacted at the discretion of the AO to resolve management conflicts and protect persons, property, and public lands and resources.	No change (same as 2015)
Where an AO determines that off-highway vehicles (OHV) are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures are implemented to prevent recurrence (43 CFR, Part 8341.2).	No change (same as 2015)

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
A closure or restriction order will be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders will be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.	No change (same as 2015)
Management Decisions for Greater Sage-Grouse Priority Habitat Management Areas	
MD-20 Greater Sage-Grouse PHMA: Manage PHMA so that discrete anthropogenic (human- caused) disturbances do not adversely impact GRSG distribution or abundance.	No change (same as 2015)
MD-21 Greater Sage-Grouse PHMA: PHMA will be the same as the State of South Dakota Sage- grouse Core Areas (SDGFP 2014); which includes 127,735 surface and 412,822 subsurface oil and gas minerals acres. See Figure 1-2 and 1-3. Adaptive management for sage-grouse is described in Chapter 2 Narrative section under Greater Sage-Grouse. BLM will apply the lek buffer-distances in the USGS Report "Conservation Buffer Distance Estimates for Greater Sage-Grouse-A Review (Open File Report 2014-1239)" in both GHMA and PHMA as detailed in Appendix B, Applying Lek Buffer-Distances When Approving Actions.	Completely Revised – revised by rangewide direction
MD-22 Surface Disturbing and Disruptive Activities and Fluid Minerals: Surface disturbing and disruptive activities may be allowed if the project proponent can clearly demonstrate that adverse impacts on sage-grouse can be adequately mitigated through BMPs, guidelines (Appendix J), disturbance is within the 3% disturbance cap limit (Appendix E) and RDFs (Appendix C) are included and the goals for sage-grouse not compromised. If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) within GRSG PHMA in any given BSU, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 hard rock mining law, valid existing rights, etc.) will be permitted by BLM within PHMA in any given BSU until the disturbance has been reduced to less than the cap.	Completely Revised - revised by rangewide and state specific direction
If the 3% anthropogenic disturbance cap is exceeded on lands (regardless of land ownership) or if anthropogenic disturbance and habitat loss associated with conversion to agricultural tillage or fire exceed 5% within a project analysis area in PHMA, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the 1872 Mining Law, valid existing rights, etc.) will be permitted by BLM within PHMA in a project analysis area until the disturbance has been reduced to less than the cap. Within existing designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location.	Completely Revised - revised by rangewide and state specific direction
Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining	No change (same as 2015)

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
facility is co-located into an existing disturbed area. This direction applies to the following: oil and gas wells and development facilities, coal mines, wind towers, solar fields, geothermal, and mining (active locatable, leasable, and saleable developments). Appendix E provides specific details about how calculations are determined for disturbance caps. Prior to approving any surface disturbance and disruptive activities, the project proponent will be required to provide a plan approved by BLM to maintain suitability of habitat and avoid or minimize habitat loss and disturbance.	
Fluid Minerals - NSO: PHMA will be managed as NSO and Use (127,735 surface and 412,822 oil and gas subsurface minerals acres). These areas will be open to oil and gas leasing with a NSO stipulation. All sage-grouse habitat that is not part of PHMA will be managed as GHMA as noted in Figure 1-2.	Completely Revised - revised by rangewide and state specific direction
Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA.	Completely Revised - revised by rangewide and state specific direction
Waivers or modifications to a fluid minerals lease NSO stipulation will not be granted. The AO may grant an exception to a fluid mineral lease NSO stipulation in certain cases. Exceptions based on conservation gain (ii) may only be considered in (A) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) area of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP. See Appendix G.	Completely Revised - revised by rangewide and state specific direction
Oil and gas stipulations will also apply to geothermal resources. Locatable minerals will be open. RDFs (Appendix C) and other applicable BMPs and Guidelines (Appendix J) will be applied as BMPs or Guidelines for locatable minerals, subject to valid existing rights and the mining laws. Non-energy leasable minerals and salable minerals will be closed except for the following exception: PHMA are closed to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met: The activity is within the BSU and project area disturbance cap; the activity is subject to the provisions set forth in the mitigation measures (Appendix F) BMPs and Guidelines (Appendix J), and RDFs for Greater Sage-Grouse Habitat (Appendix C) are applied, and the activity is permissible under the subregional screening criteria.	Completely Revised - revised by rangewide and state specific direction
Required Design Features: RDFs are required for certain activities in all GRSG habitat. RDFs establish the minimum specifications for certain activities to help mitigate adverse impacts. However, the applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects (e.g., a resource is not present on a given site) or may require slight variations (e.g., a larger or smaller protective area). All variations in RDFs would require that at least one of the following be demonstrated in the NEPA analysis associated with the project or activity: A specific RDF is documented to not be applicable to the site-specific conditions of the project or activity (e.g., due to site limitations or engineering considerations). Economic considerations, such as increased	Completely Revised - revised by state specific direction

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
costs, do not necessarily require that an RDF be varied or rendered inapplicable. An alternative RDF, a state-implemented conservation measure or plan-level protection is determined to provide equal or better protection for GRSG or its habitat. A specific RDF would provide no additional protection to GRSG or its habitat.	
Where the federal government owns the mineral estate in PHMA and GHMA, and the surface is in non- federal ownership, the federal government will apply the same stipulations, Conditions of Approval (COAs), and/or conservation measures and mineral RDFs if the mineral estate is developed on BLM- administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner.	Partially Revised - revised by state specific direction to clarify HMA language
Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMA and GHMA, the federal government will apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.	Partially Revised - revised by state specific direction to clarify HMA language
At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1).	Completely Revised – revised by rangewide direction
MD-23 Grazing Permits and Leases: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments (RCA) or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3.	Completely Revised – revised by rangewide direction
MD-24 Other Resources Uses: Other resource uses within PHMA may be allowed pending project level environmental review provided that Mitigation, BMPs Guidelines, standard operating procedures (SOP), and RDFs are implemented, Impacts are evaluated as described in the GRSG Effects Analysis Process (Appendix I) and the project does not exceed the disturbance cap (Appendix E) and the goals for sage-grouse and sage-grouse habitat are not compromised. Categorical Exclusions (CXs) including those under the Energy Policy Act of 2005, Section 390 will not be used in priority sage-grouse habitats due to resource conflicts.	Completely Revised - revised by state specific direction
MD-25 Renewable Energy ROWs: PHMA will be exclusion areas. Other types of ROWs: PHMA will be avoidance areas. Winter range is an exclusion areas for renewable energy ROWs.	Completely Revised - revised by rangewide and state specific direction
MD-26 General ROWs: PHMA are defined as avoidance areas for all General ROWs (major and minor). Renewable ROWs are addressed in MD-25 above. Sage-Grouse winter range is treated the same in PHMA and GHMA: These areas are avoidance areas for general ROWs. If a proposed project cannot be avoided, the following actions will apply: Within PHMA all new power and utility lines (overhead lines) that can be safely buried will be buried.	Completely Revised - revised by rangewide and state specific direction

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
When burial of power lines is not possible, above ground lines will be located and designed to minimize impacts of predation, collision and other associated stressors to sage-grouse. Existing overhead lines within PHMA and within sage-grouse winter range will be evaluated for threats to sage-grouse and if necessary, modified to reduce the threat. If modification is not likely to be effective, the overhead line may be relocated. Any requirements for modification or relocation of existing overhead lines will be subject to valid existing rights.	
Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in Table 2 of the Monitoring Framework (Appendix D)−under valid existing rights prior to authorizing new projects in PHMA.	Partially revised – Updated monitoring framework as part of rangewide direction
MD-27 Lands and Realty: PHMA and GHMA within the Center of the Nation will be Class 2 land retention areas (Appendix A2, Map E and Figure 1-3). Any land disposals will be limited and subject to specialist review. Refer to the Land Tenure subsection of the Lands section of this table for additional details about Class 2 retention criteria. BLM could also dispose of land in PHMA and GHMA within the Center of the Nation areas in cases where there is mixed ownership, and land exchanges will allow for additional or more contiguous federal ownership patterns. Under sage-grouse habitat areas with minority federal ownership, BLM will develop an additional, effective mitigation agreement for any disposal of federal land. As a final preservation measure, consideration will be given to pursuing a permanent conservation easement. Lands classified as PHMA and GHMA for GRSG will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the GRSG or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the GRSG. The agency can demonstrate that disposal of the lands will provide a net conservation gain to Greater Sage-Grouse; or the agency can demonstrate that the disposal of the lands will have no direct or indirect adverse impact on conservation of Greater Sage-Grouse.	No change (same as 2015)
MD-28 Weed Treatments: TL: Spot weed treatments only, using IPM methods within all suitable nesting or brood rearing habitat of known sage-grouse leks from March 1-June 30.	No change (same as 2015)
MD-29 Surface Disturbance and Disruptive Activities and Fluid Minerals in Winter Range: Winter range in PHMA will be treated the same as winter range in GHMA: Surface disturbing and disruptive activities will not be allowed in winter range for sage-grouse unless the project proponent can clearly demonstrate that the impacts can be adequately mitigated, conservation actions or needed design features are included and the goals of this plan are not compromised. Prior to approving any surface disturbance and disruptive activities, the project proponent will be required to provide a plan approved by BLM to maintain suitability of habitat and avoid or minimize habitat loss and disturbance.	Completely Revised - revised by rangewide and state specific direction

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Fluid Minerals - NSO: Sage-grouse winter range will be managed as a NSO for oil and gas development and exploration. Waivers or modifications to a fluid minerals lease no-surface-occupancy stipulation will not be granted for NSO stipulations in PHMA.	Completely Revised - revised by rangewide and state specific direction
MD-30 Rights of Ways (ROWs): Winter range in PHMA will be treated the same as winter range in GHMA: Renewable Energy ROWs in sage-grouse winter range will be an exclusion area. Other types of ROWs in sage-grouse winter range will be an avoidance area. In cases where avoidance is not possible, BLM may require co-location of new ROWs with existing ROWs where possible. ROWs are defined for sage-grouse management in terms of major and minor ROWs. Major ROWs include transmission lines 100kV and greater and pipelines 24 inches in width and greater. Minor ROWs include utilities under these design descriptions, as well as communication sites and towers. Greater Sage-Grouse PHMA are avoidance areas for major and minor ROWs. Within GHMA, major ROWs are avoidance and minor ROWs are avoidance within two miles of leks with GHMA. The rest of the GHMA is open to minor ROWs. Sage-Grouse winter range is treated the same in PHMA and GHMA: These areas are avoidance areas for general ROWs and exclusion areas for renewable energy ROWs.	Completely Revised - revised by rangewide and state specific direction
[Plan Maintenance Action in 2018 (February 2, 2018) clarified the use and application of the habitat objectives. Updated the language in MD-31. This MD was deleted and replaced with the text below.] The habitat objectives for GRSG (Table 2-5) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site. The seasonal habitat descriptions in Table 2-5 vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sagegrouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area.	Completely Revised – revised by rangewide direction. Table 2-5 removed, see Appendix 8 for habitat indicators

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards. The Habitat Objectives Tables are to be used: ● To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments ● To evaluate land use plan effectiveness for sage-grouse conservation, and ● As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.	
MD-32 Land Health Standards: BLM will prioritize grazing leases in PHMA to determine if modifications are necessary prior to renewals or if the allotment does not meet Land Health Standards.	Completely Revised – revised by rangewide direction
MD-33 Prescribed Fire: Prescribed fire may be allowed in PHMA and general habitat if it is done solely for the purposes of improving or maintaining sage-grouse habitat. If prescribed fire is used in Greater Sage-Grouse habitat, the NEPA analysis for the Burn Plan will address the following: • Why alternative techniques were not selected as a viable options; • How Greater Sage-Grouse goals and objectives would be met by its use; • How the COT report objectives would be addressed and met; • Develop a risk assessment to address how potential threats to Greater Sage-Grouse habitat would be minimized. Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect Greater Sage-Grouse habitat in PHMA (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, and burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat would be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality. Secretarial order SO3336 will be applied to protect GRSG habitat from fire: http://www.forestsandrangelands.gov/rangeland/index.shtml.	Partially Revised - revised by state specific direction to clarify

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
MD-34 Grazing Permits/Leases: The NEPA analysis for renewals and modifications of livestock grazing permits/leases within PHMA will include specific management thresholds based on GRSG Habitat Objectives Table and Land Health Standards (43 CFR, Part 4180.2) and ecological site potential and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.	Completely Revised – revised by rangewide direction
MD 35 – Grazing Allotments: Allotments within PHMA, focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.	Completely Revised – revised by rangewide direction
MD 36 – Review and prioritization of Grazing Leases/Permits: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (ex., fire) and legal obligations.	Completely Revised – revised by rangewide direction
MD-37: Range Improvements: Range improvements in PHMA would be allowed if the improvements would not impact GRSG, improvements would provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats, or if improvements would meet the lek buffer requirement. Refer to Appendix B for a discussion about GRSG lek buffers.	Completely Revised – revised by rangewide direction
MD-38 Recreation: In PHMA, BLM will not construct new recreation facilities (e.g., campgrounds, trails, trailheads, staging areas) unless the development would have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from critical areas, etc.), or unless the development is required for visitor health and safety or resource protection.	Partially Revised - revised by state specific direction, see mitigation and SSS sections
MD-39: Travel: Temporary travel closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); and 43 CFR subpart 8341 (Conditions of Use). Temporary closure or restriction orders under these authorities are enacted at the discretion of the AO to resolve management conflicts and protect persons, property, and public lands and resources.	No change (same as 2015)
Where an AO determines that OHVs are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures are implemented to prevent recurrence (43 CFR, Part 8341.2).	No change (same as 2015)

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
A closure or restriction order will be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders will be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.	No change (same as 2015)
Habitat Objectives	
[Plan Maintenance Action in 2018 (February 2, 2018) clarified the use and application of the habitat objectives. Updated the language in MD-31 and here in the Habitat Objectives section. Most of this section was deleted and replaced with the text below.] The habitat objectives for GRSG (Table 2-5) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site. The seasonal habitat descriptions in Table 2-5 vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sagegrouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area. The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards. The Habitat Objectives Tables are to be used: ● To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments ● To evaluate land use plan effectiveness for sage-grouse conservation, and	Completely Revised - revised by rangewide direction. Table 2-5 removed, indicators now in new appendix.

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
● As a basis to develop measurable project objectives for actions in BLM-designated GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.	
In all PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush canopy cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).	No change (same as 2015)
Adaptive Management Strategy for Greater Sage-Grouse Habitat Management	
Adaptive Management is a decision process that promotes flexible resource management decision- making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. Careful monitoring of these outcomes both advances scientific understanding and helps with adjusting resource management directions as part of an iterative learning process. Adaptive management also recognizes the importance of natural variability in contributing to ecological resilience and productivity. Adaptive management does not represent an end in itself, but rather a means to more effective decisions and enhanced benefits. On February 1, 2008, the USDI published its Adaptive Management Implementation Policy (522 DM 1). The adaptive management strategy presented within this EIS complies with this policy and direction. The GRSG Monitoring Framework will be used to inform adaptive management; the GRSG Monitoring Framework can be found in Appendix D. The following provides the BLM adaptive management strategy for the South Dakota ARMP.	Completely Revised - revised by rangewide direction
Adaptive Management and Monitoring	
This EIS contains a monitoring framework plan (Appendix D) that includes an effectiveness monitoring component. The agencies intend to use the data collected from the effectiveness monitoring to identify any changes in habitat conditions related to the goals and objectives of the plan and other range-wide conservation strategies BLM 2004; Stiver et al. 2006; USFWS 2013). The information collected through the Monitoring Framework Plan (Appendix D) will be used by the BLM to determine when adaptive management hard and soft triggers (discussed below) are met. Adaptive management responses at the RMP level were included as part of the assumptions when impacts were analyzed in Chapter 4 of the Proposed RMP. In making amendments to this plan, the BLM will coordinate with the FWS as BLM continues to meet its objective of conserving, enhancing and restoring GRSG habitat by reducing, minimizing or eliminating threats to that habitat. The GRSG adaptive management plan provides a means of addressing and responding to unintended negative impacts on GRSG and its habitat before consequences become severe or irreversible.	Completely Revised - revised by rangewide direction
The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter.	Completely Revised - revised by rangewide direction
Adaptive Management Triggers	
Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives. The BLM will use soft and hard triggers.	Completely Revised - revised by rangewide direction

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Soft Triggers	
Soft triggers are indicators that management or specific activities may not be achieving the intended results of conservation actions. The soft trigger is any negative deviation from normal trends in habitat or population in any given year, or if observed across two to three consecutive years. Metrics include, but are not limited to, annual lek counts, wing counts, aerial surveys, habitat monitoring, and Density and Disturbance Calculation Tool (DDCT) evaluations. BLM field offices, local SDGFP offices, and sage-grouse working groups will evaluate the metrics. The purpose of these strategies is to address localized Greater Sage-Grouse population and habitat changes by providing the framework in which management will change if monitoring identifies negative population trends and habitat anomalies.	Completely Revised - revised by rangewide direction
Each major project (EIS level) will include adaptive management strategies in support of the population management objectives for Greater Sage-Grouse set by the State of South Dakota, and will be consistent with this Greater Sage-Grouse Adaptive Management Plan. These adaptive management strategies will be developed in partnership with the State of South Dakota, project proponents, partners, and stakeholders, incorporating the best available science.	Completely Revised - revised by rangewide direction
Soft Triggers Response	
Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short or long term, as allowed by law. The project-level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal factor. The management agency and the adaptive management group will implement an appropriate response strategy to address causal factors not addressed by specific project adaptive management strategies, not attributable to a specific project, or to make adjustments at a larger regional or state-wide level.	Completely Revised - revised by rangewide direction
Hard Triggers	
Hard triggers are indicators that management is not achieving desired conservation results. Hard triggers would be considered a catastrophic indicator that the species is not responding to conservation actions, or that a larger-scale impact is having a negative effect. Hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts. Within the context of normal population variables, hard triggers shall be determined to take effect when two of the three metrics exceeds 60% of normal variability for the BSU in a single year, or when any of the three metrics exceeds 40% of normal variability for a three-year time period within a five-year range of analysis. A minimum of three years is used to determine trends, with a five-year period preferred to allow determination of three actual time periods (i.e., Y1-2-3, Y2-3-4, Y3-4-5). Baseline population estimates are established by pre-disturbance surveys, reference surveys, and account for regional and statewide trends in population levels. Population count data in South Dakota are maintained by SDGFP. Estimates of population are determined based upon survey protocols determined by SDGFP, and are implemented consistently throughout the state. Population counts are tracked for individual leks and are then summarized by county and for the state.	Completely Revised - revised by rangewide direction

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Hard Trigger Response	
Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from Greater Sage-Grouse conservation objectives set forth in the BLM plans. As such, the ARMP includes a "hard-wired" plan-level response; that is, it provides that, upon reaching the trigger, a more restrictive alternative, or an appropriate component of a more restrictive alternative analyzed in the Proposed RMP and Final EIS, will be implemented without further action by the BLM. Specific "hard- wired" changes in management are identified in Table 2-7, Specific Management Responses, below. In addition to the specific changes identified in Table 2-7, the BLM will review available and pertinent data, in coordination with Greater Sage-Grouse biologists and managers from multiple agencies, including the USFWS, NRCS, and the State of South Dakota, to determine the causal factor(s) and implement a corrective strategy. The corrective strategy would include the changes identified in Table 2-7 and could also include the need to amend or revise the ARMP to address the situation and modify management accordingly.	Completely Revised - revised by rangewide direction
Upon determination that a hard trigger has been tripped, the BLM will immediately defer issuance of discretionary authorizations for new actions within the BSU for a period of 90 days. When a hard trigger is hit in a BSU, including those that cross state lines, the WAFWA Management Zone Greater Sage-Grouse Conservation Team will convene to determine the casual factor(s), put project level responses in place, as appropriate, and discuss further appropriate actions to be applied.	Completely Revised - revised by rangewide direction
In addition to implementing the hard wired plan-level response, in the event that new scientific information becomes available demonstrating that the hard-wired response would be insufficient to stop a severe deviation from sage-grouse conservation objectives set forth in the BLM plans, the BLM will immediately implement a formal directive to protect GRSG and its habitat and to ensure that conservation options are not foreclosed. To the extent that it is supported scientifically, this formal directive will be drawn from the range of alternatives analyzed in the RMP Amendments/Revisions.	Completely Revised - revised by rangewide direction
Mitigation for Sage-Grouse Management	
Consistent with the Plan's goal, the intent of the South Dakota ARMP is to provide a net conservation gain to the species. In all sage-grouse habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in sage-grouse habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species, including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions.	Completely Revised - revised by rangewide and state specific direction

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Actions that result in habitat loss and degradation including those identified as threats which contribute to Greater Sage-Grouse disturbance as identified by the USFWS in its 2010 listing decision (75 FR 13910) and shown in Table 2 in the attached Monitoring Framework (Appendix D). This is also consistent with BLM Manual 6840 – Special Status Species Management, Section .02B, which directs BLM "to initiate proactive conservation measures that reduce or eliminate threats to Bureau sensitive species to minimize the likelihood of the need for listing of these species under the ESA."	Completely Revised - revised by rangewide and state specific direction
Mitigation Standards. In undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing-third party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species, including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Mitigation will follow the regulations from the CEQ (40 CFR, Part 1508.20; e.g., avoid, minimize, and compensate), hereafter referred to as the mitigation hierarchy. If impacts from BLM management actions and authorized third-party actions that result in habitat loss and degradation remain after applying avoidance and minimization measures (i.e., residual impacts), then compensatory mitigation projects will be used to provide a net conservation gain to the species. Any compensatory mitigation will be durable, timely, and in addition to that which would have resulted without the compensatory mitigation.	Completely Revised - revised by rangewide and state specific direction
Greater Sage-Grouse Conservation Team. The BLM will establish a WAFWA Management Zone Greater Sage-Grouse Conservation Team (hereafter, Team) to help guide the conservation of Greater Sage- Grouse, within 90 days of the issuance of the ROD. This Team will develop a WAFWA Management Zone Regional Mitigation Strategy (hereafter, Regional Mitigation Strategy). The Team will also compile and report on monitoring data (including data on habitat condition, population trends, and mitigation effectiveness) from States across the WAFWA Management Zone (see Monitoring section). Subsequently, the Team will use these data to either modify the appropriate Regional Mitigation Strategy or recommend adaptive management actions (see Adaptive Management section). The BLM will invite governmental and Tribal partners to participate in this Team, including the SDGFP and USFWS, in compliance with the exemptions provided for committees defined in the Federal Advisory Committee Act and the regulations that implement that act. The BLM will strive for a collaborative and unified approach between Federal agencies, Tribal governments, state and local government(s), and other stakeholders for Greater Sage-Grouse conservation. The Team will provide advice, and will not make any decisions that impact Federal lands. The BLM will remain responsible for making decisions that affect Federal lands.	Completely Revised - revised by rangewide and state specific direction

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Developing a Regional Mitigation Strategy. The Team will develop a Regional Mitigation Strategy to inform the mitigation components of NEPA analyses for BLM management actions and third-party actions that result in habitat loss and degradation. The Strategy will be developed within one year of the issuance of the ROD. The BLM's Regional Mitigation Manual MS-1794 will serve as a framework for developing the Regional Mitigation Strategy. The Regional Mitigation Strategy will be applicable to the States/Field Offices within the WAFWA Management Zone's boundaries. Regional mitigation is a landscape-scale approach to mitigating impacts on resources. This involves anticipating future mitigation needs and strategically identifying mitigation sites and measures that can provide a net conservation gain to the species. The Regional Mitigation Strategy developed by the Team will elaborate on the components identified above (i.e., avoidance, minimization, and compensation; additionality, timeliness, and durability). In the time period before the Strategy is developed, BLM will consider regional conditions, trends, and sites, to the greatest extent possible, when applying the mitigation hierarchy and will ensure that mitigation is consistent with the standards set forth in the first paragraph of this section.	Completely Revised - revised by rangewide and state specific direction
Incorporating the Regional Mitigation Strategy into NEPA Analyses. The BLM will include the avoidance, minimization, and compensatory recommendations from the Regional Mitigation Strategy in one or more of the NEPA analysis' alternatives for BLM management actions and third-party actions that result in habitat loss and degradation, and the appropriate mitigation actions will be carried forward into the decision.	Completely Revised - revised by rangewide and state specific direction
Implementing a Compensatory Mitigation Program. Consistent with the principles identified above, the BLM needs to ensure that compensatory mitigation is strategically implemented to provide a net conservation gain to the species, as identified in the Regional Mitigation Strategy. To align with existing compensatory mitigation efforts, this compensatory mitigation program will be implemented at a State level (as opposed to a WAFWA Management Zone, a Field Office, or a Forest), in collaboration with our partners (e.g., Federal, Tribal, and State agencies). To ensure transparent and effective management of the compensatory mitigation funds, the BLM will enter into a contract or agreement with a third-party to help manage the State-level compensatory mitigation funds, within one year of the issuance of the ROD. The selection of the third-party compensatory mitigation administrator will conform to all relevant laws, regulations, and policies. The BLM will remain responsible for making decisions that affect Federal lands. Information on BMPs, Guidelines and SOPs can be found in Appendix J. RDFs are described in Appendix C.	Completely Revised - revised by rangewide and state specific direction

GRSG Management from South Dakota RMP	Types of Change to Existing Management Direction in the Proposed RMP Amendment
Monitoring Framework for Greater Sage-Grouse Habitat Management	
The BLM's planning regulations, specifically 43 CFR, Part 1610.4-9, require that land use plans establish intervals and standards for monitoring based on the sensitivity of the resource decisions. Land use plan monitoring is the process of tracking the implementation of land use plan decisions (implementation monitoring) and collecting data/information necessary to evaluate the effectiveness of land use plan decisions (effectiveness monitoring). For GRSG, these types of monitoring are also described in the criteria found in the Policy for Evaluation of Conservation Efforts When Making Listing Decisions (50 CFR Vol. 68, No. 60). One of the Policy for Evaluation of Conservation Efforts When Making Listing Decisions criteria evaluates whether provisions for monitoring and reporting progress on implementation (based on compliance with the implementation schedule) and effectiveness (based on evaluation of quantifiable parameters) of the conservation effort are provided. The Monitoring Framework is located in Appendix D.	Completely Revised – revised by rangewide direction

Table 2. South Dakota Habitat Objectives for GRSG

[Note: Table from 2015 Plan, see Appendix 8 for Indicator Tables for Proposed Plan]

Attribute	Indicators	Habitat Conditions	Reference
BREEDING HABITAT (LEK AND NESTING/EARLY BROOD REARING)			
Lek Security	Proximity of trees	Trees absent or rare. When present trees consist of rocky mountain juniper and ponderosa pine >328 feet (100 meters) from lek.	Baruch-Mordo et al. 2013 Stiver et al. 2015
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 328 feet (100 m) of an occupied lek	Stiver et al. 2015
NESTING/EARLY BROOD REARING			
Cover	Sagebrush canopy cover [2]	2-20%	Connelly et al. 2000 Connelly et al. 2003 Hagen et al. 2011
	Sagebrush height	4-12 inches (10.16-30.48 cm)	Connelly et al. 2000
	Predominant sagebrush shape	Predominantly spreading shape5	Stiver et al. 2015
	Perennial grass cover (such as native rhizomatous and bunchgrasses) 2	>10%	Stiver et al. 2015 Connelly et al. 2000
	Perennial grass height (includes residual grasses)	Adequate nest cover based on ecological site potential and seasonal precipitation.[15]	Connelly et al. 2000 Stiver et al. 2015 Connelly et al. 2003 Hagen et al. 2011
	Perennial forb cover [2]	>3%, Based on ecological site potential and seasonal precipitation	Connelly et al. 2000
	Perennial forb availability	Preferred forbs are common with several species present[6]	Stiver et al. 2015

Attribute	Indicators	Habitat Conditions	Reference
LATE BROOD-REARING/SUMMER1 (July-October) (Apply to all habitat outside of nesting/breeding and winter)			
Cover	Sagebrush canopy cover[2]	2-20%	Connelly et al. 2000
	Sagebrush height	4 - 12 inches (10.16-30.48 cm)	Connelly et al. 2000
	Perennial grass canopy cover [2]	>10%	Connelly et al. 2000
	Upland and riparian perennial forb availability [2]	Preferred forbs are common with several preferred species present,6,	Stiver et al. 2015
	Riparian meadow habitat condition	Proper Functioning Condition (PFC)13	
WINTER1 November-March1 (Apply to areas of known or likely winter-use)			
Cover and Food	Seasonal habitat extent	Winter habitat is managed to optimize its potential within the constraints of ecological site potential	Connelly et al. 2000 Stiver et al. 2015
	Sagebrush canopy cover	2-20%	Connelly et al. 2000 Stiver et al. 2015
	Sagebrush height above snow	Winter habitat is managed to optimize its potential within the constraints of ecological site potential	Connelly et al. 2000

NOTES

1 Seasonal dates can be adjusted by local unit according to geographic region.

2 Absolute cover is the actual recorded cover and can exceed 100% when recorded across all species and all layers. It is not relative cover, which is the proportions of each species, and equals 100%. Note that cover is reported for only those species (e.g., sagebrush, preferred forbs) that are sampled to determine suitability of habitat for sage-grouse. Overall cover at the site will be greater than that sampled for sage-grouse habitat, due to other species present. Percent cover refers to foliar cover, measured using the HAF protocol line-point intercept method.

3 Arid corresponds to the 10 – 12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush subspecies for this type site (Stiver et al. 2015 In press).

4 Mesic corresponds to the >12 inch precipitation zone.

5 Collectively the indicators for sagebrush (cover, height, and shape), perennial grass and perennial forb (cover, height and/or availability) represent the desired condition range for nesting/early brood rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. 2015 In press. Sagebrush plants that are more tree or columnar shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015 In press). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.

6 Preferred forbs are listed in Stiver et al. 2015 In press. Overall total forb cover may be greater than that of preferred for cover since not all forb species are listed as preferred.

15 Specific height requirements needed to meet the objective will be set when project level planning is completed.

2.14.2 Relevant Appendices

The following table shows which appendices from the 2015 plan amendment have management direction that may change through the Proposed RMPA. The appendices can be found on the South Dakota RMP ePlanning website.

ARMPA Appendix Name	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Approved RMP Amendment Maps	Completely Revised – See new maps in Appendix 1
B: Applying GRSG Lek Buffer-Distances When Approving Decisions	Completely revised – see state-specific language
C: GRSG Required Design Features	Partially updated – see state-specific language
D: GRSG Monitoring Framework	Completely revised –see new rangewide management direction
E: GRSG Disturbance Caps	Removed, see new rangewide management direction
F: GRSG Regional Mitigation Strategy	Removed, see new rangewide management direction
G: Fluid Mineral Stipulations	Partially revised, GRSG stipulations changed, see Appendix 16
I: Greater Sage-Grouse Effects Analysis Process	Removed
J: Summary of Mitigation Measures, Best Management Practices (BMPs), Standards, Guidelines, and Standard Operating Procedures (SOPs)	Partially revised with new direction (livestock grazing BMPs)
K: South Dakota Field Office Soil, Water and Reclamation Mitigation Guidelines	No change (same as 2015)
L: South Dakota Field Office Reclamation Guidelines and Abandoned Mine Actions	No change (same as 2015)
M: South Dakota Field Office Grazing Allotment Allocations	No change (same as 2015)
N: Land Ownership Adjustment Criteria	No change (same as 2015)
O: Soil Monitoring	No change (same as 2015)
P: Cultural Resource Stipulation for Grazing Leases	No change (same as 2015)
Q: South Dakota Field Office Air Resource Management Plan: Adaptive Management Strategy for Oil and Gas Resources	No change (same as 2015)
R: Rights-of-Way and Renewable Energy Avoidance or Exclusion Areas	No change (same as 2015)
S: Summary of Restrictions Table	No change (same as 2015)

Appendix 2.15
Utah RMPs

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2.15 UTAH RMPS

This appendix presents the GRSG approved RMP amendment language from the 2015 and 2019 records of decision for Utah. Changes between 2015 and 2019 are noted. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment (RMPA), either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMPA include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable 2015 and 2019 appendices that are listed in **Section 2.15.2** of this appendix. For the additional state-specific Utah management direction for the Proposed RMPA, see Chapter 2, Table 2-11.

2.15.1 Utah

Table 1: Comparison of Proposed RMP Amendment to Existing GRSG RMP Management Direction in Utah

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
SPECIAL STATUS SPECIES (SSS)	***SPECIAL STATUS SPECIES (SSS)***	—
GOAL:	**GOAL:**	—
Goal SSS-1: Maintain and/or increase GRSG abundance and distribution by conserving, enhancing or restoring the sagebrush ecosystem upon which populations depend in collaboration with other conservation partners.	No changes made.	Completely Revised - revised by rangewide.
Objectives:	**Objectives:**	—
Objective SSS-1: Designate PHMA that are large enough to stabilize populations in the short-term and enhance populations over the long-term. Protect PHMA from anthropogenic disturbances that will reduce distribution or abundance of GRSG. Enhance or improve GRSG habitat (e.g., through restoration or rehabilitation activities) within PHMA that has been impaired or altered.	No changes made.	No change (same as 2015).
Objective SSS-2: In all GRSG habitat, manage activities that result in habitat loss and degradation to provide a net conservation gain of GRSG habitat. Exceptions to net conservation gain for GRSG shall be made for vegetation treatments to benefit Utah prairie dog.	**Objective SSS-2:** In PHMA, manage activities that result in habitat loss and degradation to improve the condition of GRSG habitat across the planning area. Exceptions to this mitigation standard for GRSG shall be made for vegetation treatments to benefit Utah prairie dog.	Completely Revised – revised by rangewide.

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Objective SSS-3: In all GRSG habitat, where sagebrush is the current or potential dominant vegetation type or is a primary species within the various states of the ecological site description, maintain or restore vegetation to provide habitat for lekking, nesting, brood rearing, and winter habitats. The habitat objectives for GRSG (**Table 2**) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site. In addition, areas where PHMA and GHMA overlap mapped Utah prairie dog habitat will be managed for both species; accomplishing this shall include coordination with species specific experts to develop conservation and recovery objectives that will benefit both species. The seasonal habitat descriptions in **Table 2** vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse	**Objective SSS-3:** In PHMA, where sagebrush is the current or potential dominant vegetation type or is a primary species within the various states of the ecological site description, maintain or restore vegetation to provide habitat for lekking, nesting, brood rearing, and winter habitats. The habitat objectives for GRSG (**Table 3**) is a list of indicators, characteristics, and values that describe GRSG seasonal habitat use areas. The BLM used indicator values derived from a synthesis of local and regional GRSG habitat research and data to describe the typical vegetation communities that sage-grouse select. While the habitat objectives are not attainable on every site or every acre within designated GRSG habitat management areas, the values reflect a range of habitat conditions that generally lead to greater survival of individuals within a population. When permitting land use activities, BLM should consider the ecological site potential within designated habitat management areas to validate the habitat conditions achievable for a specific site. In addition, areas where PHMA and GHMA overlap mapped Utah prairie dog habitat will be managed for both species; accomplishing this shall include coordination with species specific experts to develop conservation and recovery objectives that will benefit both species. The seasonal habitat descriptions in **Table 3** vary across the range of sage-grouse, within a subregion, and between sites. They are not land health standards but are quantitative measures that inform the Special Status Species Habitat Land Health Standard for sage-grouse. These measurable values reflect ecological potential, and may be adjusted based on local factors influencing sage-grouse habitat selection. Local data or recent	Completely revised – revised by rangewide.

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
habitat selection. Local data or recent science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sage-grouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area.	science may indicate that sage-grouse select for vegetation structure and composition in seasonal habitats not characterized by the values in the habitat objectives table. In these cases, it may be appropriate to adjust the values. Habitat objectives should be evaluated in the context of annual variability in ecological conditions and should not be used singly to determine habitat suitability for sage-grouse. They may be used to demonstrate trends over time, during plan evaluations for effectiveness of sage-grouse conservation, or when identify limiting habitat characteristics for a given area.	
The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards.	The indicators, characteristics, values and desired seasonal habitat conditions in the GRSG Plan Habitat Objectives Table are meant to inform the wildlife habitat component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2), but do not replace rangeland health assessments. Results from the LHS evaluation should be used to support BLM in land use authorization processes and during development of objectives for management actions such as vegetation treatments. BLM land use authorizations will contain terms and conditions regarding the actions needed to achieve or make progress toward achieving habitat objectives and land health standards.	
The Habitat Objectives Tables are to be used: • To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments • To evaluate land use plan effectiveness for sage-grouse conservation, and • As a basis to develop measurable project objectives for actions in BLM-designated	The Habitat Objectives Tables are to be used: • To assess habitat suitability for sage-grouse following the BLM policy on sage-grouse habitat assessments • To evaluate land use plan effectiveness for sage-grouse conservation, and • As a basis to develop measurable project objectives for actions in BLM-designated	

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.	GRSG Habitat Management areas when considered alongside land health standards, ecological potential and local information.	
Objective SSS-4: Within PHMA, increase the amount and functionality of seasonal habitats by: • Maintaining or increasing sagebrush in perennial grasslands, where needed to meet the Habitat Objectives for Greater Sage-Grouse (**Table 2**), unless there is a conflict with Utah prairie dog. • Reducing conifer (e.g., pinyon/juniper) from areas that are most likely to support GRSG at a rate that is at least equal to the rate of encroachment. • Reducing the extent of annual grasslands. • Maintaining or improving corridors for migration or movement between seasonal habitats, as well as for long-term genetic connections between populations. • Maintaining or improving understory (grass, forb) and/or riparian condition within breeding and late brood-rearing habitats. • Conducting vegetation treatments based on the following 10-year (decadal) acreage objectives:	**Objective SSS-4:** Within PHMA, increase the amount and functionality of seasonal habitats by: • Maintaining or increasing sagebrush in perennial grasslands, where needed to meet the Habitat Objectives for Greater Sage-Grouse (**Table 3**), unless there is a conflict with Utah prairie dog. • Reducing conifer (e.g., pinyon/juniper) from areas that are most likely to support GRSG at a rate that is at least equal to the rate of encroachment. • Reducing the extent of invasive annual grasslands. • Maintaining or improving corridors for migration or movement between seasonal habitats, as well as for long-term genetic connections between populations. • Maintaining or improving understory (grass, forb) and/or riparian condition within breeding and late brood-rearing habitats. • Conducting vegetation treatments based on the following 10-year (decadal) acreage objectives:	Partially revised- remove parenthetical reference to habitat objectives table.

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment

Table 1a. Vegetation Treatments per 10-year (decadal) Acreage Objectives (2015)

Population Areas	Mechanical Treatment[1]	Annual Grass Treatment[1]
Box Elder	9,300	17,800
Ibapah; Hamlin Valley	17,900	2,100
Rich; Uintah	40,700	6,800
Carbon	2,600	200
Bald Hills; Panguitch	43,900	8,900
Parker Mountain	32,800	2,200
Sheeprocks	33,700	10,000
Statewide	*180,900*	*48,000*

[1] These acreage figures, based on Vegetation Dynamics Development Tool modeling, represent an objective for treatment on BLM-administered lands over a 10-year (decadal) time frame to support achievement or progress toward GRSG habitat objectives (see Final EIS Appendix V, Great Basin Vegetation Modeling using Vegetation Dynamics Development Tool). This accounts for variations in yearly funding availability and does not reflect a maximum or minimum acreage for any one treatment type or total treatment acreage, should funding and site specific conditions allow for more or less treatment acreage than described in order to meet habitat objectives.

Table 1b. Vegetation Treatments per 10-year (decadal) Acreage Objectives (2019)

Population Areas	Mechanical Treatment[1]	Annual Grass Treatment[1]
Box Elder	9,300	17,800
Ibapah; Hamlin Valley	17,900	2,100
Rich; Uintah	40,700	6,800
Carbon	2,600	200
Bald Hills; Panguitch	43,900	8,900
Parker Mountain	32,800	2,200
Sheeprocks	33,700	10,000
Statewide	*180,900*	*48,000*

[1] These acreage figures, based on Vegetation Dynamics Development Tool modeling, represent an objective for treatment on BLM-administered lands over a 10-year (decadal) time frame to support achievement or progress toward GRSG habitat objectives (see Final EIS Appendix V, Great Basin Vegetation Modeling using Vegetation Dynamics Development Tool). This accounts for variations in yearly funding availability and does not reflect a maximum or minimum acreage for any one treatment type or total treatment acreage, should funding and site specific conditions allow for more or less treatment acreage than described in order to meet habitat objectives.

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Outside PHMA (in adjacent opportunity areas) improve and restore historical GRSG habitat to support GRSG populations and to maintain or enhance connectivity. Statewide, complete a decadal average of 170,200 acres of mechanical treatments and 33,000 acres of annual grass treatments. Prioritization is for completion of treatments within PHMA before treating areas outside.	Outside PHMA (in adjacent opportunity areas) improve and restore historical GRSG habitat to support GRSG populations and to maintain or enhance connectivity. Statewide, complete a decadal average of 170,200 acres of mechanical treatments and 33,000 acres of annual grass treatments. Prioritization is for completion of treatments within PHMA before treating areas outside.	
Objective SSS-5: Participate in local GRSG conservation efforts (e.g., the appropriate State of Utah agency, Natural Resources Conservation Service (NRCS), and local working groups) to implement landscape-scale habitat conservation, to implement consistent management to benefit GRSG, and to gather and use local research and monitoring to promote the conservation of GRSG.	No changes made.	No change (same as 2015).
Management Actions (MA):	**Management Actions (MA):**	—
MA-SSS-1: Identify PHMA and GHMA as identified in **Table 4** below (Figure 2-1, Habitat Management Areas [Appendix A, Approved RMP Amendment Maps]): The BLM will apply these the goals, objectives, and management actions where the agency has discretion to implement them; the actions do not apply in areas where the BLM does not administer the surface or mineral estate. Minor adjustments to PHMA/GHMA external boundaries can be made if BLM biologists, in coordination with the appropriate State of Utah agency, determine site-specific conditions warrant such changes to more accurately depict existing or potential GRSG habitat. The appropriate planning process (i.e., plan maintenance or plan amendment) will be used, as determined on a case-by-case basis considering site-specific issues. See additional	Identify PHMA as follows in **Table 5** below (Figure 2-1, Habitat Management Areas [Appendix A, 2015 ROD/ Approved RMPA Maps]): The BLM will apply these the goals, objectives, and management actions where the agency has discretion to implement them; the actions do not apply in areas where the BLM does not administer the surface or mineral estate. The PHMA boundaries are not intended to represent a survey-grade boundary and are not expected to be used exclusively at a project-level. In accordance with the adaptive management framework and existing law, regulation and policy, inventories will continue to be conducted to provide information on GRSG habitat and distribution (FLPMA, 43 USC 1701 Sec. 201 (a), BLM Manual 6840 .04 D 3; BLM-M-6840 .04 E 2). Prior to considering proposed actions within	Partially revised – updated HMA boundaries, non-habitat criteria.

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
information and protocol on adjusting occupied habitat and PHMA/GHMA boundaries in Appendix K, Greater Sage-Grouse Habitat Baseline and Habitat Update Protocol. The PHMA and GHMA objectives and management actions would apply to existing sagebrush areas and areas with ecological sagebrush potential within the respective PHMA and GHMA polygons. In the mapped PHMA and GHMA there may be areas that lack the principle habitat components necessary for GRSG, including but not limited to rock outcrops, alkaline flats, and pinyon-juniper ecological sites. These are areas that do not have existing sagebrush or ecological potential to contain sagebrush. These areas of non-habitat may be identified during site-specific project review by agency biologists, in discussion with the appropriate State of Utah agency. Because of the importance of PHMA to conserve, enhance and restore GRSG and its habitat, objectives and management actions will apply to all the areas within the respective PHMA polygons. The GHMA objectives and management actions will apply to the areas of identified non-habitat within the GHMA polygons unless **all** the following conditions are met: • the non-habitat does not provide important connectivity between areas with existing or potential habitat; • all direct and indirect impacts that impair the function of adjacent seasonal habitats or the life-history or behavioral needs of the GRSG population are eliminated through project design (e.g., minimize sound, preclude tall structures, require perch deterrents), as demonstrated in the project's NEPA document.	PHMA, a field investigation should be conducted by a qualified biologist in collaboration with federal and state biologists. To this end, additional site-specific information associated with local surveys could result in a more precise delineation of habitat management areas. If in the review of a proposed action, there are discrepancies between the PHMA maps and the on-the-ground conditions, the on-the-ground information should be used to determine where the management would be applied. Minor adjustments to PHMA external boundaries (increases or decreases) can be made if BLM biologists, in coordination with the appropriate State of Utah agency, determine site-specific conditions warrant such changes to more accurately depict existing or potential GRSG habitat. The appropriate planning process (i.e., plan maintenance or plan amendment) will be used, as determined on a case-by-case basis considering site-specific issues. See additional information and protocol on adjusting seasonal habitat and PHMA boundaries in Appendix K, Greater Sage-Grouse Habitat Baseline and Habitat Update Protocol. The PHMA objectives and management actions apply to ecological sites that currently provide GRSG habitat within the respective PHMA polygons, as well as areas with ecological potential for GRSG habitat that have not cross an ecological threshold to a different stable non-GRSG habitat vegetation community. Mapped PHMA may also include areas that lack the principle habitat components necessary for GRSG, including but not limited to rock outcrops, alkaline flats, pinyon-juniper ecological sites, and areas that have crossed an ecological threshold to a different stable non-GRSG habitat vegetation	

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Exceptions in non-habitat may be approved by the Authorized Officer, but only with the concurrence of one level of delegated authority above the Authorized Officer. Any exception granted based on the above criteria would only apply to the specific project-level authorization. Proposed projects in the same area would need to undergo individual analysis to confirm the criteria are met prior to subsequent authorizations. Excepting a site-specific project from compliance with GRSG management in an area of non-habitat would not change the boundaries of PHMA or GHMA.	community, such as cheatgrass monocultures or pinyon/juniper woodlands (phase 3, absent sagebrush understory) (Chambers et al. 2014; Bestelmeyer et al. 2010; Bestelmeyer, et al. 2011). These are areas that do not contain sagebrush or other vegetation necessary for the various GRSG seasonal habitats. These areas of non-habitat may be identified during site-specific project review by agency biologists, in discussion with the appropriate State of Utah agency. The PHMA objectives and management actions will apply to the areas identified as habitat, as well as non-habitat within the PHMA polygons unless **both** of the following conditions are met: • the non-habitat does not provide important connectivity between seasonal habitats; and • direct and indirect impacts on adjacent seasonal habitats (disturbance to or disruption of) that would impair their biological function of providing the life-history or behavioral needs of the GRSG population are eliminated through project design (e.g., minimize sound, preclude tall structures, require perch deterrents), as demonstrated in the project's NEPA document. Any exception granted based on the above criteria would only apply to the specific project-level authorization. Proposed projects in the same area would need to undergo individual analysis to confirm the criteria are met prior to subsequent authorizations. Excepting a site-specific project from compliance with GRSG management in an area of non-habitat would not change the boundaries of PHMA.	

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MA-SSS-2: Designate SFA as shown on Figure 2-1 (181,100 acres of BLM surface estate; 52,200 acres split-estate federal minerals). SFA will be managed as PHMA, with the following additional management: • Recommended for withdrawal from the Mining Law of 1872 (as amended), subject to valid existing rights. • Managed as NSO, without waiver, exception, or modification, for fluid mineral leasing. • Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration (see specific management sections).	No similar action.	No change (same as 2019).
MA-SSS-3: In PHMA, apply the following management to discretionary disturbances or activities that are not otherwise excluded or closed to minimize and mitigate effects on GRSG and its habitat from the project/activity:	**MA-SSS-3:** In PHMA, apply the following management to discretionary disturbances or activities that are not otherwise excluded or closed to minimize and mitigate effects on GRSG and its habitat from the project/activity:	Various revisions – see section specific revisions below
MA-SSS-3: <u>A- Net Conservation Gain:</u> In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species, including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Exceptions to	**MA-SSS-3:** <u>A- Mitigation Strategy:</u> In PHMA, when undertaking BLM management actions, and, consistent with valid existing rights and applicable law, when authorizing third-party actions that result in habitat loss and degradation, the BLM will achieve the planning-level GRSG management goals and objectives through implementation of mitigation and management actions. Under this Proposed Plan Amendment, management would be consistent with the GRSG goals and objectives, and in conformance with BLM Manual 6840, Special Status Species Management.	Completely revised – revised by rangewide.

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net conservation gain for GRSG shall be made for vegetation treatments to benefit Utah prairie dog. Mitigation will be conducted according to the mitigation framework contained in Appendix F, Mitigation Strategy: Utah Greater Sage-Grouse RMPA. Consider the likelihood of development of not-yet-constructed surface-disturbing activities – as defined in Table D.2 of the Monitoring Framework (Appendix D)−under valid existing rights prior to authorizing new projects in PHMA.	In accordance with BLM Manual 6840, the BLM will undertake planning decisions, actions and authorizations "to minimize or eliminate threats affecting the status of [GRSG] or to improve the condition of [GRSG] habitat" across the planning area. Exceptions to this mitigation strategy for GRSG shall be made for vegetation treatments to benefit Utah prairie dog. 1) Compensation, which involves replacing or providing substitute resources for the impacts (including through payments to fund such work), would be considered only when voluntarily offered by a proponent, required by a law other than FLPMA, or to meet a State recommendation or requirement. Therefore, consistent with valid existing rights and applicable law, when considering third-party actions that result in habitat loss and degradation, the BLM will consider compensatory mitigation actions only as a component of compliance with a State mitigation plan, program, or authority; when required by a federal law other than FLPMA; or when offered voluntarily by a project proponent. Accordingly, before authorizing third-party actions that result in habitat loss and degradation in PHMA or State of Utah SGMAs, the BLM will complete the following steps: Notify the appropriate State of Utah agency to determine if the State of Utah requires or recommends any additional mitigation – including compensatory mitigation – under State regulations, policies, or programs related to the conservation of GRSG; 2) Recommend to the project proponent that it coordinate with the appropriate State of Utah	

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	agency to ensure it complies with all applicable State requirements relating to its proposal; 3) Consider the State's recommendations – if the State of Utah determines that there are unacceptable residual impacts on GRSG or its habitat and compensatory mitigation is required as a part of State policy or authorization, or if a proponent voluntarily offers mitigation, the BLM will incorporate that mitigation into the BLM's NEPA and decision-making process; 4) The BLM will ensure mitigation outcomes are consistent with the State of Utah's mitigation strategy and principles outlined in the State's Conservation Plan for Greater Sage-Grouse, including, but not limited to: a) Creating, restoring and/or protecting functional habitat or habitat corridors to offset the impacts of unavoidable disturbance to GRSG habitat, b) In most cases, compensatory mitigation projects should be completed before the project triggering mitigation occurs, c) Compensatory mitigation projects should account for the risk that the mitigation may fail or not persist for the full duration of the project it is intended to offset, d) Compensatory mitigation projects should provide habitat that is in place for at least the duration of the project it is intended to offset. Project-specific analysis will be necessary to determine how a compensatory mitigation proposal addresses impacts from a proposed action. The BLM will cooperate with the State to determine appropriate project design and	

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
	alignment with State policies and requirements, including those regarding compensatory mitigation. The BLM will defer to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action. The BLM will not deny a proposed authorization in GRSG habitat solely on the grounds that the proponent has not proposed or agreed to undertake voluntary compensatory mitigation. In cases where waivers, exceptions, or modification may be granted for projects with a residual impact, voluntary compensatory mitigation consistent with the State's management goals can be one mechanism by which a proponent achieves the RMPA goals, objectives, and waiver, exception, or modification criteria. When a proponent volunteers compensatory mitigation as their chosen approach to address residual impacts, the BLM can incorporate those actions into the rationale used to grant a waiver, exception, or modification. The final decision to grant a waiver, exception, or modification will be based, in part, on criteria consistent with the State's GRSG management plans and policies. In short, the BLM would continue to apply the mitigation hierarchy as described in the CEQ regulations at 40 CFR 1508.20; however, the BLM would focus on avoiding, minimizing, rectifying, and reducing impacts over time. Compensation would be considered only when voluntarily offered by a proponent, required by a law other than FLPMA, or to meet a State recommendation or requirement. The BLM commits to cooperating with the State to analyze applicant-proposed, state-recommended, or state-imposed compensatory mitigation to offset residual	

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	impacts. The BLM remains committed to achieving the planning-level management goals and objectives identified in this ROD and the 2015 ARMPA by ensuring GRSG habitat impacts are addressed through implementing mitigating actions consistent with the governing RMP.	
MA-SSS-3: B- Disturbance Cap In PHMA, manage discrete anthropogenic disturbances, whether temporary or permanent, so they cover less than 3 percent of 1) PHMA associated with a GRSG population area and 2) within a proposed project analysis area. See Appendix E, Greater Sage-Grouse Disturbance Cap Guidance, for additional information on implementing the disturbance cap, including what is and is not considered disturbance and how to calculate the proposed project analysis area. If the 3 percent anthropogenic disturbance cap is exceeded on all lands (regardless of land ownership) within GRSG PHMA in any given population area (BSU), then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the Mining Law of 1872 [as amended], valid existing rights, etc.) will be permitted by the BLM within GRSG PHMA in any given population area (BSU) until the disturbance has been reduced to less than the cap. If the 3 percent disturbance cap is exceeded on all lands (regardless of land ownership) within a proposed project analysis area in PHMA, then no further anthropogenic disturbance will be permitted by the BLM until disturbance in the proposed project analysis area has been reduced to maintain the area under the cap (subject to applicable laws and regulations, such as the Mining	**MA-SSS-3:** B- Disturbance Cap In PHMA, manage discrete anthropogenic disturbances so they cover less than 3 percent of 1) PHMA associated with a GRSG population area and 2) within a proposed project analysis area. See Appendix E, Greater Sage-Grouse Disturbance Cap Guidance, for additional information on implementing the disturbance cap, including what is and is not considered disturbance and how to calculate the proposed project analysis area. If the 3 percent disturbance cap is exceeded on all lands (regardless of land ownership) within GRSG PHMA in any given population area (BSU) or within a proposed project analysis area in PHMA, then no further discrete anthropogenic disturbances (subject to applicable laws and regulations, such as the Mining Law of 1872 [as amended], valid existing rights, etc.) will be permitted by the BLM within GRSG PHMA in any given population area (BSU) or the proposed project analysis area until the disturbance has been reduced to less than the cap. However, the 3 percent cap may be exceeded at either scale if a technical team determines that site-specific Greater Sage-Grouse habitat and population information, combined with project design elements indicates the project will improve the condition of Greater Sage-Grouse habitat within the proposed project analysis area or within	Completely revised – revised by rangewide.

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Law of 1872 [as amended], valid existing rights, etc.). Within designated utility corridors, the 3 percent disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that a net conservation gain to the species will be achieved. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location. An area with disturbance is not excluded from the 3 percent until it has been restored to provide GRSG habitat. The objective of successful restoration is to provide for the needs of GRSG, as evidenced by one of the following: • Vegetative cover is consistent with the GRSG habitat objectives and the ecological site description (Objective SSS-3), or • Monitoring indicates the area is regularly used by GRSG to sustain one or more seasonal habitat requirements (nesting, brood-rearing, winter). Final restoration success and approval for abandonment for disturbances will be subject to an interdisciplinary review of available monitoring data and final monitoring reports.	the PHMA in the population area where the project is located. Factors considered by the team will include Greater Sage-Grouse abundance and trends, movement patterns, habitat amount and quality, extent and alignment of project disturbance, location and density of existing disturbance, project design options and other biological factors. Such exceptions to the 3 percent disturbance cap may only be approved by the BLM Authorized Officer with the concurrence of the State Director. The finding and recommendation shall be made by the technical team, which should consist of, at least, a BLM field biologist, other local Greater Sage-Grouse experts, and biologists and other representatives from the appropriate State of Utah agency. Within designated utility corridors, the 3 percent disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that doing so will improve the condition of Greater Sage-Grouse habitat in comparison to siting a project outside the designated corridor. This exception is limited to projects which fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location. An area with disturbance within GRSG habitat is not excluded from the 3 percent cap until it provides GRSG habitat. The objective of successful restoration of disturbed GRSG seasonal habitats is to provide for the needs of GRSG, which could be evidenced by one of the following:	

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	• Vegetative cover is consistent with the GRSG habitat objectives and the ecological site description (Objective SSS-3), or • Monitoring indicates the area is regularly used by GRSG to sustain one or more seasonal habitat requirements (nesting, brood-rearing, winter). Include a schedule in project authorizations for monitoring the status of restoration efforts (e.g., areas of disturbance that meet the restoration criteria). Areas where disturbance would exceed 3 percent after project construction should include annual assessments to prioritize restoration efforts and determine what areas have been restored. Areas of PHMA that were not Greater Sage-Grouse habitat at project initiation would be excluded from the 3 percent cap calculation upon project completion and reclamation, as outlined in the applicable lease or permit. Final restoration success and approval for abandonment for disturbances will be subject to an interdisciplinary review of available monitoring data and final monitoring reports. Consider the likelihood of development of not-yet-constructed surface-disturbing activities—as defined in Table D.2 of the Monitoring Framework (Appendix D of the 2015 ROD/ Approved RMPA)—under valid existing rights prior to authorizing new projects in PHMA.	

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MA-SSS-3: C- Density of Energy/Mining Facilities Subject to applicable laws and regulations and valid existing rights, if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is collocated into an existing disturbed area (subject to applicable laws and regulations, such as the Mining Law of 1872 [as amended], valid existing rights, etc.). Energy and mining facilities to which this action applies are: • Oil and gas wells and development facilities, • Coal mines, • Wind towers, • Solar fields, • Geothermal wells/developments, and • Active locatable, leasable, and saleable developments.	**MA-SSS-3:** C- Density of Energy/Mining Facilities Subject to applicable laws, including the Mining Law of 1872, and applicable regulations, and valid existing rights , if the average density of one energy and mining facility per 640 acres (the density cap) is exceeded on all lands (regardless of land ownership) in PHMA within a proposed project analysis area, then no further disturbance from energy or mining facilities will be permitted by BLM: (1) until disturbance in the proposed project analysis area has been reduced to maintain the limit under the cap; or (2) unless the energy or mining facility is collocated into an existing disturbed area (subject to applicable laws and regulations, such as the Mining Law of 1872 [as amended], valid existing rights, etc.); however, the density cap may be exceeded if a project is on non-habitat (see MA-SSS-1 language related to placement of development in non-habitat portions of PHMA), or if the process identified in MA-SSS-3B determines the project will improve the condition of GRSG habitat at the proposed project analysis area or within the PHMA where the project is located through analysis of site-specific GRSG habitat and population information and project design elements. Energy and mining facilities to which this action applies are: • Oil and gas wells and development facilities, • Coal mines, • Wind towers, • Solar fields, • Geothermal wells/developments, and • Active locatable, leasable, and saleable developments.	No change (same as 2019).

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MA-SSS-3: D- Predation In PHMA, eliminate or minimize external food sources for corvids, particularly dumps, or waste transfer facilities. Apply best management practices (BMP) to development activities to reduce opportunities for GRSG predators (e.g., limiting food sources, nest/perches deterrents, and road kill). Apply habitat management practices (e.g. grazing management and vegetation treatments) that decrease the effectiveness of predators. Collaborate with applicable government entities to implement programs to control predator populations of GRSG (e.g., ravens, red fox, badgers, and raccoons).	**MA-SSS-3:** D- Predation In PHMA, eliminate or minimize external food sources for corvids, particularly dumps, or waste transfer facilities. Apply best management practices (BMP) to development activities to reduce opportunities for GRSG predators (e.g., limiting food sources, nest/perches deterrents, and road kill). Apply habitat management practices (e.g. grazing management and vegetation treatments) that decrease the effectiveness of predators. When conducting habitat treatments, remove trees that have corvid nests that could impact PHMA nesting and brood-rearing habitat when in compliance with the Migratory Bird Treaty Act (e.g., when the nest is unoccupied and outside of migratory bird nesting season). Efforts by other agencies to minimize impacts from predators on the GRSG should be supported and encouraged where needs have been documented. Collaborate with applicable government entities to implement programs to control predator populations of GRSG (e.g., ravens, red fox, badgers, and raccoons).	Completely revised – revised by rangewide.

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MA-SSS-3: E- Noise Restrictions: In PHMA, limit noise from discrete anthropogenic disturbances, whether during construction, operation, or maintenance, to not exceed 10 decibels above ambient sound levels (as available at the signing of the GRSG RMPA ROD or as first measured thereafter) at occupied leks from 2 hours before to 2 hours after official sunrise and sunset during breeding season (e.g., while males are strutting). Support the establishment of ambient baseline noise levels for PHMA habitat area leks. Limit project related noise in other PHMA habitats and seasons where it will be expected to reduce functionality of habitats that support associated GRSG populations. As additional research and information emerges, specific new limitations appropriate to the type of projects being considered will be evaluated and appropriate measures will be implemented where necessary to minimize potential for noise impacts on PHMA GRSG population behavioral cycles.	**MA-SSS-3:** E- Noise Restrictions: No changes made.	No change (same as 2015).
MA-SSS-3: F- Tall Structure Restrictions: In PHMA, limit the placement of permanent tall structures within GRSG breeding and nesting habitats. For the purposes of this restriction, a tall structure is any man-made structure that provides for perching/nesting opportunities for predators (e.g., raptors and ravens) that are naturally absent, or that decreases the use of an area by GRSG. A determination as to whether something is considered a tall structure will be made based on local conditions such as existing vegetation or topography.	**MA-SSS-3:** F- Tall Structure Restrictions: No changes made.	No change (same as 2015).

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MA-SSS-3: G- Seasonal Restrictions: In PHMA, in coordination with the appropriate State of Utah agency, apply seasonal restrictions during the period specified below to manage discretionary discrete anthropogenic disturbances and uses on public lands to prevent disturbance to GRSG populations and habitat during seasonal life cycle periods as follows: • In breeding (leks), nesting and early brood-rearing habitat from Feb 15 – Jun 15 • In brood rearing habitat from Apr 15 – Aug 15 • In winter habitat from Nov 15 – Mar 15 Specific time and distance determinations will be based on site-specific conditions and may be modified due to documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring and long and/or heavy winter) in order to better protect GRSG, in coordination with the appropriate State of Utah agency.	**MA-SSS-3:** G- Seasonal Restrictions: No changes made.	No change (same as 2015).
MA-SSS-3: H- Buffers: In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the US Geological Survey Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239; Manier et al. 2014) in accordance with Appendix B, Applying Lek-Buffer Distances.	**MA-SSS-3:** H- Buffers: In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will assess and address impacts within the lek buffer-distances identified in the US Geological Survey Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239; Manier et al. 2014) in accordance with Appendix B, Applying Lek-Buffer Distances.	No change (same as 2019).

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MA-SSS-3: I- Required Design Features/Best Management Practices: In PHMA, apply the RDFs from the applicable sections identified in Appendix C, Required Design Features, when authorizing/permitting site-specific activities/projects for wildland fire management actions, travel and transportation, lands and realty, fluid minerals, nonenergy leasable minerals, coal, mineral materials, and locatable minerals (consistent with applicable law). The applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some RDFs may not apply to some projects and/or may require slight variations. All variations in RDFs will require that at least one of the following be demonstrated in the NEPA analysis associated with the project/activity: • A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable; An alternative RDF, state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat; • A specific RDF will provide no additional protection to GRSG or its habitat.	**MA-SSS-3:** I- Required Design Features/Best Management Practices: No changes made.	No change (same as 2015)

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MA-SSS-4: In PHMA and in adjacent opportunity areas, maintain, improve and restore GRSG habitat to support GRSG populations and to maintain or enhance connectivity. Vegetation treatments will be applied to meet GRSG habitat objectives and provide additional GRSG habitat, unless there is a conflict with Utah prairie dog, where the landscape will be managed for both species. • PHMA boundaries may be adjusted to include additional restored GRSG habitat and habitat identified during survey or inventory work. Changes to maps and associated management will occur through the appropriate BLM planning processes (e.g., plan maintenance or plan amendment), as described in Appendix K.	No changes made.	No change (same as 2015).
MA-SSS-5: In GHMA, apply the following management to meet the objective of a net conservation gain for discretionary actions that can result in habitat loss and degradation:	No similar action.	Completely revised –See rows below.
MA-SSS-5: <u>A- Existing Management</u>: Implement GRSG management actions included in the existing RMPs and project-specific mitigation measures associated with existing decisions.	No similar action.	Completely revised – revised by statewide.

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MA-SSS-5: B- Net Conservation Gain: In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species, including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Exceptions to net conservation gain for GRSG may be made for vegetation treatments to benefit Utah prairie dog. Mitigation will be conducted according to the mitigation framework contained in Appendix F.	No similar action.	Completely revised – revised by rangewide and statewide.
MA-SSS-5: C- Buffers: In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the US Geological Survey Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239; Manier et al. 2014) in accordance with Appendix B.	No similar action.	Completely revised – revised by statewide (update to 2019 buffer appendix).
D- Required Design Features/Best Management In GHMA, apply the fluid mineral RDFs that are associated with GHMA identified in Appendix C when authorizing/permitting site-specific fluid mineral development activities/projects. The applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances,	No similar action.	Completely revised – revised by statewide (same as 2015).

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some RDFs may not apply to some projects and/or may require slight variations. All variations in RDFs will require that at least one of the following be demonstrated in the NEPA analysis associated with the project/activity: • A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable; • An alternative RDF, state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat; • A specific RDF will provide no additional protection to GRSG or its habitat.		
MA-SSS-6 <u>Sage-Grouse Management Outside PHMA/GHMA</u> Proposed projects within State of Utah Sage-Grouse Management Areas (SGMA) and USFWS priority areas for conservation (PAC), as well as adjacent to PHMA outside these areas, will consider impacts on GRSG and implement measures to mitigate impacts when preparing site-specific planning and environmental compliance documents. • Outside of PHMA, prior to site-specific authorizations, the BLM will evaluate habitat conditions and may require surveys to determine if the project area contains GRSG habitat (FLPMA, 43 United States Code (USC) 1701 Sec. 201 (a); BLM Manual 6840.04 D3; BLM-M-6840.04 E2).	**MA-SSS-6** <u>Sage-Grouse Management Outside PHMA</u> Outside PHMA, implement Greater Sage-Grouse management actions included in the RMPs and project-specific mitigation measures associated with decisions that pre-dated the 2015 amendments. Proposed projects within State of Utah Sage-Grouse Management Areas (SGMA) and USFWS priority areas for conservation (PAC), as well as adjacent to PHMA outside these areas, will consider impacts on GRSG and may implement measures to mitigate impacts on GRSG populations within adjacent PHMA when preparing site-specific planning and environmental compliance documents.	Partially revised – revised by state specific (See new actions in state specific tables – GHMA in UT).

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Surveys will be required prior to authorizing discrete anthropogenic disturbances within 4 miles of an occupied lek that is located in PHMA, but only in existing sagebrush. If an area is determined to be GRSG habitat (e.g., nesting, brood-rearing, winter, transition), mitigation will be considered as part of the project level NEPA analysis and will be attached as conditions of approval to new discretionary actions, if deemed necessary to protect the habitat (BLM Manual 6840.04 D 5). Measures that may be considered include those identified in Appendix C. Outside of PHMA, but within SGMAs and PACs, avoid removal of sagebrush and minimize development that creates a physical barrier to GRSG movement; these areas may be used by GRSG to connect to other populations or seasonal habitat areas. Exceptions shall be made for vegetation treatments to benefit Utah prairie dog, where the landscape will be managed for both species. Outside of PHMA, but within SGMAs and PACs, consider noise and permanent structure stipulations around leks. Outside PHMA, portions of State of Utah opportunity areas (see Final EIS Map 2.4) within 4 miles of a lek that is located in PHMA will be managed with the following allocations: • Fluid minerals will be open for leasing with CSU stipulations (noise and tall structures). • Lands ROWs, permits, and leases will be avoided, applying avoidance criteria for noise and tall structures. Do not site wind energy development in	Outside of PHMA, but within SGMAs and PACs, avoid removal of sagebrush and minimize development that creates a physical barrier to GRSG movement; these areas may be used by GRSG to connect to other populations or seasonal habitat areas. Exceptions shall be made for vegetation treatments to benefit Utah prairie dog, where the landscape will be managed for both species. Outside of PHMA, but within SGMAs and PACs, consider noise and permanent structure stipulations around leks. Outside PHMA, after analyzing the impacts using the buffer distances identified in Appendix B from a lek that is located in PHMA, portions of State of Utah opportunity areas will be managed with the following allocations: • Fluid minerals will be open for leasing with CSU stipulations (noise and tall structures). • Lands ROWs, permits, and leases will be avoided, applying avoidance criteria for noise and tall structures. Avoid siting wind energy development in opportunity areas within the buffer distances identified in Appendix B from occupied GRSG leks that are in PHMA, if the lek buffer analysis as identified in Appendix B shows that siting wind energy development in opportunities areas will impact lek persistence within PHMA. Outside of PHMA, avoid and minimize effects from discrete anthropogenic disturbances in areas that have been treated with the intent of improving or creating new GRSG habitat. Evaluate conditions in the treated area to determine if it is providing	

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opportunity areas within 5 miles from occupied GRSG leks that are in PHMA. Outside of PHMA, avoid and minimize effects from discrete anthropogenic disturbances in areas that have been treated with the intent of improving or creating new GRSG habitat. Evaluate conditions in the treated area to determine if it is providing habitat for GRSG and if additional measures are necessary to protect the habitat.	habitat for GRSG and if additional measures are necessary to protect the habitat. Outside of PHMA, provide that acres of GRSG seasonal habitat (based on best available maps, then confirmed to be regularly used by Greater Sage-Grouse to sustain one or more seasonal habitat requirements through coordination with the appropriate State of Utah agency and through on-the-ground information) that is lost to habitat degradation actions (Appendix C, Table C.2 of the 2015 ROD/Approved RMPA) are replaced by creating/improving Greater Sage-Grouse habitat within PHMA.	
MA-SSS-7 Adaptive Management This plan establishes soft and hard triggers for both GRSG populations and habitat. The specific triggers and additional detail on the management responses are identified in Appendix I, Adaptive Management. The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter. If monitoring indicates the soft-trigger is met, the BLM will determine if there is a specific cause or causes that are contributing to the decline. If it is determined that the decline is related to a natural population variation, no specific management actions will be required. However, if BLM management actions are determined to cause or contribute to the decline, the BLM manager will apply measures within their implementation-level discretion to mitigate the decline of populations and/or habitats to the area where the trigger has been met. These measures will apply more conservative or restrictive implementation conservation conditions, terms, or	**MA-SSS-7** Adaptive Management This plan establishes soft and hard triggers for both GRSG populations and habitat. The specific triggers and additional detail on the management responses are identified in Appendix I, Adaptive Management. The hard and soft trigger data will be analyzed annually. If monitoring indicates the soft-trigger is met, the BLM will review available and pertinent data, in coordination with GRSG biologists from multiple agencies including the appropriate State of Utah agency, USFS, USFWS, and/or NRCS, to determine the causal factor(s) for the declines within 6 months of identifying that a trigger has been met. If it is determined that the decline is related to a natural population variation, no specific management actions will be required; however, if BLM management actions are determined to cause or contribute to the decline, the BLM will work with the appropriate State of Utah agency and public land users to identify and apply management to slow down or stop the population decline. Such measures would be applied by the BLM manager within their implementation-	Completely revised – revised by rangewide.

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decisions within the agencies' discretion to mitigate the decline of populations and/or habitats. If monitoring indicates the hard trigger is met, a set of specific management actions from the BLM Proposed Plan will immediately be replaced with or adjusted by different management actions in the area where the trigger has been met. Table I.1 of Appendix I identifies the management actions from the BLM Proposed Plan, and the corresponding new management actions that will be immediately implemented to the specific area in the event a hard trigger is met. In addition to these specific changes, the BLM will review available and pertinent data for the area, in coordination GRSG biologists from multiple agencies including the appropriate State of Utah agency, USFWS, and NRCS, to determine the causal factor(s) and implement a corrective strategy. The final strategy associated with a hard trigger being met will be the changes identified in Table I.1 of Appendix I, and may also include the need to further amend or revise the RMP to address the situation and modify management accordingly, for the area where the trigger was met.	level discretion to mitigate the decline of populations and/or habitats to the area where the trigger has been met. These measures will apply more conservative or restrictive implementation conservation conditions, terms, or decisions within the agencies' discretion to mitigate the decline of populations and/or habitats. Such measures could also include other management actions which may require the need to amend the RMP to address the situation and modify management. If monitoring indicates the hard trigger is met, the BLM will review available and pertinent data, in coordination with GRSG biologists from multiple agencies including the appropriate State of Utah agency, USFS, USFWS, and/or NRCS, to determine the causal factor(s) for the declines. The BLM and the team will also identify measures needed to address the causal factor(s) and develop a corrective strategy for the area where the trigger has been met. The corrective strategy would include the applicable changes identified in Table I.1 of Appendix I that address the causal factor, and could also include other management actions, which may be require the need to amend the RMP to address the situation and modify management. If determining the causal factor and development of the corrective strategy is not completed within 6 months of documenting that the trigger has been met, all the plan level responses identified in Table I.1 will be applied until the causal factor analysis is complete. Upon completion of the causal factor analysis any responses that do not address the causal factor(s) would be removed. In developing a corrective strategy, managers may select changes in management that are identified in Table I.1, Specific Management Responses that have already been analyzed for implementation. This table also	

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
	identifies which decision from the BLM RMPA would be changed. The management identified in the corrective strategy would be implemented until ten-year population trends reflect natural fluctuations anticipated for the area. The BLM would determine the area reflects natural fluctuations in coordination with GRSG biologists from multiple agencies including Forest Service, UDWR, USFWS, and/or NRCS. Upon determination, the management would revert to the RMPA. If all the leks in an area that has met a hard trigger are not active for ten years, becoming unoccupied by definition, the PHMA designation and all its associated management would be removed since there is no longer a GRSG population for which management should be prioritized. For any area that has met a soft or hard trigger, the BLM, the appropriate State of Utah agency, and other members of the technical team will annually review monitoring data regarding population and habitat trends to verify that management actions implemented to mitigate declines are being successful. If monitoring indicates continued declines, the causal factor analysis will be reviewed, updated if needed, and applicable additional management would be identified and implemented.	

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
VEGETATION (VEG)	***VEGETATION (VEG)***	—
Objectives:	**Objectives:**	—
Objective VEG-1: In SFA and PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush cover or as consistent with specific ecological site conditions; exceptions to this objective shall be made where GRSG habitat and Utah prairie dog occur on the same landscape, which will be managed for both species. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).	**Objective VEG-1:** In PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush cover or as consistent with specific ecological site conditions; exceptions to this objective shall be made where GRSG habitat and Utah prairie dog occur on the same landscape, which will be managed for both species. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).	No change (same as 2019).
Management Actions (MA):	**Management Actions (MA):**	—
MA-VEG-1: In PHMA, where necessary to meet GRSG habitat objectives, treat areas to maintain and expand healthy GRSG habitat (e.g., conifer encroachment areas and annual grasslands). In PHMA, prioritize implementation of restoration/treatment projects based on environmental variables that improve chances for project success in areas most likely to benefit GRSG (e.g., proximity to existing GRSG populations, ecological site potential, and resistance and resilience), documented in Appendix H, Fire and Invasives Assessment Tool. In PHMA, prioritize restoration in seasonal habitats that are identified as the limiting factor for GRSG distribution and/or abundance. Apply seasonal restrictions to avoid treating areas during seasons of use, as needed, when implementing vegetation treatments (see MA-SSS-3G).	**MA-VEG-1**: In PHMA, where necessary to meet GRSG habitat objectives, treat areas to maintain and expand healthy GRSG habitat (e.g., conifer encroachment areas and invasive annual grasslands). In PHMA, prioritize implementation of restoration/treatment projects based on environmental variables that improve chances for project success in areas most likely to benefit GRSG (e.g., proximity to existing GRSG populations, ecological site potential, and resistance and resilience), documented in Appendix H, Fire and Invasives Assessment Tool. In PHMA, prioritize restoration in seasonal habitats that are identified as the limiting factor for GRSG distribution and/or abundance. Apply seasonal restrictions to avoid treating areas during seasons of use, as needed, when implementing vegetation treatments (see MA-SSS-3G).	No change (same as 2019).

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
In PHMA, avoid sagebrush reduction treatments within GRSG nesting and winter habitat unless the project plan and associated NEPA document demonstrate a biological need for the treatment to maintain or improve habitat for the GRSG population, or unless the treatment is for Utah prairie dog recovery where the needs of both species will be addressed on the landscape. Coordinate with the appropriate State of Utah agency and the USFWS prior to conducting sagebrush treatment projects within nesting and winter habitat. Use collaborative planning efforts to develop and implement habitat restoration projects. Expertise and ideas from entities such as local landowners, local GRSG working groups, and other federal, state, county, and private organizations shall be solicited and considered in development of restoration projects. In PHMA, implement project design features that will contribute to the most favorable conditions for success when planning and implementing restoration/vegetation treatment projects. Examples include, but are not limited to the following: • Review of available plant species and their adaptation to the site when developing seed mixes. • The need to reduce non-native annual grass densities and competition through herbicide, targeted grazing, tillage, etc. • Assessment of on-site vegetation to ascertain if enough desirable perennial vegetation exists to consider the use of passive restoration techniques.	In PHMA, avoid sagebrush reduction treatments within GRSG nesting and winter habitat unless the project plan and associated NEPA document demonstrate a biological need for the treatment to maintain or improve habitat for the GRSG population, or unless the treatment is for Utah prairie dog recovery where the needs of both species will be addressed on the landscape. Coordinate with the appropriate State of Utah agency and the USFWS prior to conducting sagebrush treatment projects within nesting and winter habitat. Use collaborative planning efforts to develop and implement habitat restoration projects. Expertise and ideas from entities such as local landowners, local GRSG working groups, and other federal, state, county, and private organizations shall be solicited and considered in development of restoration projects. In PHMA, implement project design features that will contribute to the most favorable conditions for success when planning and implementing restoration/vegetation treatment projects. Examples include, but are not limited to the following: • Review of available plant species and their adaptation to the site when developing seed mixes. • The need to reduce non-native annual grass densities and competition through herbicide, targeted grazing, tillage, etc. • Assessment of on-site vegetation to ascertain if enough desirable perennial vegetation exists to consider the use of passive restoration techniques.	

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
• Use of site preparation techniques that retain existing desirable vegetation. • Use of "mother plant" techniques or planting of satellite populations of desirable plants to serve as seed sources. • The need for post-treatment control of non-native annual grass and other invasive species. Upon completion of vegetation treatments, monitor and manage the project area to ensure long-term success, including persistence of seeded species and/or other treatment components, such as implementing maintenance treatments.	• Use of site preparation techniques that retain existing desirable vegetation. • Use of "mother plant" techniques or planting of satellite populations of desirable plants to serve as seed sources. • The need for post-treatment control of non-native annual grass and other invasive species. Upon completion of vegetation treatments, monitor and manage the project area to ensure long-term success, including persistence of seeded species and/or other treatment components, such as implementing maintenance treatments.	
MA-VEG-2: Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. When conducting conifer treatments: • Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase I or phase II. • Treat areas in late Phase II or Phase III condition to create movement corridors, connect habitats, or to break up continuous, hazardous fuels and reduce the potential for catastrophic fire. • Prioritize methods to reduce conifer canopy cover to those that maintain the understory vegetation as the preferred treatment methods (e.g., mechanical, lop and scatter). • Require that vegetation treatments conducted within 0.6 miles of a lek include an objective of reducing conifer, where technically feasible, to less than 5 percent canopy cover, with preference for complete removal.	**MA-VEG-2:** Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal cultural values. When conducting conifer treatments: • Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where juniper encroachment is phase I or phase II. • Treat areas in late Phase II or Phase III condition to create movement corridors, connect habitats, or to break up continuous, hazardous fuels and reduce the potential for catastrophic fire. • Prioritize methods to reduce conifer canopy cover to those that maintain the understory vegetation as the preferred treatment methods (e.g., mechanical, lop and scatter). • When conducting habitat treatments, remove trees that have corvid nests that could impact PHMA nesting and brood-rearing habitat when in compliance with the Migratory Bird Treaty Act (e.g., when the nest is unoccupied and outside of	No change (same as 2019).

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
• Include stipulations to avoid removing old-growth pinyon/juniper stands (e.g., Tausch et al. 2009; Miller et al. 1999). Use of site-specific analysis and tools like the Vegetation Dynamics Development Tool and the fire and invasives assessment tool report (Chambers et al. 2014) will help refine the location for specific areas to be treated.	migratory bird nesting season). • Require that vegetation treatments conducted within 0.6 miles of a lek include an objective of reducing conifer, where technically feasible, to less than 5 percent canopy cover, with preference for complete removal. • Include stipulations to avoid removing old-growth pinyon/juniper stands (e.g., Tausch et al. 2009; Miller et al. 1999). Use of site-specific analysis and tools like the Vegetation Dynamics Development Tool and the fire and invasives assessment tool report (Chambers et al. 2014) will help refine the location for specific areas to be treated.	
MA-VEG-3: In PHMA manage wet meadows to maintain a component of perennial forbs with diverse species richness relative to site potential (e.g., reference state) to facilitate brood rearing. Also conserve or enhance these wet meadow complexes to maintain or increase amount of edge and cover within that edge.	**MA-VEG-3:** In PHMA manage riparian areas for proper functioning condition. In PHMA manage wet meadows to maintain a component of perennial forbs with diverse species richness relative to site potential (e.g., reference state) to facilitate brood rearing. Also conserve or enhance these wet meadow complexes to maintain or increase amount of edge and cover within that edge.	No change (same as 2019).

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MA-VEG-4: In PHMA, include GRSG habitat objectives in restoration/treatment projects. Include short-term and long-term habitat conditions in treatment objectives, including specific objectives for the establishment of sagebrush cover and height, as well as cover and heights for understory perennial grasses and forbs necessary for GRSG seasonal habitats (see Objective SSS-3). Make meeting the GRSG objectives for the restoration/treatment project one of the primary priorities for the project and subsequent land uses, recognizing that managing for other special status species may result in treatment objectives that may not meet GRSG seasonal habitat objectives (e.g., winter habitat cover requirements versus creation of Utah prairie dog habitat). Where GRSG habitat overlaps with that of federally listed threatened or endangered species (e.g., Utah prairie dogs), coordinate with species-specific experts to develop conservation and recovery objectives and allow habitat treatments that will benefit both species.	No changes made.	No change (same as 2015).
MA-VEG-5: In PHMA, prioritize the use of native seeds for restoration based on availability, adaptation (ecological site potential), and probability of success. Where probability of success or adapted seed availability is low, desirable non-native seeds may be used as long as they support GRSG habitat objectives. Re-establishment of appropriate sagebrush species/subspecies and important understory plants, relative to site potential, should be the principle objective for rehabilitation efforts.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MA-VEG-6: In PHMA, design post restoration management to ensure long term persistence. This could include changes in livestock grazing management, wild horse and burro management and travel management, etc., to achieve and maintain the desired condition of the restoration effort that benefits GRSG, as well as monitoring and maintaining the treated area.	No changes made.	No change (same as 2015).
MA-VEG-7: In PHMA, limit commercial seed or live plant collection to levels that ensure long-term maintenance of the GRSG habitat objectives. Locations, species allowed for collection, and limits on the amounts to be collected will be developed on a case-by-case basis following environmental review of annual site-specific conditions. Commercial collection during sensitive seasonal periods (see MA-SSS-3G) will include mitigation, developed to reflect the site-specific conditions on the ground, that could include, but is not necessarily limited to, restrictions on the timing and method of collection activities, limiting the number of individuals collecting, providing portions of collected seeds for use in local restoration projects, etc.	No changes made.	No change (same as 2015).
MA-VEG-8: In PHMA, allow for seed collection and use in restoration/reclamation activities. Prioritize use of seed from areas as close as possible to where the seed will be used to capture local adaptations.	No changes made.	No change (same as 2015).
MA-VEG-9: In PHMA, diversify the perennial grass and forb components through additional seeding in areas where historical seedings (e.g., crested wheatgrass) have been recolonized by sagebrush.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MA-VEG-10: Follow the applicable and technically feasible RDFs in Appendix C for vegetation projects/activities (fuels management) at the site-level unless at least one of the following can be demonstrated in the NEPA analyses associated with the project/activity: • A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity; • An alternative RDF, state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat; • A specific RDF will provide no additional protection to GRSG or its habitat.	• No changes made.	No change (same as 2015).
MA-VEG-11: In PHMA, design post Emergency Stabilization and Rehabilitation/Burn Area Emergency Rehabilitation management to ensure long term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse and burro, and travel management, etc., to achieve and maintain the desired condition of Emergency Stabilization and Rehabilitation projects to benefit GRSG (Eiswerth and Shonkwiler 2006). Monitor and control invasive vegetation post-wildfire for at least 3 years.	No changes made.	No change (same as 2015).
<u>Integrated Invasive Species Management</u> **MA-VEG-12**: In PHMA, integrated Vegetation Management will be used to control, suppress, and eradicate noxious and invasive species per BLM Handbook H-1740-2.	No changes made.	No change (same as 2015).
MA-VEG-13: In PHMA, treatments of Mormon cricket outbreaks will be collaborated with partners at the federal, state, and local levels to maintain and enhance GRSG habitats.	No changes made.	No change (same as 2015).

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MA-VEG-14: Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species.	No changes made.	No change (same as 2015).
FIRE AND FUELS MANAGEMENT (FIRE)	***FIRE AND FUELS MANAGEMENT (FIRE)***	—
Management Actions (MA):	**Management Actions (MA):**	—
MA-FIRE-1: In collaboration with the USFWS and relevant state agencies, complete and maintain GRSG Landscape Wildland Fire and Invasive Species Habitat Assessments to prioritize at risk habitats, and identify fuels management, preparedness, suppression and restoration priorities necessary to maintain sagebrush habitat to support interconnecting GRSG populations. These assessments and subsequent assessment updates will also be a collaborative effort to take into account other GRSG priorities identified in this plan. Appendix H describes a minimal framework example and suggested approach for this assessment. Implementation actions will be tiered to the local GRSG Landscape Wildland Fire and Invasive Species Assessment, using best available science related to the conservation of GRSG. In collaboration with USFWS and relevant state agencies, BLM planning units will identify annual treatment needs for wildfire and invasive species management as identified in local unit level Landscape Wildfire and Invasive Species Assessments. Annual treatment needs will be coordinated across state/regional scales and across jurisdictional boundaries for long-term conservation of GRSG. Annually complete a review of landscape assessment implementation efforts with appropriate USFWS and state agency personnel.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Fuels Management **MA-FIRE-2**: Follow the applicable and technically feasible RDFs in Appendix C for fuels management at the site-level unless at least one of the following can be demonstrated in the NEPA analyses associated with the project/activity: • A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity; • An alternative RDF, state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat; • A specific RDF will provide no additional protection to GRSG or its habitat.	No changes made.	No change (same as 2015).
MA-FIRE-3: In PHMA, fuel treatments will be designed through an interdisciplinary process to expand, enhance, maintain, or protect GRSG habitat. • In collaboration with USFWS and relevant state agencies, BLM planning units with large blocks of GRSG habitat will develop, using the assessment process described in Appendix H, a fuels management strategy which considers an up-to-date fuels profile, land use plan direction, current and potential habitat fragmentation, sagebrush and GRSG ecological factors, and active vegetation management steps to provide critical breaks in fuel continuity, where appropriate. When developing this strategy, planning units will consider the risk of increased habitat fragmentation from a proposed action versus the risk of large scale fragmentation	**MA-FIRE-3:** In PHMA, fuel treatments will be designed through an interdisciplinary process to expand, enhance, maintain, or protect GRSG habitat. • In collaboration with USFWS and relevant state agencies, BLM planning units with large blocks of GRSG habitat will develop, using the assessment process described in Appendix H, a fuels management strategy which considers an up-to-date fuels profile, land use plan direction, current and potential habitat fragmentation, sagebrush and GRSG ecological factors, and active vegetation management steps to provide critical breaks in fuel continuity, where appropriate. When developing this strategy, planning units will consider the risk of increased habitat fragmentation from a proposed action versus the risk of large scale	No change (same as 2019).

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posed by wildfires if the action is not taken. • Use green strips and/or fuel breaks to protect GRSG habitat from fire events. • When possible, locate fuel breaks along existing roads, ROWs, and other suitable topographic or natural features (e.g., areas devoid of vegetation, rock outcrops). • Avoid constructing fuel breaks through large areas of intact GRSG habitat, unless the associated NEPA document demonstrates a biological need for the fuel break to maintain or protect habitat for the GRSG population. Coordinate with the appropriate State of Utah agency and the USFWS prior to constructing fuel breaks within nesting and winter habitat. • Using an interdisciplinary approach, a full range of fuel reduction techniques will be available. Fuel reduction techniques such as conifer reduction, grazing, prescribed fire, chemical, biological, and mechanical treatments may be acceptable, given site-specific variables. • Remove encroaching conifer stands as a fuels management tool, where environmental review documents it protects or improves GRSG habitat. • Prioritize the use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. Where probability of success for native seed availability is low, desirable non-native seeds may be used to meet GRSG habitat objectives to trend toward restoring the fire regime. When reseeding, use fire resistant native	fragmentation posed by wildfires if the action is not taken. • Use green strips and/or fuel breaks to protect GRSG habitat from fire events. • When possible, locate fuel breaks along existing roads, ROWs, and other suitable topographic or natural features (e.g., areas devoid of vegetation, rock outcrops). • Avoid constructing fuel breaks through large areas of intact GRSG habitat, unless the associated NEPA document demonstrates a biological need for the fuel break to maintain or protect habitat for the GRSG population. Coordinate with the appropriate State of Utah agency and the USFWS prior to constructing fuel breaks within nesting and winter habitat. • Using an interdisciplinary approach, a full range of fuel reduction techniques will be available. Fuel reduction techniques such as conifer reduction, targeted livestock grazing, prescribed fire, chemical, biological, and mechanical treatments may be acceptable, given site-specific variables. • Remove encroaching conifer stands as a fuels management tool, where environmental review documents it protects or improves GRSG habitat. • Prioritize the use of native seeds for fuels management treatment based on availability, adaptation (site potential), and probability of success. Where probability of success for native seed availability is low, desirable non-native seeds may be used to meet GRSG habitat objectives to trend toward restoring the fire regime.	

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
and desirable non-native species, as appropriate, to provide for fire breaks. • Upon project completion, monitor and manage fuels projects to ensure long-term success, including persistence of seeded species and/or other treatment components, such as implementing maintenance actions. Control invasive vegetation post-treatment. • Apply seasonal restrictions, as needed, for implementing fuels management treatments according to the type of seasonal habitats present (see MA-SSS-3G). In PHMA, avoid sagebrush reduction fuels treatments within GRSG nesting and winter habitat unless the project plan and associated NEPA document demonstrate a biological need for the treatment to maintain or improve habitat for the GRSG population, or unless the treatment is for Utah prairie dog recovery where the needs of both species will be addressed on the landscape. Treatments in winter habitat should be designed to maintain sagebrush, especially tall sagebrush (sagebrush capable of standing above heavier than normal snowfall), which will be available to GRSG above snow during a severe winter, considering the needs of Utah prairie dog recovery. Prior to conducting fuels treatments in winter habitat, coordinate with the appropriate State of Utah agency and the USFWS to design the treatment to strategically reduce wildfire risk around or in the winter habitat.	When reseeding, use fire resistant native and desirable non-native species, as appropriate, to provide for fire breaks. • Upon project completion, monitor and manage fuels projects to ensure long-term success, including persistence of seeded species and/or other treatment components, such as implementing maintenance actions. Control invasive vegetation post-treatment. • Apply seasonal restrictions, as needed, for implementing fuels management treatments according to the type of seasonal habitats present (see MA-SSS-3G). In PHMA, avoid sagebrush reduction fuels treatments within GRSG nesting and winter habitat unless the project plan and associated NEPA document demonstrate a biological need for the treatment to maintain or improve habitat for the GRSG population, or unless the treatment is for Utah prairie dog recovery where the needs of both species will be addressed on the landscape. Treatments in winter habitat should be designed to maintain sagebrush, especially tall sagebrush (sagebrush capable of standing above heavier than normal snowfall), which will be available to GRSG above snow during a severe winter, considering the needs of Utah prairie dog recovery. Prior to conducting fuels treatments in winter habitat, coordinate with the appropriate State of Utah agency and the USFWS to design the treatment to strategically reduce wildfire risk around or in the winter habitat.	

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MA-FIRE-4: If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address: • why alternative techniques were not selected as a viable options; • how GRSG goals and objectives will be met by its use; • how the COT Report objectives will be addressed and met; • a risk assessment to address how potential threats to GRSG habitat will be minimized. Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire may be used to meet specific fuels objectives that will protect GRSG habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities), as well as managing the landscape for GRSG in concert with Utah prairie dog. Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.	No changes made.	No change (same as 2015).

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MA-FIRE-5: In PHMA, during fuels management project design, consider the use of targeted livestock grazing to strategically reduce fine fuels and, if used, implement grazing management that will accomplish this objective. If implementing targeted grazing, implement measures to minimize impacts on native perennial grasses.	No similar action.	No change (same as 2015).
Pre-Suppression **MA-FIRE-6**: Follow the applicable and technically feasible RDFs in Appendix C for fire and fuels management at the site-level unless at least one of the following can be demonstrated in the NEPA analyses associated with the project/activity: • A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity; • An alternative RDF, state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat; • A specific RDF will provide no additional protection to GRSG or its habitat. Implement a coordinated inter-agency approach to fire restrictions based upon National Fire Danger Rating System thresholds (fuel conditions, drought conditions and predicted weather patterns) for GRSG habitat. Develop wildfire prevention plans that explain the resource value of GRSG habitat and include fire prevention messages and actions to reduce human-caused ignitions.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Suppression **MA-FIRE-7:** Follow the applicable and technically feasible RDFs in Appendix C for fire and fuels management at the site-level unless at least one of the following can be demonstrated in the NEPA analyses associated with the project/activity: • A RDF is documented to not be applicable to the site-specific conditions of the project/activity; • An alternative RDF, state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat; A specific RDF will provide no additional protection to GRSG or its habitat.	No changes made.	No change (same as 2015).
MA-FIRE-8: The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. GRSG habitat in PHMA will be prioritized commensurate with property values and other critical habitat to be protected, with the goal to restore, enhance, and maintain areas suitable for GRSG across the range of GRSG habitat consistent with LUP direction. PHMA will be viewed as more valuable than GHMA when priorities are established. When suppression resources are widely available, maximum efforts will be placed on limiting fire growth in GHMA polygons as well. These priority areas will be further refined following completion of the GRSG Landscape Wildland Fire Invasive Species Habitat Assessments described in Appendix H.	**MA-FIRE-8**: The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. GRSG habitat in PHMA will be prioritized commensurate with property values and other critical habitat to be protected, with the goal to restore, enhance, and maintain areas suitable for GRSG across the range of GRSG habitat consistent with LUP direction. PHMA will be viewed as more valuable than non-PHMA when priorities are established. When suppression resources are widely available, maximum efforts will be placed on limiting fire growth outside and adjacent to PHMA polygons as well. These priority areas will be further refined following completion of the GRSG Landscape Wildland Fire Invasive Species Habitat	Partially revised – revised to state specific.

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In GHMA or areas where treatment/seeding has occurred to improve habitat, prioritize suppression where wildfires threaten adjacent PHMA.	Assessments described in Appendix H. Outside PHMA or areas where treatment/seeding has occurred to improve habitat, prioritize suppression where wildfires threaten adjacent PHMA.	
MA-FIRE-9: Within acceptable risk levels use a full range of fire management strategies and tactics, including the management of wildfires to achieve resource objectives, across the range of GRSG habitat consistent with LUP direction. In PHMA, burnout operations areas should be avoided by constructing direct fire lines, whenever safe and practical to do so.	No changes made.	No change (same as 2015).
LIVESTOCK GRAZING/RANGE MANAGEMENT (LG)	***LIVESTOCK GRAZING/RANGE MANAGEMENT (LG)***	—
Management Actions (MA):	**Management Actions (MA):**	—
MA-LG-1: PHMA and GHMA will be available for livestock grazing (Figure 2-3, Livestock Grazing [Appendix A]). Active animal unit months (AUMs) for livestock grazing will be 329,521 on BLM lands. Make adjustments to permitted AUMs consistent with regulation and the remaining grazing direction. In addition, on an annual basis livestock numbers and the season of use can be adjusted within the terms and conditions of the permit. Make adjustments to permitted use and annual adjustments to levels of livestock use consistent with regulation and the direction identified below where livestock grazing is identified as a causal factor to not meeting standards or habitat objectives.	No similar action. [Meaning the presence of GRSG habitat management areas does not affect the determination of whether or not an area is available for livestock grazing or the active AUMs.]	Completely revised – revised by rangewide.

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MA-LG-2: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in SFA first followed by PHMA outside SFA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (ex., fire) and legal obligations.	No similar action.	Completely revised – revised by rangewide.
MA-LG-3: In PHMA, consult, cooperate, and collaborate with other land owners and management agencies (e.g., private and SITLA) to develop plans which provide for landscape level approaches to habitat improvement. Manage unfenced private and SITLA lands within a grazing allotment that are under exchange of use agreements or percent public land use as a single unit that will have the same management as the public lands.	No similar action.	Completely revised – revised by rangewide.
MA-LG-4: Evaluate Utah's Rangeland Health Standards and process grazing permits. Focus monitoring and management activities on allotments found not to be achieving Utah's Rangeland Health Standards where livestock grazing is identified as a causal factor and that have the best opportunities for conserving, enhancing or restoring habitat for GRSG. • Use ecological site descriptions and/or other appropriate information to determine the desired plant community within proper functioning ecological processes for conducting land health assessments to evaluate the achievement or non-achievement of rangeland health standards.	No similar action.	Completely revised – revised by rangewide.

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MA-LG-5: In PHMA and GHMA, conduct land health assessments that include indicators and measurements of structure, condition, composition, etc., of vegetation specific to achieving GRSG habitat objectives (Objective SSS-3), including within wetlands and riparian areas. Prioritize land health assessments in SFA, followed by PHMA outside of the SFA. Conduct land health assessments at the watershed scale and use the GRSG habitat objectives when assessing the applicable standard in GRSG habitats.	No similar action.	Completely revised – revised by rangewide.
MA-LG-6: In PHMA, when livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperating and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications include, but are not limited to, changes in: • Season or timing of use; • Numbers of livestock; • Distribution of livestock use; • Duration and/or level of use; • Kind of livestock (e.g., cattle, sheep, horses, or goats); and • Grazing schedules (including rest or deferment). *Not in priority order The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMA will include specific management thresholds based on **Table 2**, Land Health Standards (43 CFR, Part 4180.2), and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have	**MA-LG-6:** In PHMA, when an area is not meeting or making progress towards achievable habitat objectives and Land Health Standards, and the causal factor is livestock grazing (i.e., improper livestock grazing), implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications include, but are not limited to, changes in: • Season or timing of use; • Numbers of livestock; • Distribution of livestock use; • Duration and/or level of use; • Kind of livestock (e.g., cattle, sheep, horses, or goats); and • Grazing schedules (including rest or deferment). *Not in priority order When improper livestock grazing is the causal factor for not meeting or making progress towards achievable habitat objectives and Land Health Standards, the NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will analyze multiple potential modifications (e.g., alternatives from the list above) that address the reasons for not meeting,	Completely revised – revised by rangewide.

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
already been subjected to NEPA analysis. Adjustments to meet seasonal GRSG habitat requirements could include those items identified in the list above.	allowing the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. Adjustments to meet seasonal GRSG habitat requirements could include those items identified in the list above.	
MA-LG-7: In PHMA, during drought periods, prioritize evaluating effects of the drought relative to GRSG needs for food and cover. Initiate emergency management measures (e.g. delaying turnout, adjusting the amount and/or duration of livestock grazing, implement other terms of the permit) during times of drought to protect GRSG habitat, in accordance with Instruction Memorandum 2013-094 (Resource Management During Drought), or other agency policies. Implement post-drought management to allow for vegetation recovery that meets GRSG needs.	No similar action.	Completely revised – revised by rangewide.
MA-LG-8: In PHMA, manage riparian areas and wet meadows for proper functioning condition.	No similar action.	Completely revised – revised by rangewide.
MA-LG-9: In PHMA, assess livestock grazing in riparian and meadow complexes and ensure recovery or maintenance of appropriate vegetation and water quality. Where recovery or maintenance is not occurring and the causal factor is livestock grazing, reduce pressure on riparian or wet meadow vegetation used by GRSG in the summer by adjusting grazing management practices (e.g., use fencing/herding techniques, or changes in seasonal use or livestock distribution). Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.	No similar action.	Completely revised – revised by rangewide.

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MA-LG-10: In PHMA, limit authorization of new water developments to projects that have a neutral effect or are beneficial to GRSG habitat (such as by shifting livestock use away from critical areas). New developments that divert surface water must be designed to maintain riparian or wet meadow vegetation and hydrology to meet GRSG needs.	**MA-LG-10:** In PHMA, manage existing and new water developments to have a neutral or beneficial effect to GRSG habitat.	Completely revised – revised by rangewide.
MA-LG-11: In PHMA, evaluate existing water developments (springs, seeps, etc., and their associated pipelines) to determine if modifications are necessary to maintain or improve riparian areas and GRSG habitat. Make modifications where necessary, considering impacts on other water uses when such considerations are neutral or beneficial to GRSG.	No similar action.	Completely revised – revised by rangewide.
MA-LG-12: In PHMA, ensure that vegetation treatments conserve, enhance or restore GRSG habitat (this includes treatments that benefit livestock).	No similar action.	Completely revised – revised by rangewide.
MA-LG-13: In PHMA, evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If existing seedings provide value in conserving or enhancing GRSG habitats, then no restoration will be necessary. Assess the compatibility of these seedings for GRSG habitat during the land health assessments.	No similar action.	Completely revised – revised by rangewide.

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MA-LG-14: In PHMA, design new structural range improvements to have a neutral effect or conserve, enhance, or restore GRSG habitat through an improved grazing management system relative to GRSG objectives. Structural range improvements, in this context, include but are not limited to: cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. Potential for invasive species establishment or increase following construction must be considered in the project planning process and monitored and treated post-construction.	No similar action.	Completely revised – revised by rangewide.
MA-LG-15: In PHMA, evaluate existing structural range improvements to make sure they have a neutral effect or conserve, enhance or restore GRSG habitat.	No similar action.	Completely revised – revised by rangewide.
MA-LG-16: To reduce outright GRSG strikes and mortality, remove, modify or mark fences in high risk areas (Stevens et al. 2012) based on proximity to lek (e.g., within 1.2 miles of a lek), lek size, and topography, or as latest science indicates. Prioritize actions in SFA first, then PHMA. Employ NRCS fence collision risk tool (NRCS/CEAP Conservation Insight Publication "Applying the Sage Grouse Fence Collision Risk Tool to Reduce Bird Strikes").	**MA-LG-16:** To reduce outright GRSG strikes and mortality, remove, modify or mark fences in high risk areas (Stevens et al. 2012) based on proximity to lek (e.g., within 1.2 miles of a lek), lek size, and topography, or as latest science indicates. Employ NRCS fence collision risk tool (NRCS/CEAP Conservation Insight Publication "Applying the Sage Grouse Fence Collision Risk Tool to Reduce Bird Strikes").	Completely revised – revised by rangewide.
MA-LG-17: In PHMA, monitor for and treat noxious weeds and treat invasive species where needed, associated with existing range improvements.	No similar action.	Completely revised – revised by rangewide.

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MA-LG-18: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3.	No similar action.	Completely revised – revised by rangewide.
WILD HORSES AND BURROS (WHB)	***WILD HORSES AND BURROS (WHB)***	—
Management Actions (MA):	**Management Actions (MA):**	—
MA-WHB-1: Manage HMAs in GRSG habitat within established appropriate management level ranges to achieve and maintain GRSG habitat objectives (Objective SSS-3).	No changes made.	Completely revised – revised by rangewide.
MA-WHB-2: Complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g. range, wildlife, and riparian). The priorities for conducting assessments are: 1. HMAs containing PHMA; 2. HMAs containing only GHMA; 3. HMAs containing sagebrush habitat outside of PHMA and GHMA mapped habitat; and HMAs without GRSG habitat.	**MA-WHB-2:** Complete rangeland health assessments for HMAs containing GRSG habitat using an interdisciplinary team of specialists (e.g. range, wildlife, and riparian). The priorities for conducting assessments are: 1. HMAs containing PHMA; 2. HMAs containing sagebrush habitat outside of PHMA mapped habitat; and HMAs without GRSG habitat.	Partially revised – refer to state specific (WHB 2015 GHMA).
MA-WHB-3: Prioritize gathers and population growth suppression techniques in HMAs in GRSG habitat, unless removals are necessary in other areas to address higher priority environmental issues, including herd health impacts.	No changes made.	Completely revised – revised by rangewide.
MA-WHB-4: In PHMA, assess and adjust appropriate management levels through the NEPA process within HMAs when wild horses or burros are identified as a significant causal factor in not meeting land health standards, even if current appropriate management levels are not being exceeded.	No changes made.	Completely revised – revised by rangewide.

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MA-WHB-5: In PHMA, monitor the effects of WHB use in relation to GRSG seasonal habitat objectives on an annual basis to help determine future management actions.	No changes made.	No change (same as 2015).
MA-WHB-6: Develop or amend herd management plans to incorporate GRSG habitat objectives and management considerations for all HMAs within GRSG habitat, with an emphasis placed on PHMA.	No changes made.	No change (same as 2015).
MA-WHB-7: Consider removals or exclusion of wild horses/burros during or immediately following emergency situations (such as fire, floods, and drought) to facilitate meeting GRSG habitat objectives where HMAs overlap with GRSG habitat.	No changes made.	No change (same as 2015).
MA-WHB-8: When conducting NEPA analysis for wild horse/burro management activities, water developments, or other rangeland improvements for wild horses, address the direct and indirect effect on GRSG populations and habitat. Implement any water developments or rangeland improvements using the criteria identified for domestic livestock.	No changes made.	No change (same as 2015).
MA-WHB-9: Coordinate with professionals from other federal and state agencies, researchers at universities, and others to utilize and evaluate new management tools (e.g., population growth suppression, inventory techniques, and telemetry) for implementing the wild horse and burro program.	No changes made.	No change (same as 2015).

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MINERALS RESOURCES (MR)	***MINERALS RESOURCES (MR)***	—
Management Actions (MA):	**Management Actions (MA):**	—
MA-MR-1: Allow exploration for all minerals (e.g., geophysical, trenching, drilling, etc.) within mapped occupied GRSG habitat areas that are not closed to leasing, permitting, etc., to obtain exploratory information. In areas where leasing, permitting, etc. is still available, minerals exploration shall be subject to the pertinent management for discretionary activities in PHMA (MA-SSS-3) and GHMA (MA-SSS-5).	No changes made.	No change (same as 2015).
Fluid Minerals	***Fluid Minerals***	—
Objectives:	**Objectives:**	—
Objective MR-1: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 USC 226(p) and 43 CFR, Part 3162.3-1(h).	No similar objective.	Completely revised – revised by rangewide.

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Objective MR-2: Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, minimize, and compensate for adverse impacts on the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an application for permit to drill for the lease to avoid, minimize, and compensate for impacts on GRSG or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such federal leases.	No changes made.	Completely revised – revised by rangewide.
Management Actions (MA):	**Management Actions (MA):**	—
MA-MR-2: Manage fluid mineral leasing in PHMA as follows (Figure 2-4, Fluid Minerals [Oil and Gas] [Appendix A]) (Appendix G, Stipulations Associated with Fluid Mineral Leasing): • open to leasing, subject to standard stipulations: 0 acres • open to leasing, subject to CSU and/or TL stipulations: 23,600 acres • open to leasing, subject to NSO stipulations: 3,229,600 acres closed to leasing: 111,900 acres	No changes made.	Partially revised -revised by editorial updates to acres.
Unleased Federal Fluid Mineral Estate	***Unleased Federal Fluid Mineral Estate***	—
MA-MR-3: <u>Unleased Areas within PHMA</u> PHMA will be designated as open to leasing fluid minerals, subject to NSO stipulations. In SFA, there will be no waivers, exceptions, or modifications. In the remainder of PHMA, no waivers or modifications to a fluid mineral lease NSO stipulation will be granted. The Authorized Officer may grant an exception to a fluid mineral	**MA-MR-3:** <u>Unleased Areas within PHMA</u> PHMA will be designated as open to leasing fluid minerals, subject to NSO stipulations. Within PHMA, the Authorized Officer may grant an exception to a fluid mineral lease NSO stipulation where the proposed action: • Occurs in non-habitat that does not provide important connectivity between	Completely revised -revised by rangewide.

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lease no-surface-occupancy stipulation only where the proposed action: • Would not have direct, indirect, or cumulative effects on GRSG or its habitat; or, • Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to GRSG. Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid federal fluid mineral lease existing as of the date of this Approved RMPA. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception	habitat areas and the development would not cause indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function of providing the life-history or behavioral needs of the Greater Sage-Grouse population due to project design (e.g., minimize sound, preclude tall structures, require perch deterrents), as demonstrated in the project's NEPA document; or • Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and development on the parcel in question would have less of an impact on Greater Sage-Grouse or its habitat than on the nearby parcel; this exception must also include measures sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. The BLM Authorized Officer may grant a modification to a fluid mineral lease no surface occupancy stipulation only where an exception is granted, as described above, for the primary disturbance (e.g., well pad, compressor station). A modification to the no surface occupancy stipulation could be considered for the associated infrastructure related to the development that are not individually precluded by other Greater Sage-Grouse actions (e.g., roads, pipelines, power lines). While the no surface occupancy stipulation could be modified for this infrastructure, it must still comply with other Greater Sage-Grouse management contained in MA-SSS-3.	

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will not be granted. Approved exceptions will be made publically available at least quarterly. In addition, any lease activities will apply the pertinent management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs). Outside PHMA, portions of opportunity areas within 4 miles of a lek that is located in PHMA will be open for leasing with CSU stipulations (avoiding noise and tall structures that could affect adjacent GRSG use of PHMA).	The BLM Authorized Officer may grant a waiver to a fluid mineral lease no surface occupancy stipulation if, through the appropriate planning process (i.e., plan maintenance, amendment) the area is no longer within PHMA. Approved exceptions will be made publicly available at least quarterly. In addition, any lease activities will apply the pertinent management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, seasonal restrictions, and RDFs), including if an exception to the NSO is granted. Outside PHMA, portions of opportunity areas within the buffer distances identified in Appendix B of a lek that is located in PHMA will be open for leasing with CSU stipulations (avoiding noise and tall structures that could affect adjacent GRSG use of PHMA).	
MA-MR-4: <u>Unleased Areas within GHMA</u> Manage fluid mineral leasing in GHMA as follows (Figure 2-4): • open to leasing, subject to standard stipulations: 238,700 acres • open to leasing, subject to CSU and/or TL stipulations: 294,200 acres • open to leasing, subject to NSO stipulations: 32,700 acres • closed to leasing: 28,400 acres • planning decision not mapped: 133,400 acres In GHMA, new development of fluid mineral leases could be considered if they apply the pertinent management for discretionary activities in GHMA identified in MA-SSS-5.	No similar action.	Partially revised - Revised by updating acres, adding new rangewide WEMs to existing GHMA allocations.

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Leased Federal Fluid Mineral Estate	***Leased Federal Fluid Mineral Estate***	—
MA-MR-5: Apply the following conservation measures through implementation decisions (e.g., approval of an application for permit to drill, geothermal drilling permit, Sundry Notice, Master Development Plans, etc.) and upon completion of the environmental record of review (43 CFR, Part 3162.5). In this process, evaluate whether the conservation measures are "reasonable" (43 CFR, Part 3101.1-2) with the valid existing rights.	No changes made.	Completely revised -revised by rangewide.
MA-MR-6: In PHMA, avoid, minimize, and compensate for impacts on GRSG and their habitat (e.g., habitat loss, fragmentation, indirect impacts, etc.) from new oil and gas development on existing leases. Where possible, place development outside of PHMA. If it is determined that this restriction renders the recovery of fluid minerals infeasible or uneconomic, considering the lease as a whole, or where development of existing leases requires that disturbance density exceeds 1 per 640, and/or 3 percent disturbance cap, apply other measures to site proposed lease activities to meet GRSG habitat objectives and require mitigation as described in Appendix F. If the lease is entirely within PHMA, if feasible, apply the lek buffers from MA-SSS-3H. If this is not technically feasible, locate infrastructure in areas that will minimize habitat loss. Require any development to be placed at the most distal part of the lease from the lek or in areas least harmful to GRSG populations and habitat (e.g., areas where local terrain features such as ridges and ravines may reduce habitat importance or shield nearby habitat from disruptive factors). For geophysical exploration activities, include seasonal TLs and RDFs as permit conditions of approval to eliminate or minimize surface-	**MA-MR-6:** In PHMA, avoid, minimize, and compensate for impacts on GRSG and their habitat (e.g., habitat loss, fragmentation, indirect impacts, etc.) from new oil and gas development on existing leases (see MA-SSS-1 language related to placement of development in non-habitat portions of PHMA). Where possible, place development outside of PHMA. If it is determined that this restriction renders the recovery of fluid minerals infeasible or uneconomic, considering the lease as a whole, or where development of existing leases requires that disturbance density exceeds 1 per 640, and/or 3 percent disturbance cap, apply other measures to site proposed lease activities to meet GRSG habitat objectives and require mitigation as described in Appendix F. If the lease is entirely within PHMA, if technically feasible, apply the lek buffers from MA-SSS-3H. If this is not technically feasible, locate infrastructure in areas that will minimize habitat loss. Require any development to be placed at the most distal part of the lease from the lek or in areas least harmful to GRSG populations and habitat (e.g., areas where local terrain features such as ridges and ravines may reduce habitat importance or shield nearby habitat from disruptive factors).	Completely revised - revised by rangewide.

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disturbing and disruptive activities within nesting and brood-rearing habitat and winter concentration areas.	For geophysical exploration activities, include seasonal TLs and RDFs as permit conditions of approval to eliminate or minimize surface-disturbing and disruptive activities within nesting and brood-rearing habitat and winter concentration areas.	
MA-MR-7: To the extent consistent with existing lease-rights, apply the pertinent management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs) and in GHMA identified in MA-SSS-5 (i.e., mitigation, buffers, and RDFs).	**MA-MR-7:** To the extent consistent with existing lease-rights, apply the pertinent management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs).	Partially revised - revised by state specific.
MA-MR-8: In PHMA, operators must submit a master development plan with site-specific plans of development for roads, wells, pipelines and other infrastructure prior to any development being authorized. The BLM will evaluate the plan through the NEPA process.	No changes made.	Completely revised -revised by rangewide.
MA-MR-9: In PHMA, encourage unitization when deemed necessary for proper development and operation of an area (with strong oversight and monitoring) to minimize adverse impacts on GRSG according to the Federal Lease Form, 3100-11, Sections 4 and 6.	No changes made.	No change (same as 2015).
MA-MR-10: In PHMA, identify areas where acquisitions (including federal mineral rights) or conservation easements, will benefit GRSG habitat.	No similar action.	No change (same as 2015).
MA-MR-11: In PHMA, require a full reclamation bond specific to the site in accordance with 43 CFR, Parts 3104.2, 3104.3, 3104.5, and 36 CFR, Part 228.109. Insure bonds are sufficient for costs relative to reclamation that will result in full restoration of the lands to the condition it was found prior to disturbance. Base the reclamation costs on the assumption that contractors will perform the work.	No changes made.	No change (same as 2015).

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Locatable Minerals	***Locatable Minerals***	—
Management Actions (MA):	**Management Actions (MA):**	—
MA-MR-12: SFA will be recommended for withdrawal from the Mining Law of 1872 (as amended), subject to valid existing rights (Figure 2-5, Locatable Minerals [Appendix A]). Other federal lands or non-federal lands with federal mineral interests within PHMA or GHMA that are not already withdrawn will be available for locatable mineral entry. Areas that are recommended for withdrawal will continue to be managed as they are currently managed. In PHMA, to the extent consistent with the rights of a mining claimant under existing laws and regulations, limit surface disturbance from locatable mineral development and apply management to minimize and mitigate impacts. To the extent allowable by law, work with claimants to voluntarily apply the pertinent management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs) and in GHMA identified in MA-SSS-5 (i.e., mitigation and buffers). Regardless of whether agreements with the claimant incorporates the 3 percent disturbance cap (MA-SSS-3B), disturbance from locatable mineral development will be included as disturbance when calculating disturbance for other land uses.	**MA-MR-12:** Federal lands or non-federal lands with federal mineral interests within PHMA that are not already withdrawn will be available for locatable mineral entry. Areas that are recommended for withdrawal will continue to be managed as they are currently managed. In PHMA, to the extent consistent with the rights of a mining claimant under existing laws and regulations, limit surface disturbance from locatable mineral development and apply management to minimize and mitigate impacts. To the extent allowable by law, work with claimants to voluntarily apply the pertinent management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs). Regardless of whether agreements with the claimant incorporates the 3 percent disturbance cap (MA-SSS-3B), disturbance from locatable mineral development will be included as disturbance when calculating disturbance for other land uses.	Partially revised – (same as 2019 with addition of GHMA and SSS-5 see state specific).

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Saleable Materials	***Saleable Materials***	—
Management Actions (MA):	**Management Actions (MA):**	—
MA-MR-13: In PHMA, manage mineral materials as follows (Figure 2-6, Salable Minerals [Mineral Materials] [Appendix A]): • open to mineral materials development: 0 acres closed to mineral materials development: 2,587,100 acres	No changes made.	Partially revise – revised by editorial update to acres.
MA-MR-14: Close PHMA to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met at all phases of the development (construction and long-term operation of facilities): • the activity is within the population area (BSU) and project area disturbance cap (MA-SSS-3B); • the activity is subject to the provisions set forth in the mitigation framework (MA-SSS-3A); • all applicable RDFs are applied (MA-SSS-3I); and • the activity applies the other pertinent management for discretionary activities in PHMA in MA-SSS-3. In GHMA, new mineral material developments can be considered if consistent with the pertinent management for discretionary activities described in MA-SSS-5.	**MA-MR-14:** Close PHMA to new mineral material sales (see MA-SSS-1 language related to placement of development in non-habitat portions of PHMA). However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met at all phases of the development (construction and long-term operation of facilities): • the activity is within the population area (BSU) and project area disturbance cap (MA-SSS-3B); • the activity is subject to the provisions set forth in the mitigation framework (MA-SSS-3A); • all applicable RDFs are applied (MA-SSS-3I); and the activity applies the other pertinent management for discretionary activities in PHMA in MA-SSS-3.	Partially revised – revised by state specific GHMA.

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Non-Energy Leasable Minerals	***Non-Energy Leasable Minerals***	—
Management Actions (MA):	**Management Actions (MA):**	—
MA-MR-15: In PHMA, manage nonenergy leasable minerals on federal lands and non-federal lands with federal mineral interests as follows (Figure 2-7, Non-Energy Leasable Minerals [Appendix A]): • Open to Leasing Consideration – 24,800 acres (National Forest System lands in Wyoming) • Closed to Leasing – 3,340,200 acres In PHMA, close federal lands and non-federal lands with federal mineral interests to nonenergy leasable mineral leasing. However, expansion of existing operations could be considered if the new lease is contiguous with an existing operation and the new lease (construction, operation, or maintenance) applies the pertinent management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs).	**MA-MR-15:** In PHMA, manage nonenergy leasable minerals on federal lands and non-federal lands with federal mineral interests as follows (Figure 2-7, Non-Energy Leasable Minerals [Appendix A]) (see MA-SSS-1 language related to placement of development in non-habitat portions of PHMA): • Open to Leasing Consideration – 24,800 acres (National Forest System lands in Wyoming) • Closed to Leasing – 3,340,200 acres In PHMA, close federal lands and non-federal lands with federal mineral interests to nonenergy leasable mineral leasing. However, expansion of existing operations could be considered if the new lease is contiguous with an existing operation and the new lease (construction, operation, or maintenance) applies the pertinent management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, seasonal restrictions, and RDFs).	Partially revised – revised by editorial updates to acres.
MA-MR-16: In GHMA, manage nonenergy leasable minerals on federal lands and non-federal lands with federal mineral interests as follows (Figure 2-7): • Open to Leasing Consideration – 699,300 acres • Closed to Leasing – 28,200 acres New leasing and development in GHMA can be considered if consistent with the pertinent management for discretionary activities described in MA-SSS-5.	No similar action.	Completely revised – revised by state specific.

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MA-MR-17: In PHMA, exploration and prospecting activities associated with nonenergy leasable minerals will be required to comply with the same stipulations identified for leasing and development, above. In addition: • The exploration/prospecting activity does not occur during sensitive seasonal periods (i.e., breeding and nesting, brood rearing, winter) (MA-SSS-3G). • Facilities associated with exploration/prospecting activities will be removed before the next breeding season. Disturbances will be restored.	No changes made.	No change (same as 2015).
Coal	***Coal***	—
• **Management Actions (MA):**	**Management Actions (MA):**	—
MA-MR-18: <u>Leases Associated with Surface Mining</u> At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1).	**MA-MR-18:** <u>Leases Associated with Surface Mining</u> At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR, Part 3461.5. Coordination with the appropriate State of Utah agency and the determination of essential habitat for maintaining GRSG for purposes of the suitability criteria set forth at 43 CFR, Part 3461.5(o)(1) will consider site-specific information associated with potential lease nomination areas as part of the unsuitability process identified above.	Completely revised -revised by rangewide.

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MA-MR-19: Leases Associated with Underground Mining Consider leasing PHMA for coal that will be extracted through underground mining. Require the following stipulations as part of any new lease or lease modification: • In PHMA, appurtenant facilities will not be placed in GRSG habitat, where technically feasible. • In PHMA, if placement of facilities outside of GRSG habitat is not technically feasible, disturbances associated with the lease (construction, operation, or maintenance) can be allowed if they are consistent with the pertinent management for discretionary activities identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, buffers, noise restrictions, seasonal restrictions, etc.). If the above criteria cannot be met, do not grant new leases or modifications.	No changes made.	No change (same as 2015).
MA-MR-20: New leasing for underground mining of coal in GHMA can be considered if consistent with the pertinent management for discretionary activities described in MA-SSS-5.	No similar action.	Completely revised -revised by statewide.
MA-MR-21: In PHMA, exploration activities needed to meet data adequacy standards associated with potential coal leasing will be required to comply with the pertinent management for discretionary activities identified in MA-SSS-3 (e.g., mitigation, disturbance cap, buffers, noise restrictions, seasonal restrictions, etc.).	No similar action.	No change (same as 2019).

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MA-MR-22: For underground coal mining operations on existing leases: In PHMA, unless required for technical or safety reasons, do not authorize new appurtenant surface facilities for existing underground mining. If new appurtenant surface facilities associated the existing mine leases cannot be located outside of PHMA, collocate them with any existing disturbed areas, if possible. If collocation is not possible, then construct new facilities to minimize disturbed areas while meeting mine safety standards/requirements, as identified by Mine Safety and Health Administration mine-plan approval process, and locate the facilities in an area least harmful to GRSG habitat based on vegetation, topography, or other habitat features.	No changes made.	No change (same as 2015).
MA-MR-23: For coal mining operations on existing leases: In GHMA, new disturbances could be considered if consistent with the pertinent management for discretionary activities described in MA-SSS-5.	No changes made.	Completed revised – revised by state specific.
Mineral Split-Estate	***Mineral Split-Estate***	—
Management Actions (MA):	**Management Actions (MA):**	—
MA-MR-24: Where the federal government manages the mineral estate in PHMA and GHMA, and the surface is in non-federal ownership, apply the same stipulations, conditions of approval, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. Where the federal government manages the surface and the mineral estate is in non-federal ownership in PHMA and GHMA, apply appropriate surface use conditions of approval, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.	**MA-MR-24:** Where the federal government manages the mineral estate in PHMA, and the surface is in non-federal ownership, apply the same stipulations, conditions of approval, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. Where the federal government manages the surface and the mineral estate is in non-federal ownership in PHMA, apply appropriate surface use conditions of approval, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.	Partially revised – revised by state specific.

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RENEWABLE ENERGY (WIND AND SOLAR) (RE)	***RENEWABLE ENERGY (WIND AND SOLAR) (RE)***	—
Management Actions (MA):	**Management Actions (MA):**	—
Wind Energy Development **MA-RE-1:** PHMA will be designated as exclusion areas for wind energy development (2,026,400 acres) (Figure 2-8, Wind [Appendix A]). Do not site wind energy development in opportunity areas within 5 miles from occupied GRSG leks that are in PHMA. Manage wind energy development in GHMA as follows: • Open – 484,900 acres • Avoided – 0 acres • Excluded – 17,600 acres New wind ROW authorizations can be allowed in GHMA if they apply the pertinent management for discretionary activities identified in MA-SSS-5. *Solar Energy Development* The BLM's Approved Resource Management Plan Amendments/ROD for Solar Energy Development in Six Southwestern States (October 2012) excluded all GRSG occupied habitat to new utility-scale solar development. Because the existing land use plans already exclude solar development in GRSG habitat; this plan amendment process does not need to make additional decisions related to solar development (Figure 2-9, Solar [Appendix A]).	*Wind Energy Development* **MA-RE-1:** PHMA will be designated as exclusion areas for wind energy development (2,026,400 acres) (Figure 2-8, Wind [Appendix A]). Avoid siting wind energy development in opportunity areas within the buffer distances identified in Appendix B from occupied GRSG leks that are in PHMA, if the lek buffer analysis as identified in Appendix B shows that siting wind energy development in opportunities areas will impact lek persistence within PHMA. *Solar Energy Development* The BLM's Approved Resource Management Plan Amendments/ROD for Solar Energy Development in Six Southwestern States (October 2012) excluded all GRSG occupied habitat to new utility-scale solar development. Because the existing land use plans already exclude solar development in GRSG habitat; this plan amendment process does not need to make additional decisions related to solar development (Figure 2-9, Solar [Appendix A]).	Completely revised – revised by rangewide.
LANDS AND REALTY (LR)	***LANDS AND REALTY (LR)***	—
Objectives:	**Objectives:**	—
Objective LR-1: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available.	No changes made.	No change (same as 2015).

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Management Actions (MA):	**Management Actions (MA):**	—
MA-LR-1: In PHMA, manage lands ROWs, permits, and leases as follows (Figure 2-11, Rights-of-Way [Appendix A]): • Open: 18,900 acres (associated with designated above-ground ROW corridors) • Avoided: 1,997,000 acres Excluded: 10,500 acres	No changes made.	Partially revised -editorial updates to acres.
MA-LR-2: <u>Linear and Site-Type ROWs, Permits, and Leases (excluding wind and solar)</u> PHMA will be avoidance areas for new linear and site type ROWs, permits, and leases except for within ROW corridors designated for aboveground use. Placement of new ROWs, permits, and leases in PHMA shall be avoided if at all possible. Where avoidance is not possible in PHMA, placement of a new ROW/permit/lease can be allowed if it applies the management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, buffers, tall structure restrictions, seasonal restrictions, and applicable RDFs). In PHMA, lands ROWs, permits and leases that cannot be avoided shall be located in areas that minimize the effect on the GRSG population (e.g., non-habitat areas, least suitable habitat, collocated with existing disturbances). In PHMA, new proposals for power lines, access roads, pump storage, and other hydroelectric facilities licensed by Federal Energy Regulatory Commission will be subject to all GRSG ROW avoidance allocations and pertinent management for discretionary activities in MA-SSS-3. Outside PHMA, portions of opportunity areas within 4-miles of a lek that is located in PHMA will be	**MA-LR-2:** <u>Linear and Site-Type ROWs, Permits, and Leases (excluding wind and solar)</u> PHMA will be avoidance areas for new linear and site type ROWs, permits, and leases except for within ROW corridors designated for aboveground use. Placement of new ROWs, permits, and leases in PHMA shall be avoided if at all possible. Where avoidance is not possible in PHMA, placement of a new ROW/permit/lease can be allowed if it applies the management for discretionary activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, buffers, tall structure restrictions, seasonal restrictions, and applicable RDFs). In PHMA, lands ROWs, permits and leases that cannot be avoided shall be located in areas that minimize the effect on the GRSG population (e.g., non-habitat areas, least suitable habitat, collocated with existing disturbances). In PHMA, new proposals for power lines, access roads, pump storage, and other hydroelectric facilities licensed by Federal Energy Regulatory Commission will be subject to all GRSG ROW avoidance allocations and pertinent management for discretionary activities in MA-SSS-3. Outside PHMA, portions of opportunity areas within 4-miles of a lek that is located in PHMA will be	Partially revised- retain general language from 2019; but replace with specific language related to major transmission and pipelines to rangewide.

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avoidance areas for new ROWs, permits and leases, applying stipulations for noise and tall structures. In addition to the above requirements, the subsequent conditions will apply to specific types of ROW authorizations: <u>Transmission Lines</u> PHMA are designated as avoidance areas for high voltage transmission line ROWs, except for the transmission projects specifically identified below. All authorizations in these areas, other than the following identified projects, must comply with the conservation measures outlined in this plan, including the RDFs and avoidance criteria presented in MA-SSS-03. The BLM is currently processing an application for TransWest Express (including those portions of Energy Gateway South that are collocated) and the NEPA review for this project is well underway. Conservation measures for GRSG are being analyzed through the project's NEPA review process, which should achieve a net conservation benefit for the GRSG. In PHMA, high voltage transmission lines (100 kilovolt or greater) will be avoided if possible. If avoidance is not possible, they will be placed in designated corridors where technically feasible. Where not technically feasible, lines should be located adjacent to existing infrastructure, unless using a different alignment better minimizes impacts on GRSG. New ROWs constructed adjacent to existing infrastructure will be constructed as close as technically feasible to existing infrastructure to limit disturbance to the smallest footprint. In PHMA outside of designated corridors, new transmission lines must be buried where technically feasible. Where burying transmission lines is not technically feasible:	avoidance areas for new ROWs, permits and leases, applying stipulations for noise and tall structures. In addition to the above requirements, the subsequent conditions will apply to specific types of ROW authorizations: <u>Transmission Lines</u> PHMA are designated as avoidance areas for high voltage transmission line ROWs, except for the transmission projects specifically identified below. All authorizations in these areas, other than the following identified projects, must comply with the conservation measures outlined in this plan, including the RDFs and avoidance criteria presented in MA-SSS-03. The BLM is currently processing an application for TransWest Express (including those portions of Energy Gateway South that are collocated) and the NEPA review for this project is well underway. Conservation measures for GRSG are being analyzed through the project's NEPA review process, which should achieve a net conservation benefit for the GRSG. In PHMA, high voltage transmission lines (100 kilovolt or greater) will be avoided if possible. If avoidance is not possible, they will be placed in designated corridors where technically feasible. Where not technically feasible, lines should be located adjacent to existing infrastructure, unless using a different alignment or construction method (e.g., burial) better minimizes impacts on GRSG. New ROWs constructed adjacent to existing infrastructure will be constructed as close as technically feasible to existing infrastructure to limit disturbance to the smallest footprint. In PHMA, if an existing transmission line is being upgraded to a higher voltage transmission line outside an existing corridor:	

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• new transmission lines must be located adjacent to existing infrastructure, unless using a different alignment better minimizes impacts on GRSG; and • they will be subject to GRSG ROW avoidance criteria described above. In PHMA, if an existing transmission line is being upgraded to a higher voltage transmission line outside an existing corridor: • the existing transmission line must be removed within a reasonable amount of time after the new line is installed and energized; and • the new line must be constructed in the same alignment as the existing line unless an alternate route will benefit GRSG or GRSG habitat. In PHMA, where existing guy wires are determined to have a negative impact on GRSG or its habitat, they shall be removed or appropriately marked with bird flight diverters to make them more visible to GRSG in flight. <u>Pipelines</u> In PHMA, major pipelines (greater than 24 inches) that cannot avoid PHMA will be placed in designated corridors where technically feasible. Where not technically feasible, pipelines shall be located adjacent to existing infrastructure, unless using a different alignment better minimizes impacts on GRSG. <u>Communication Sites</u> In PHMA, new communication towers that cannot avoid PHMA must be located, where technically feasible, within an existing communication site. New sites will be considered where necessary for public safety.	• the existing transmission line must be removed within a reasonable amount of time after the new line is installed and energized; and • the new line must be constructed in the same alignment as the existing line unless an alternate route will benefit GRSG or GRSG habitat. In PHMA, where existing guy wires are determined to have a negative impact on GRSG or its habitat, they shall be removed or appropriately marked with bird flight diverters to make them more visible to GRSG in flight. <u>Pipelines</u> In PHMA, major pipelines (greater than 24 inches) that cannot avoid PHMA will be placed in designated corridors where technically feasible. Where not technically feasible, pipelines shall be located adjacent to existing infrastructure, unless using a different alignment better minimizes impacts on GRSG. <u>Communication Sites</u> In PHMA, new communication towers that cannot avoid PHMA must be located, where technically feasible, within an existing communication site. New sites will be considered where necessary for public safety.	

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MA-LR-3: Road ROWs In PHMA, new road ROWs will be authorized when necessary for public safety, administrative access, or subject to valid existing rights. If the new ROW is necessary for public safety, administrative access, or subject to valid existing rights and creates new surface disturbance, then avoid, minimize, and compensate for the impacts. In PHMA, limit route construction to realignments of existing ROWs if the realignment maintains or enhances GRSG habitat, eliminates the need to authorize a new ROW to construct a new road, or is necessary for public safety or public need. In PHMA, subject to valid existing rights, new road ROWs/easements will be authorized only when necessary for public safety or administrative access or, if it creates no new or de minimis new surface disturbance. In PHMA, collocate new ROWs as close as technically possible to existing ROWs or where it best minimizes GRSG impacts. Use existing roads, or realignments, to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to the absolute minimum standard necessary. In PHMA, existing Federal Highway Act Appropriation ROWs will be managed as valid existing rights, and new Federal Highway Act ROWs will continue to be considered and subject to all GRSG ROW plan restrictions.	No changes made.	No change (same as 2015).

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MA-LR-4: In PHMA, designate ROW corridors as identified on Figure 2-10, Designated Utility Corridors [Appendix A]: • Retain 17,600 acres of existing designated ROW corridor • Retain 44,300 acres of existing designated ROW corridor, but stipulate new developments be limited to underground use only • Undesignate 18,200 acres of existing designated ROW corridor In PHMA, placement of new ROWs in corridors should be avoided if at all possible. Where avoidance is not possible: • Allow new linear ROWs in designated corridors. • New ROWs constructed in designated corridors will be constructed as close as technically feasible to existing linear ROW infrastructure to limit disturbance to the smallest footprint, unless using a different alignment better minimizes impacts on GRSG. Apply the pertinent management for discretionary activities in PHMA identified in MA-SSS-3.	No changes made.	Partially revised – revised to update acres and align conditions with rangewide.

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MA-LR-5: In PHMA, when a ROW grant expires, is relinquished, or terminated, required rehabilitation as a term and condition of the FLPMA ROW grant, in compliance with 43 CFR, Part 2805.12(i). • the lease holder will be required to restore the site by removing overhead lines and other infrastructure, and; • eliminate existing raven nesting opportunities created by anthropogenic development on public lands (e.g., remove power line and communication facilities no longer in service). In PHMA, during renewal, amendment or reauthorization of existing permits, work with existing ROW holders to mitigate impacts of existing ROW infrastructure. Where technically feasible, require ROW holders to bury or relocate existing power lines to minimize long-term impacts on GRSG habitat. Where the potential long-term impacts of relocating or burying the line will be greater than the existing impacts, do not pursue the mitigation. If relocation or burying is not feasible or will result in severe short-term or greater long-term impacts on GRSG habitat, incorporate additional terms and conditions in the ROW authorization for protection of GRSG habitat. Work with ROW holders to retrofit existing towers with perch deterrents or other anti-perching devices, where appropriate, to limit GRSG predation.	**MA-LR-5:** In PHMA, when a ROW grant expires, is relinquished, or terminated, required rehabilitation as a term and condition of the FLPMA ROW grant, in compliance with 43 CFR, Part 2805.12(i). • the lease holder will be required to restore the site by removing overhead lines and other infrastructure, and; • eliminate existing raven nesting opportunities created by anthropogenic development on public lands (e.g., remove power line and communication facilities no longer in service). In PHMA, during renewal, amendment or reauthorization of existing permits, work with existing ROW holders to mitigate impacts of existing ROW infrastructure on GRSG (e.g., predator deterrents, maintenance schedules, relocation, burial, etc.). Where the potential long-term impacts of mitigation will be greater than the existing impacts, do not pursue the mitigation. If relocation or burying is not feasible or will result in severe short-term or greater long-term impacts on GRSG habitat, incorporate additional terms and conditions in the ROW authorization for protection of GRSG habitat. Work with ROW holders to retrofit existing towers with perch deterrents or other anti-perching devices, where appropriate, to limit GRSG predation.	No change (same as 2019).
MA-LR-6: In PHMA, where existing leases or ROWs have had some level of development (road, fence, well, etc.) and are no longer in use, remove the features and restore the habitat.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MA-LR-7: In GHMA, manage ROWs, permits, and leases as follows (Figure 2-11): • Open: 484,900 acres • Avoided: 0 acres • Excluded: 17,600 acres • New ROWs (including permits and leases) authorizations will be allowed if they apply the pertinent management for discretionary activities in GHMA identified in MA-SSS-5.	No similar action.	Completely revised – revised by state specific.
MA-LR-8: In GHMA, retain 74,700 acres of designated ROW corridors as identified on Figure 2-10.	No similar action.	Partially revised – revised by sate specific, updates to acres.
Land Tenure	***Land Tenure***	—
MA-LR-9: Lands classified as PHMA and GHMA for GRSG will be retained in federal management (Figure 2-12, Land Tenure [Appendix A]) unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the GRSG or (2) the agency can demonstrate that the disposal of the lands, including land exchanges, will have no direct or indirect adverse impact on conservation of the GRSG.	**MA-LR-9:** Lands classified as PHMA for GRSG will be retained in federal management (Figure 2-12, Land Tenure [Appendix A]) unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will improve the condition of GRSG habitat or (2) the agency can demonstrate that the disposal of the lands, including land exchanges, will not compromise the persistence of GRSG populations within a PHMA.	Partially revised - reference to GHMA – Connectivity.
MA-LR-10: In PHMA, where suitable conservation actions cannot be achieved, seek to acquire state and private lands with intact federal mineral estate by donation, purchase or exchange in order to best conserve, enhance or restore GRSG habitat.	No changes made.	No change (same as 2015).
• ***Recommended Withdrawals***	***Recommended Withdrawals***	—
MA-LR-11: SFA will be recommended for withdrawal from the Mining Law of 1872 (as amended), subject to valid existing rights. Other federal lands or non-federal lands with federal mineral interests within PHMA or GHMA that are not already withdrawn or recommended for withdrawal will be available for locatable mineral entry (Figure 2-5).	**MA-LR-11:** Federal lands or non-federal lands with federal mineral interests within PHMA that are not already withdrawn or recommended for withdrawal will be available for locatable mineral entry (Figure 2-5).	Partially revised (same as 2019 with addition of GHMA and refer to state specific).

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
RECREATION (REC)	***RECREATION (REC)***	—
Management Actions (MA):	**Management Actions (MA):**	—
MA-REC-1: In PHMA, only allow BLM SRPs that have neutral or beneficial effect on GRSG and their habitat. Evaluate existing SRPs for adverse effect on GRSG and their habitat. Modify or cancel the permit, as appropriate and where possible to avoid or mitigate effects of habitat alterations or other physical disturbances to GRSG (e.g., breeding, brood-rearing, migration patterns, or winter survival). Identify permit stipulations that require the permittee to implement any necessary habitat restoration activities after SRP events. Restoration activities must be consistent with GRSG habitat objectives.	No changes made.	No change (same as 2015).
MA-REC-2: In PHMA, do not construct new recreation facilities (e.g., campgrounds, trailheads, staging areas) unless the development will have a net conservation gain to GRSG habitat (such as concentrating recreation, diverting use away from critical areas, etc.), or unless the development is required for visitor health and safety or resource protection.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
TRAVEL AND TRANSPORTATION MANAGEMENT (TTM)	***TRAVEL AND TRANSPORTATION MANAGEMENT (TTM)***	—
Management Actions (MA):	**Management Actions (MA):**	—
MA-TTM-1: Manage off-highway vehicle (OHV) use in GRSG habitat as follows (Figure 2-13, Trails and Travel Management [Appendix A]): • Open to cross-country use: 525 acres (one area each in Parker Mountain and Uintah Population Areas) • Limited to existing routes: 1,274,700 acres • Limited to designated routes: 1,220,500 acres • Closed: 33,200 acres	**MA-TTM-1:** Manage off-highway vehicle (OHV) use in GRSG habitat as follows (Figure 2-13, Trails and Travel Management [Appendix A]): • Open to cross-country use: 525 acres (one area each in Parker Mountain and Uintah Population Areas); two areas outside of PHMA in the Sheeprocks Population Area, associated with 5-Mile Pass (6,320 acres) and Little Sahara Sand Dunes (7,900 acres) • Limited to existing routes: 1,260,500 acres • Limited to designated routes: 1,220,500 acres • Closed: 33,200 acres	No change (same as 2019).
MA-TTM-2: PHMA and GHMA that do not have designated routes in a Travel Management Plan will be managed as limited to existing routes until a Travel Management Plan designates routes (unless they are already designated as limited to designated routes or closed to OHV use). OHV Areas designated as "closed" will be managed as areas closed to motorized vehicles. OHV Areas designated as "limited existing" within PHMA will be managed as "limited to existing roads, primitive roads, and trails" until the completion of an implementation level travel plan. Individual route designations will occur during subsequent implementation level travel management planning efforts. Upon the completion of implementation level travel management plans OHV areas designated as "Limited" will automatically transition to "limited to designated roads, primitive roads and trails."	**MA-TTM-2:** PHMA that does not have designated routes in a Travel Management Plan will be managed as limited to existing routes until a Travel Management Plan designates routes (unless they are already designated as limited to designated routes or closed to OHV use). Two areas that were GHMA previously will remain limited to existing routes, though they would no longer be GHMA: 7,400 acres in the Bald Hills area and 13,500 acres in the Fillmore Field Office portions of Sheeprocks area, east of Highway 6. The other two areas of former GHMA (6,320 acres in the 5-Mile Pass area and 7,900 acres in the Little Sahara Recreation Area) will also remain limited until the BLM completes the Section 106 OHV area designation process found in the *Programmatic Agreement among the Advisory Council on Historic Preservation, The Bureau of Land Management – Utah and the Utah State Historic*	No change (same as 2019).

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
	Preservation Office regarding National Historic Preservation Act Responsibilities for Travel and Transportation Management Undertakings. Under the Programmatic Agreement the BLM will identify an Area of Potential Effect, conduct an identification process, make a finding of effect, and if necessary, develop a historic properties treatment plan. Once these procedures are completed, the applicable portions of these areas will revert to being open to cross-country use, consistent with prior RMP OHV allocations. OHV Areas designated as "closed" will be managed as areas closed to motorized vehicles. OHV Areas designated as "limited existing" within PHMA will be managed as "limited to existing roads, primitive roads, and trails" until the completion of an implementation level travel plan. Individual route designations will occur during subsequent implementation level travel management planning efforts. Upon the completion of implementation level travel management plans OHV areas designated as "Limited" will automatically transition to "limited to designated roads, primitive roads and trails."	
MA-TTM-3: Implementation level travel planning efforts will be guided by the goals, objectives and guidelines outlined in the GRSG section, relevant national and Utah specific guidance as well as the following: • A timeline to complete travel planning efforts will be identified, prioritized and updated annually in all relevant planning areas to accelerate the accomplishment of: data collection, route evaluation and selection, and on the ground implementation efforts including signing, monitoring and rehabilitation.	**MA-TTM-3:** Implementation level travel planning efforts will be guided by the goals, objectives and guidelines outlined in the GRSG section, relevant national and Utah specific guidance as well as the following: • A timeline to complete travel planning efforts will be identified, prioritized and updated annually in all relevant planning areas to accelerate the accomplishment of: data collection, route evaluation and selection, and on the ground implementation efforts including signing, monitoring and rehabilitation.	No change (same as 2019).

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
• During subsequent travel management planning, consultation "with interested user groups, federal, state, county, and local agencies, local landowners, and other parties in a manner that provides an opportunity for the public to express itself and have its views given consideration." Consequently, a public outreach plan to fully engage all interested stakeholders will be incorporated into future travel management plans. • Among other designation criteria from 43 CFR, Part 8342.1(b), "areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats." • During subsequent travel management planning, all routes will undergo a route evaluation to determine its purpose and need and the potential resource and/or user conflicts from motorized travel. Where resource and/or user conflicts outweigh the purpose and need for the route, the route will be considered for closure or considered for relocation outside of sensitive GRSG habitat. • During subsequent travel planning, threats to GRSG and their habitat will be considered when evaluating route designations and/or closures. • During subsequent travel management planning, routes that do not have a purpose or need will be considered for closure. • During subsequent travel management, planning, routes that are duplicative, parallel, or redundant will be considered for closure.	• During subsequent travel management planning, consultation "with interested user groups, federal, state, county, and local agencies, local landowners, and other parties in a manner that provides an opportunity for the public to express itself and have its views given consideration." Consequently, an outreach plan to fully engage all interested stakeholders, including state, local, and tribal governments, will be incorporated into future travel management plans. • Among other designation criteria from 43 CFR, Part 8342.1(b), "areas and trails shall be located to minimize harassment of wildlife or significant disruption of wildlife habitats. Special attention will be given to protect endangered or threatened species and their habitats."	

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
• During subsequent travel management planning, seasonal restrictions on OHV use will be considered in important seasonal habitats where OHV use is a threat. During subsequent travel management planning, consider limiting over snow vehicles designed for use over snow and that runs on a track or tracks and/or a ski or skis, while in use over snow to designated routes or consider seasonal closures in GRSG wintering areas from November 1 through March 31. • During subsequent travel management planning, routes not required for public access or recreation with a current administrative/agency purpose or need will be evaluated for administrative access only. • During subsequent travel management planning, consider prioritizing restoration of routes not designated in a Travel Management Plan. • During subsequent travel management plan implementation, consider using seed mixes or transplant techniques that will maintain or enhance GRSG habitat when rehabilitating linear disturbances. During subsequent travel management plan implementation, consider scheduling road maintenance to avoid disturbance during sensitive periods and times to the extent practicable. Consider using time of day limits (e.g., no use between 6:00 pm and 9:00 am) to reduce impacts on GRSG during breeding periods.		

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MA-TTM-4: In PHMA, complete transportation plans in accordance with National BLM Travel Management guidance, requiring the BLM to maintain a current action plan and planning schedule to most effectively target available resources. The following GRSG population areas are Utah's top priority areas to designate comprehensive travel plans: • Sheeprocks • Box Elder • Ibapah • Bald Hills • Rich • Hamlin Valley	No changes made.	No change (same as 2015).
MA-TTM-5: In PHMA, travel systems will be managed with an emphasis on improving the sustainability of the travel network in a comprehensive manner to minimize impacts on GRSG, maintain motorist safety, and prevent unauthorized cross country travel while meeting access needs. To do so, it may be necessary to improve portions of existing routes, close existing routes or create new routes that meet user group needs, thereby reducing the potential for pioneering unauthorized routes. The emphasis of the comprehensive travel and transportation planning will be placed on having a neutral or positive effect on GRSG habitat.	No changes made.	No change (same as 2015).
MA-TTM-6: In PHMA, when considering upgrade of existing routes that will change route category (BLM route categories: road, primitive road, or trail) or capacity, consider the larger transportation network while providing for protection of GRSG habitat.	No similar action.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MA-TTM-7: In PHMA, use existing roads, or realignments as described above to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, then build any new road constructed to the absolute minimum standard necessary, and add the surface disturbance to the total disturbance. Apply additional effective mitigation necessary to offset the resulting loss of GRSG habitat. Plan for new routes in consideration of the larger transportation network objectives and needs while providing for protection of GRSG habitat.	No changes made.	No change (same as 2015).
MA-TTM-8: In PHMA, when reseeding roads, primitive roads and trails, use appropriate seed mixes and consider the use of transplanted sagebrush.	No similar action.	No change (same as 2019).
MA-TTM-9: Develop an educational process to advise OHV users of the potential for conflict with GRSG.	No changes made.	No change (same as 2015).

2015 BLM GRSG Approved RMP Amendment	Changes between 2015 and 2019 GRSG Management	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MA-TTM-10: In PHMA and GHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR, subpart 8351 (Designated National Area); 43 CFR, subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR, subpart 8341 (Conditions of Use) and any applicable policies. • Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that OHVs are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR, Part 8341.2) A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.	**MA-TTM-10:** In PHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR, subpart 8351 (Designated National Area); 43 CFR, subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR, subpart 8341 (Conditions of Use) and any applicable policies. • Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that OHVs are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR, Part 8341.2) A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.	Partially revised – revised to state specific.

Table 2. 2015 Habitat Objectives for Greater Sage-Grouse

Attribute	Indicators	Desired Condition
Breeding and Nesting (February 15-June 15)[1, 2, 3, 4, 5, 6]		
Lek Security	Proximity of trees	Trees absent or uncommon on shrub/grassland ecological sites within 1.8 miles (approx. 3 kilometers) of occupied leks.[6, 7, 8]
	Proximity of sagebrush to leks	Has adjacent sagebrush cover.[6]
Cover	% of seasonal habitat meeting desired conditions	>80% of the mapped nesting habitat meets the recommended vegetation characteristics, where appropriate (relative to ecological site potential, etc.).[8]
	Sagebrush cover	≥15%[6, 8, 9]
	Total shrub cover[6, 8, 9]	15-30%: Box Elder, Parker Mountain, Bald Hills, Hamlin Valley, Panguitch, Uintah south of Hwy 40 15-35%: Rich, Carbon, Emery, Sheeprocks, Ibapah, Uintah north of Highway 40
	Sagebrush height[6, 8, 9]	>12 inches (30 cm): Box Elder, Bald Hills, Hamlin Valley, Sheeprocks, Ibapah >10 inches (25 cm): Rich, Carbon, Emery, Uintah north of Highway 40 >8 inches (20 cm): Parker Mountain, Panguitch, Uintah south of Highway 40
	Predominant sagebrush shape[10]	>50% in spreading (applicable to the specific sagebrush types prone to columnar vs. spreading shape e.g., Wyoming, not black sage)[6]
	Perennial grass cover (such as native bunchgrasses, rhizomatous grasses called for on applicable ecological site descriptions, or other perennial grasses that provide similar functionality)[6, 8, 9]	>10%: Box Elder, Bald Hills, Hamlin Valley, Rich, Carbon, Emery, Sheeprocks, Ibapah, Uintah north of Highway 40 >5%:Parker Mountain, Panguitch, Uintah south of Highway 40
	Perennial grass and forb height (includes residual grasses)[6, 8, 9]	Provide overhead and lateral concealment from predators.[11]
	Perennial forb canopy cover[6, 8, 9]	>5%: Box Elder, Bald Hills, Hamlin Valley, Rich, Carbon, Emery, Sheeprocks, Ibapah, Uintah north of Highway 40 >3%: Parker Mountain, Panguitch, Uintah south of Highway 40

Attribute	Indicators	Desired Condition
Brood-Rearing/Summer (April 15-August 15)[1]		
Cover	% of Seasonal habitat meeting desired condition	>40% of the mapped brood-rearing/summer habitat meets recommended habitat characteristics where appropriate (relative to ecological site potential, etc.)[8]
	Sagebrush cover[6, 8, 9]	>10%
	Total shrub cover[6, 8, 9]	10-25%: Box Elder, Bald Hills, Hamlin Valley, Panguitch, Rich, Parker Mountain, Uintah 10-30%: Carbon, Emery, Sheeprocks, Ibapah,
	Sagebrush height[6, 8, 9]	>12 inches (30 cm): Box Elder, Bald Hills, Hamlin Valley, Sheeprocks, Ibapah >10 inches (25 cm): Rich, Carbon, Emery, Uintah north of Highway 40 >8 inches (20 cm): Parker Mountain, Panguitch, Uintah south of Highway 40
	Perennial grass cover and forbs[6, 8, 9]	>15% (Grass: >10%; Forb: >5%): Box Elder, Rich, Sheeprocks, Ibapah, Parker Mountain, Panguitch, Uintah, Carbon, Emery >15% (Grass: >8%; Forb: >7%): Bald Hills, Hamlin Valley,
	Riparian areas/mesic meadows	Proper Functioning Condition
	Upland and riparian perennial forb availability	Preferred forbs are common with several preferred species present[6, 12]
Winter (November 15-March 15)[1]		
Cover and Food	% of seasonal habitat meeting desired conditions	>80% of the mapped wintering habitat meets winter habitat characteristics where appropriate (relative to ecological site, etc.). [8]
	Sagebrush cover above snow[6, 8,]	>10%
	Sagebrush height above snow[6, 8, 9, 13]	>10 inches (25 cm): Box Elder, Bald Hills, Hamlin Valley, Rich, Carbon, Emery, Sheeprocks, Ibapah, Uintah north of Highway 40 >8 inches (20 cm): Parker Mountain, Panguitch, Uintah south of Highway 40

[1] Specific dates will be based on site-specific conditions and may be modified due to documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, and long and/or heavy winter), in coordination with the appropriate State of Utah agency.
[2] Utah Greater Sage-Grouse Working Group 2013
[3] Doherty 2008
[4] Doherty et al. 2010
[5] Holloran and Anderson 2005
[6] Stiver et al. 2015 *In Press*
[7] Baruch-Mordo et al. 2013
[8] Connelly et al. 2000
[9] Unpublished data, Utah Community-Based Conservation Program Greater Sage-Grouse Statewide Database, Utah State University, Logan, Utah and Brigham Young University, Provo, Utah. Summarization and analysis of nesting and brood-rearing habitat characteristics from data collected through Utah State University and Brigham Young University research efforts. Researchers located the nest and brood sites using radio-marked telemetry methods. Shortly after the site was used by the marked bird (after hatch or use by a brood), vegetation characteristics on the site were measured using the line intercept method for shrub canopy cover and Daubenmire frames for herbaceous cover. Researchers across the various study areas used methods that followed the guidelines identified in Connelly et al. (2003).
[10] Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015 *In Press*). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.
[11] Specific height requirements needed to meet the objective will be set at the time of watershed assessments.
[12] Preferred forbs are listed in Stiver et al. 2015 *In Press*. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.
[13] The height of sagebrush remaining above the snow depends upon snow depth in a particular year. Intent is to manage for tall, healthy, sagebrush stands.

Table 3. 2019 Habitat Objectives for Greater Sage-Grouse (see Figure 3-1 for the Low, Mid, and High Habitat Objective Zones)

Attribute	Indicators	Desired Condition
Breeding and Nesting (February 15-June 15)[1, 2, 3, 4, 5, 6]		
Lek Security	Proximity to conifers	Conifers are absent or uncommon on shrub/grassland ecological sites within 1.8 miles (approx. 3 kilometers) of occupied leks. [6, 7, 8]
	Proximity of sagebrush to leks	Has adjacent sagebrush cover.[6]
Cover	% of seasonal habitat meeting desired conditions	>80% of the mapped nesting habitat meets the recommended vegetation characteristics[8], where appropriate (relative to ecological site potential, etc.).
	Sagebrush cover[9]	Low: ≥ 7% Mid: ≥ 18% High: ≥ 14%
	Total shrub cover[6, 8, 9]	Low: ≥ 17% Mid: ≥ 22% High: ≥ 19%
	Sagebrush Composition[9]	Low: ≥ 36% Mid: ≥ 71% High: ≥ 83%
	Shrub height[6, 8, 9]	Low: ≥ 12 inches (30 cm) Mid: ≥ 5.9 inches (15 cm) High: ≥ 9 inches (23 cm)
	Perennial grass cover (such as native bunchgrasses, rhizomatous grasses called for on applicable ecological site descriptions, or other perennial grasses that provide similar functionality)[6, 8, 9]	Low: ≥ 5% Mid: ≥ 4% High: ≥ 8%
	Perennial grass and forb height (includes residual grasses)[6, 8, 9]	Provide overhead and lateral concealment from predators.[11]
	Perennial forb canopy cover[6, 8, 9]	Low: ≥ 2% Mid: ≥ 1% High: ≥ 4%

Attribute	Indicators	Desired Condition
Brood-Rearing/Summer (April 15-August 15)[1]		
Cover	% of Seasonal habitat meeting desired condition	>40% of the mapped brood-rearing/summer habitat meets recommended habitat characteristics[8] where appropriate (relative to ecological site potential, etc.)
	Sagebrush cover[6, 8, 9]	Low: ≥ 4% Mid: ≥ 16% High: ≥ 17%
	Total shrub cover[6, 8, 9]	Low: ≥ 10% Mid: ≥ 19% High: ≥ 17%
	Sagebrush Composition[9]	Low: ≥ 28% Mid: ≥ 77% High: ≥ 77%
	Shrub height[6, 8, 9]	Low: ≥ 10.25 inches (26 cm) Mid: ≥ 4.3 inches (11 cm) High: ≥ 8 inches (20 cm)
	Perennial grass cover[9]	Low: ≥ 5% Mid: ≥ 6% High: ≥ 8%
	Perennial forb cover[9]	Low: ≥ 2% Mid: ≥ 2% High: ≥ 6%
	Riparian areas/mesic meadows	Proper Functioning Condition
	Upland and riparian perennial forb availability	Preferred forbs are common with several preferred species present[6, 12]
Winter (November 15-March 15)[1]		
Cover and Food	% of seasonal habitat meeting desired conditions	>80% of the mapped wintering habitat meets winter habitat characteristics[8] where appropriate (relative to ecological site, etc.).
	Sagebrush cover above snow[6, 8,]	≥10%
	Shrub height[9]	Low: ≥ 12 inches (30 cm) Mid: ≥ 5.9 inches (15 cm) High: ≥ 9 inches (23 cm)

[1] Specific dates will be based on site-specific conditions and may be modified due to documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, and long and/or heavy winter), in coordination with the appropriate State of Utah agency.
[2] Utah Greater Sage-Grouse Working Group 2013
[3] Doherty 2008
[4] Doherty et al. 2010
[5] Holloran and Anderson 2005
[6] Stiver et al. 2015
[7] Baruch-Mordo et al. 2013

[8] Connelly et al. 2000
[9] Dahlgren, D., et al. (2019). Sage-grouse Breeding and Late Brood-Rearing Habitat Guidelines in Utah. Wildlife Society Bulletin 1-14.
[11] Specific height requirements needed to meet the objective will be set at the time of watershed assessments.
[12] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover, since not all forb species are listed as preferred.

Table 4. PHMA and GHMA in the 2015 BLM GRSG Approved RMPA

Population Area	Acres					
	PHMA			GHMA		
	Total Surface[1]	BLM Surface[2]	Split Estate[3]	Total Surface[1]	BLM Surface[2]	Split Estate[3]
Uintah	566,800	263,200	140,800	991,500	294,200	81,700
Carbon[4]	260,100	43,500	124,200	198,700	82,800	19,200
Emery	85,500	100	84,000	11,400	0	9,700
Parker Mtn.	741,300	214,200	378,300	12,900	0	7,400
Panguitch	343,900	163,200	91,000	0	0	0
Bald Hills	326,400	259,400	5,200	21,200	8,300	1,200
Hamlin Valley	143,700	101,500	6,600	0	0	0
Sheeprocks	534,600	381,100	111,200	296,500	52,800	15,300
Ibapah	88,800	48,000	700	10,800	10,100	0
Box Elder	1,227,800	439,200	112,000	0	0	0
Rich	1,051,000	167,000	178,400	197,900	300	20,600
Lucerne	0	0	0	37,500	0	11,500
Strawberry	161,500	0	40,900	20,600	0	500
Statewide	*5,531,400*	*2,080,400*	*1,273,300*	*1,799,000*	*448,500*	*167,100*
% PHMA/ GHMA	*75%*	*80%*	*85%*	*25%*	*20%*	*15%*

[1] Acreage associated with total PHMA polygon, regardless of land ownership.
[2] Acreage within PHMA where the BLM has managerial authority on the surface estate.
[3] Acreage where the surface and mineral estates are owned or administered by separate entities. These acres show where the surface estate is not BLM (e.g., private, state, tribal, and Forest Service), but that have a federal mineral estate administered by the BLM. Most minerals decisions apply to the combination of the BLM surface and mineral estates.
[4] The 41,200 acres of National Forest System lands in the Anthro Mountain area would be managed as neither PHMA nor GHMA. These areas would be identified as "Anthro Mountain." In the BLM's RMPPA, these areas are considered split-estate, where the BLM administers the mineral estate.

Table 5. PHMA in the 2019 BLM GRSG Approved RMPA

Population Area	Acres		
	PHMA		
	Total Surface[1]	BLM Surface[2]	Split Estate[3]
Uintah	566,800	263,200	140,800
Carbon [4]	260,100	43,500	124,200
Emery	85,500	100	84,000
Parker Mtn.	741,300	214,200	378,300
Panguitch	343,900	163,200	91,000
Bald Hills	326,400	259,400	5,200
Hamlin Valley	143,700	101,500	6,600
Sheeprocks	534,600	381,100	111,200
Ibapah	88,800	48,000	700
Box Elder	1,227,800	439,200	195,800
Rich	1,015,400	167,000	153,700
Lucerne	0	0	0
Strawberry	161,500	0	40,900
Statewide[5]	*5,495,800*	*2,080,400*	*1,332,400*

[1] Acreage associated with total PHMA polygon, regardless of land ownership.
[2] Acreage within PHMA where the BLM has managerial authority on the surface estate.
[3] Acreage where the surface and mineral estates are owned or administered by separate entities. These acres show where the surface estate is not BLM (e.g., private, state, tribal, and Forest Service), but that have a federal mineral estate administered by the BLM. Most minerals decisions apply to the combination of the BLM surface and mineral estates.
[4] The 41,200 acres of National Forest System lands in the Anthro Mountain area would not be managed PHMA. These areas would be identified as "Anthro Mountain." In the BLM's RMPPA, these areas are considered split-estate, where the BLM administers the mineral estate.
[5] PHMA were mapped to exclude all incorporated towns/cities.

2.15.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 plans have management direction that may change through this RMP amendment. If 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The appendices can be found on the Utah GRSG ePlanning website.

ARMPA Appendix Name	Year	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Approved RMP Amendment Maps	2015, 2019	Completely revised - refer to Appendix 1 for updated maps
B: Applying Lek Buffer Distances	2015, 2019	No change (same as 2019)
C: Required Design Features	2015	No change (same as 2015)

ARMPA Appendix Name	Year	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
D: Greater Sage-Grouse Monitoring Framework	2015	Completely revised – revised by rangewide Appendix 7
E: Greater Sage-Grouse Disturbance Cap Guidance	2015, 2019	Partially revised – revised by rangewide updates to disturbance cap
F: Mitigation Strategy: Utah Greater Sage-Grouse RMPA	2015	Delete Appendix - follow rangewide mitigation policy
G: Stipulations Associated with Fluid Mineral Leasing	2015, 2019	Partially revised – Applies rangewide exceptions, modifications, and waivers
H: Fire and Invasives Assessment Tool	2015	No change (same as 2015)
I: Adaptive Management	2015, 2019	Completely revised – revised by rangewide
K: Greater Sage Grouse Habitat Baseline and Habitat Update Protocol	2015, 2019	No change (same as 2019)
L: Livestock Grazing BMPs	New	New appendix

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Appendix 2.16
Wyoming RMP 2015 Amendments

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2.16 WYOMING RMP 2015 AMENDMENTS

This appendix presents the GRSG approved RMP amendment language from the 2015 and 2019 records of decision for the RMP Amendments for Casper, Kemmerer, Newcastle, Pinedale, Rawlins, and Rock Springs RMPs. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment (RMPA), either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMPA include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable 2015 and 2019 appendices that are listed in **Section 2.16.2** of this appendix. For the additional state-specific Wyoming management direction for the Proposed RMPA, see Chapter 2, Table 2-13.

2.16.1 Casper, Kemmerer, Newcastle, Pinedale, Rawlins, and Rock Springs RMPs (Wyoming)

Table 1. Comparison of Proposed RMP Amendment to Existing GRSG RMP Management Direction in Applicable Wyoming RMPs

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Management Goal 1: Conserve, restore, and enhance Greater Sage-Grouse habitat on a landscape scale consistent with local, state, and federal management plans and policies, as practical, while providing for multiple use of BLM-administered lands.	No changes made.	Completely revised – revised by rangewide
Management Objective (MO) 1: In cooperation with the State of Wyoming and its agencies, local governments, private landowners, local Greater Sage-Grouse working groups, partners, and stakeholders, develop site-specific conservation strategies to maintain or enhance Greater Sage-Grouse habitats and habitat connectivity.	No changes made.	No change (same as 2015)
MO 2: Maintain and enhance quality/suitable habitat to support the expansion of Greater Sage-Grouse populations on federally administered lands within the planning area.	No changes made.	No change (same as 2015)
MO 3: Manage Greater Sage-Grouse seasonal habitats and maintain habitat connectivity to support population objectives set by the State of Wyoming in cooperation with the agencies.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MO 4: Identify and prioritize opportunities for habitat enhancement and conservation within Greater Sage-Grouse core habitat areas based on threats and the ability to manage Greater Sage-Grouse habitat.	No changes made.	No change (same as 2015)
MO 5: Restore native (or desirable) plants and create landscape patterns that most benefit Greater Sage-Grouse.	No changes made.	No change (same as 2015)
MO 6: Develop specific habitat objectives to protect, enhance, or restore Greater Sage-Grouse priority habitat based on ESDs and BLM land health evaluations (including within wetlands and riparian areas) taking into account site history (historic treatments or habitat manipulations) that have changed the soil chemistry, possibly altering the ESD. If an effective grazing system that meets sage-grouse habitat requirements is not already in place, analyze at least one alternative that conserves, restores, or enhances sage-grouse habitat in the NEPA document prepared for grazing management (Doherty et al. 2011, Williams et al. 2011).	Develop specific habitat objectives to protect, enhance, or restore Greater Sage-Grouse priority habitat based on ESDs and BLM land health evaluations (including within wetlands and riparian areas) taking into account site history (historic treatments or habitat manipulations) that have changed the soil chemistry, possibly altering the ESD.	No change (same as 2019)
MO 7: Establish measurable objectives related to Greater Sage-Grouse habitat from baseline monitoring data, ESDs, or land health assessments/evaluations.	No changes made.	No change (same as 2015)
MO 8: Manage for vegetation composition and structure consistent with ecological site potential to achieve Greater Sage-Grouse seasonal habitat objectives.	No changes made.	No change (same as 2015)
MO 9: Incorporate available site information collected using the Sage-Grouse Habitat Assessment Framework or similar methods to evaluate existing resource conditions and to develop any necessary resource solutions in cooperation with the State of Wyoming and its agencies, the local governments, private landowners, project proponents, partners, and stakeholders.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MO 10: Incorporate management practices that will provide for maintenance and/or enhancement of Greater Sage-Grouse habitats, including specific attention to maintenance of desired understories of sagebrush plant communities. When developing objectives for residual cover and species diversity, identify the ecological site types within the planning area and refer to the appropriate ESDs.	No changes made.	No change (same as 2015)
MO 11: In determining appropriate management actions that will be considered, refer to the document, *Grazing Influence, Management, and Objective Development in Wyoming's Greater Sage-Grouse Habitat* (Cagney et al. 2010) for guidance.	No changes made.	No change (same as 2015)
MO 12: Identify PHMA and GHMA for each WAFWA MZ across the current geographic range of Greater Sage-Grouse that are large enough to stabilize populations in the short term and enhance populations over the long term. Greater Sage-Grouse habitat in this planning area overlaps two WAFWA MZs: (1) MZ I - Great Plains and (2) MZ II - Wyoming Basin.	No changes made.	Completely revised – revised by rangewide and state-specific
MO 13: Protect PHMA and GHMA from anthropogenic disturbance that will reduce distribution or abundance of Greater Sage-Grouse.	No changes made.	Partially revised – to include SHMA
MO 14: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority would be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. The	Leasing is allowed in PHMA. Where the BLM has a backlog of Expressions of Interest for leasing, the BLM will prioritize its work first in non-habitat management areas, followed by lower priority habitat management areas (e.g., GHMA) and then higher priority habitat management areas (i.e., PHMA). To the extent consistent with federal regulation, law, and policy, priority would be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA. When analyzing	Completely revised – revised by rangewide

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 CFR 3162.3-1(h). Where a proposed fluid mineral development project on an existing lease could adversely affect Greater Sage-Grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts on the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts on Greater Sage-Grouse or its habitat and will ensure that the best information about the Greater Sage-Grouse and its habitat informs and helps to guide development of such federal leases.	leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority would be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 CFR 3162.3-1(h). Where a proposed fluid mineral development project on an existing lease could adversely affect Greater Sage-Grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts on the extent compatible with lessees' rights to drill and produce fluid mineral resources. To incentivize development to locate outside of PHMA, the BLM would work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts on Greater Sage-Grouse or its habitat and will ensure that the best information about the Greater Sage-Grouse and its habitat informs and helps to guide development of such federal leases.	
MO 15: In all SFAs and PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in *Interpreting Indicators of Rangeland Health* (BLM Tech Ref 1734-6).	In PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in *Interpreting Indicators of Rangeland Health* (BLM Tech Ref 1734-6).	No change (same as 2019)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MO 16: The habitat objectives (see Tables 2-2 and 2-3) will be part of the Greater Sage-Grouse habitat assessment to be used during land health evaluations (see Monitoring Framework in Appendix D). These habitat objectives are not obtainable on every acre within the designated Greater Sage-Grouse habitat management areas. Therefore, the determination on whether the objectives have been met will be based on the specific site's ecological ability to meet the desired condition identified in the table.	No changes made.	Completely revised – revised by rangewide habitat objectives and Appendix referenced
MO 17: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available.	No changes made.	No change (same as 2015)
MD GMD 1: Continue to support the development of statewide Greater Sage-Grouse seasonal habitat models for the State of Wyoming.	No changes made.	No change (same as 2015)
MD GMD 2: Field offices will work with project proponents, partners, and stakeholders to avoid or minimize impacts and/or implement direct mitigation (e.g., relocating disturbance, timing restrictions, etc.), and utilize best management practices (BMPs).	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD GMD 3: Utilize the Wyoming SGIT and LWG plans or other state plans, analyses, and other sources of information to guide development of conservation objectives for local management of Greater Sage-Grouse habitats. The BLM will collaborate with appropriate federal agencies, and the State of Wyoming as contemplated under Governor Executive Order 2013-3, to: (1) develop appropriate conservation objectives; (2) define a framework for evaluating situations where Greater Sage-Grouse conservation objectives are not being achieved on federal land, to determine if a causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and (3) identify appropriate site-based action to achieve Greater Sage-Grouse conservation objectives within the framework.	No changes made.	Partially revised – to update Executive Order referenced
MD GMD 4: Include the collection of baseline data and outline post-project monitoring components in project planning, as appropriate and necessary.	No changes made.	No change (same as 2015)
MD GMD 5: The BLM will coordinate new recommendations, mitigation, habitat objectives, and management considerations applied for Greater Sage-Grouse with the WGFD and other appropriate agencies, local government cooperators, and the Wyoming SGIT. These measures will be analyzed in site-specific NEPA documents, and planning-level documents, as necessary.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD GMD 6: Apply appropriate seasonal restrictions for implementing vegetation management treatments according to the type of seasonal habitats present within Greater Sage-Grouse habitat. Vegetation treatments must include monitoring to determine achievement of objectives and their long-term success.	No changes made.	No change (same as 2015)
MD GMD 7: Ensure site-specific, measurable conservation and mitigation objectives are included in project planning within Greater Sage-Grouse habitats.	No changes made.	No change (same as 2015)
MD GMD 8: Each BLM field office will develop landscape-scale restoration, conservation, and maintenance strategies, including special management of seasonal habitats and identified connectivity zones outside of PHMA, working with voluntary partners and cooperating agencies. These strategies and habitat designations must be coordinated and reconciled with Wyoming's Greater Sage-Grouse Core Area Protection strategy (EO 2015-4), and where possible, with adjoining management entities that share habitats or populations.	No changes made.	Partially revised – to update Executive Order referenced
MD GMD 9: Design all projects in a manner that minimizes potential for invasive species establishment. Monitor and treat invasive species associated with all permitted activities consistent with BLM Handbook H-1740-2.	No changes made.	No change (same as 2015)
MD GMD 10: Apply all appropriate RDFs (Appendix C) as mandatory Stipulations/COA/Terms and Conditions within PHMA for all program areas as applicable.	No changes made.	Partially revised – to update Appendix referenced

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD GMD 11: Integrated vegetation management will be used to control, suppress, and eradicate, where possible, noxious and invasive species per BLM Handbook H-1740-2. Manage weed treatments to maintain and improve Greater Sage-Grouse habitat. RDFs and BMPs will be applied to the permit as COA as determined through the site-specific analysis.	No changes made.	No change (same as 2015)
MD GMD 12: Existing notices and approved plans of operations under 43 CFR 3809: For projects that overlap PHMA, operators may be requested to submit modifications to the accepted notice or approved plan of operations so that the operations minimally affect PHMA (core only). The AO may convey to the operator suggested conservation measures, based on the notice or plan level operations and the geographic area of those operations (also called the project area, which is defined in 43 CFR 3809.5). These suggested conservation measures include measures that support the overall goals and objectives of the priority/core population area strategy and may not be reasonable or applicable to the BLM's determination of whether the proposed operations will cause unnecessary or undue degradation under 43 CFR 3809.5. The request containing the suggested conservation measures must make clear that the operator's compliance is not mandatory. Notices or plans of operation, or modifications thereto, submitted following the issuance of this guidance: As part of the 15-day completeness review of notices (or modifications thereto) and 30-day completeness review of plans of operations (or modifications thereto), the proposed project area(s) where exploration,	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
development, mining, access and reclamation would take place will be reviewed for overlap of Greater Sage-Grouse PHMA in the corporate GIS database. If there is overlap, the BLM AO may notify the operator of ways that they may minimize impacts on PHMA (core only) and request the operator to amend its notice or plan to include such measures. The request to amend the submitted notice or plan of operations must make clear that the operator's compliance is not mandatory and that including such measures is not a requirement for completeness of either the notice or a plan of operations, nor is it a condition of acceptance of the notice or approval of the plan of operations.		
MD GMD 13: As new occupied Greater Sage-Grouse habitat is found or occurs either through additional inventories or expansion into previously unoccupied habitat, the BLM will incorporate, through appropriate processes and analyses, these areas into the GHMA category and manage them as such, until the earliest review occurs by the SGIT. At that time, they will be considered for PHMA status or continue to be managed as GHMA and will be added to the statewide map.	No changes made.	Partially revised – to include SHMA
MD GMD 14: Contribute to actions that help to ground-truth the statewide Greater Sage-Grouse seasonal habitat models for the State of Wyoming.	No changes made.	No change (same as 2015)
MD GMD 15: Use the Sage-grouse Habitat Assessment Framework or best available assessment tool (approved by the AO) when assessing or evaluating Greater Sage-Grouse habitats at multiple scales.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD GMD 16: The official Wyoming Greater Sage-Grouse lek database is maintained by the WGFD in accordance with Appendix 4B of the Umbrella MOU between the WGFD and BLM (WGFD and BLM 1990). The MOU states that agencies will meet at least annually to coordinate and review the accuracy of data, and incorporate the most up-to-date information.	No changes made.	No change (same as 2015)
MD GMD 17: Many Greater Sage-Grouse seasonal habitats within and outside of PHMA (core only) are encumbered by valid existing rights, such as mineral leases or existing rights-of-way. Fluid mineral leases often will include less stringent lease stipulations than the timing, distance, and density requirements identified for consideration in this plan. The BLM will work with proponents holding valid existing leases that include less stringent lease stipulations than the timing, distance, and density restrictions described within this plan to ensure that measurable Greater Sage-Grouse conservation objectives (such as, but not limited to, consolidation of infrastructure to reduce habitat fragmentation and loss, and effective conservation of seasonal habitats and habitat connectivity to support management objectives set by the WGFD) are included in all project proposals.	No changes made.	Completely revised – revised by rangewide
MD GMD 18: PHMA will be designated as OHV Limited Areas. The OHV limitation will ultimately be to "Designated Routes" as determined through a subsequent implementation/activity-level Travel Management Plan. In the interim, motorized use on existing routes may occur; however, no new routes may be created without specific authorization.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD GMD 19: Complete activity-level travel plans within 5 years of the record of decision (ROD) for this planning effort. During activity-level planning, where appropriate, designate routes in PHMA with current administrative/agency purpose or need to administrative access only. Existing plans shall be assessed for consistency with Greater Sage-Grouse conservation objectives.	No changes made.	No change (same as 2015)
MD GMD 20: Construct roads needed for production activities to minimum design standards within PHMA, in compliance with the Density and Disturbance Calculation Tool (DDCT) process.	No changes made.	No change (same as 2015)
MD GMD 21: Field office staff will work with project proponents (including those within the BLM) and the WGFD to site their projects in locations that meet the purpose and need for their project, utilize the DDCT, and have been determined to contain the least sensitive habitats.	No changes made.	No change (same as 2015)
MD GMD 22: Evaluate opportunities to coordinate management plans and strategies on multiple allotments where coordination under a single management plan/strategy will result in enhancing Greater Sage-Grouse populations or its habitat, as determined in coordination with the state wildlife agency and with project proponents, partners, and stakeholders.	No changes made.	No change (same as 2015)
MD GMD 23: Existing RMP decisions, pertaining to non-Greater Sage-grouse resources, will be retained unless vacated or modified by decisions in this ARMPA. Where more restrictive land use allocations or decisions are made in existing RMPs, those more restrictive land use allocations or decisions will remain in effect and will not be amended by this ARMPA.	Existing RMP decisions, pertaining to non-Greater Sage-Grouse resources, will be retained unless vacated or modified by decisions in this ARMPA. Where inconsistencies between the 2015 Greater Sage-Grouse ARMPA and this 2019 Wyoming GrSG ARMPA arise, the 2019 Wyoming GrSG ARMPA decisions and Appendices apply.	Partially revised (from 2019) – to reflect that inconsistencies invoke the most recent planning effort

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD GMD 24: Fire and fuels management actions will be designed to contribute to the protection and enhancement of sagebrush habitat that support Greater Sage-Grouse populations (including large, contiguous blocks of sagebrush).	No changes made.	No change (same as 2015)
MD GMD 25: BLM planning units (Districts), in coordination with the USFWS and relevant state agencies, will complete and continue to update Greater Sage-Grouse Landscape Wildfire & Invasive Species Habitat Assessments to prioritize at-risk habitats, and identify fuels management, preparedness, suppression and restoration priorities necessary to maintain sagebrush habitat to support interconnecting Greater Sage-Grouse populations. These assessments and subsequent assessment updates will also be a coordinated effort with an interdisciplinary team to take into account other Greater Sage-Grouse priorities identified in this plan. 2015 ARPMA Appendix L describes a minimal framework example and suggested approach for this assessment. Implementation actions will be tiered to the Local (District) Greater Sage-Grouse Landscape Wildfire & Invasive Species Assessment using the best available science related to the conservation of Greater Sage-Grouse. In coordination with the USFWS and relevant state agencies, the BLM planning units (Districts) will identify annual treatment needs for wildfire and invasive species management as identified in local unit-level Landscape Wildfire and Invasive Species Assessments. Annual treatment needs will be coordinated across state/regional scales and across jurisdictional boundaries for long-term conservation of Greater Sage-	No changes made.	Partially revised – to update Appendix referenced

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Grouse. These landscape assessment implementation efforts will be reviewed annually with appropriate USFWS and state agency personnel.		
MD GMD 26: Implement a coordinated inter-agency approach to fire restrictions based on National Fire Danger Rating System thresholds (fuel conditions, drought conditions, and predicted weather patterns) for Greater Sage-Grouse habitat.	No changes made.	No change (same as 2015)
MD GMD 27: Within acceptable risk levels, utilize a full range of fire management strategies and tactics, including the management of wildfires, to achieve resource objectives across the range of Greater Sage-Grouse habitat consistent with land use plan direction.	No changes made.	No change (same as 2015)
(No similar action.)	MD GMD 28: The BLM will update its Greater Sage-Grouse habitat management areas, including biologically significant units (BSUs), in conjunction with the State of Wyoming's core areas, upon issuance of any Wyoming Governor's Executive Order revising or amending the core area boundaries and upon completion of appropriate NEPA analysis and process. The BLM will complete the appropriate NEPA documentation (including appropriate public comment) prior to adopting any revised core area boundaries (e.g., maintenance action or plan amendment, environmental assessment, etc.).	Partially revised – to change reference from BSUs to HAF multi-scale areas

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD SSS 1: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: The BLM, in coordination with the State of Wyoming and its agencies, other local partners and stakeholders, will establish monitoring framework (Appendix D) for Greater Sage-Grouse populations and habitat that will be incorporated into individual project approvals, including small and in-house projects, as appropriate and necessary. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Casper RMP:</u> Bates Hole and Fish Creek/Willow Creek: The areas will have priority for vegetation treatments to improve Greater Sage-Grouse habitats and for vegetation monitoring to ensure residual herbaceous vegetation is maintained for nesting cover on public lands.	No changes made.	Partially revised – to update Appendix referenced
MD SSS 2: In PHMA (core only), the density of disturbance of an energy or mining facility (Appendix D) will be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights. The one location and cumulative value of existing disturbances will not exceed 5 percent of suitable habitat of the DDCT area. Inside PHMA, all suitable habitat disturbed (any program area) will not exceed 5 percent within the DDCT area using the DDCT process.	No changes made.	Partially revised – density of disturbance (i.e., 1 per 640) revised to update Appendix referenced; Completely revised – surface disturbance (5%) revised by rangewide and state-specific
MD SSS 3: Inside PHMA (connectivity only), all suitable habitat disturbed (any program area) will not exceed 5 percent of suitable habitat within the DDCT area using the DDCT process.	No changes made.	Completely revised – revised by rangewide and state-specific

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD SSS 4: Within PHMA, Specific to management for Greater Sage-Grouse, all RMPs are amended as follows: In undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation in PHMA, the BLM will require and ensure mitigation that provides a net conservation gain to the species including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. In Wyoming, the USFWS has found that "the core area strategy, if implemented by all landowners via regulatory mechanism, would provide adequate protection for Greater Sage-Grouse and their habitats in the state." The BLM will implement actions to achieve the goal of net conservation gain consistent with the Wyoming Strategy (EO2015-4) that includes "compensatory mitigation as a strategy that should be used when avoidance and minimization are inadequate to protect Core Population Area Greater sage-grouse." Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Pinedale RMP:</u> Off-site mitigation proposed by oil and gas or other operators shall be considered and analyzed in future environmental documents as possible mitigation for proposed activities within the planning area. Proposed off-site mitigation will be described and analyzed for effectiveness in detail on a project-specific basis. Planning for off-site mitigation will be performed in coordination with local	Specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Adopt the State of Wyoming's Greater Sage-Grouse Compensatory Mitigation Framework to the extent consistent with federal law, regulations, and policy. In all Greater Sage-Grouse habitat, when authorizing third-party actions in designated Greater Sage-Grouse habitat, the BLM will seek to achieve the planning-level Greater Sage-Grouse management goals and objectives through implementation of mitigation and management actions, consistent with valid existing rights and applicable law. Under this Plan Amendment, management would be consistent with the Greater Sage-Grouse goals and objectives, and in conformance with BLM Manual 6840, Special Status Species Management. In accordance with BLM Manual 6840, the BLM will undertake planning decisions, actions and authorizations "to minimize or eliminate threats affecting the status of [Greater Sage-Grouse] or to improve the condition of [Greater Sage-Grouse] habitat" across the planning area. Accordingly, before authorizing third-party actions that result in habitat loss and degradation, the BLM will complete the following steps, in alignment with the Governor of Wyoming's Executive Order 2015-4 (July 29, 2015): 1. Work jointly with the WGFD to evaluate projects and recommend mitigation in the form of avoidance and minimization. 2. The WGFD will determine if the State requires or recommends any additional mitigation – including compensatory mitigation – under State regulations, policies, or programs related to the conservation of Greater Sage-Grouse. 3. Incorporate state required or recommended mitigation into the	Completely revised – revised by rangewide

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
government agencies. The need for off-site mitigation will be determined in conformance with current BLM policy, as updated. The order of use of mitigation methods from most to least preferred is as follows: 1. On-site mitigation directly resolving impacts created by the action 2. Off-site mitigation to the resources affected by the action that cannot be resolved on-site 3. Off-site mitigation to similar or related resources affected by the action that cannot be resolved on-site. The following stipulations apply to off-site mitigation measures: 1. Off-site mitigation will be used as a last choice when developing mitigation measures. 2. Off-site mitigation proposals will describe the replacement or substitution activities or methods that are used to address potential impacts on specific resources or environments or both. 3. Off-site mitigation must be as close to "in-kind" in replacement or substitution of resources, habitat function, or environments as practicable (e.g., elk habitat for elk habitat, historical properties for historical properties). 4. Off-site mitigation practices must last as long as the impacts are expected to occur. 5. Off-site mitigation practices are to be developed, conducted or performed, and funded by the project proponent. 6. Off-site mitigation activities must be conducted subject to BLM review and approval that the mitigation will actually address the impacts occurring on the public lands. The priority order for mitigating resource impacts on-site or off-site is as follows:	BLM's NEPA decision-making process, if the WGFD determines that compensatory mitigation is required to address impacts to GRSG habitat as a part of State policy or authorization, or if a proponent voluntarily offers mitigation. 4. Analyze whether the compensatory mitigation (deferring to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action): • achieves measurable outcomes for Greater Sage-Grouse habitat function on a landscape scale as determined by WGFD that are at least equal to the lost or degraded values in accordance with the Governor of Wyoming's Executive Order 2015-4. • provides benefits that are in place for at least the duration of the impacts • accounts for a level of risk that the mitigation action may fail or not persist for the full duration of the impact 5. Ensure mitigation outcomes are consistent with the State of Wyoming's mitigation strategy and principles outlined in 2019 GrSG ARMPA Appendix C, The Greater Sage-Grouse Habitat Management Strategy The BLM has determined that, except where the law specifically requires, compensatory mitigation must be voluntary unless required by other applicable law and in recognition that State authorities may also require compensatory mitigation (IM 2019-018, *Compensatory Mitigation*, December 6, 2018). Therefore, consistent with valid existing rights and applicable law, when authorizing third-party actions that result in habitat loss and	

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1. On-site Mitigation – On-site (avoid, minimize, rectify, or reduce in time). 2. Off-site Mitigation – Local (unless greater resource benefits can be achieved through regional or interstate mitigation). 3. Off-site Mitigation – Regional (unless greater resource benefits can be achieved through interstate mitigation). 4. Off-site Mitigation – Interstate: The preferred area for conducting off-site mitigation is as near (local off-site mitigation) to the project or affected area as possible or as scientific information and impact analysis suggests. 5. Off-site Mitigation – Interstate: The preferred area for conducting off-site mitigation is as near (local off-site mitigation) to the project or affected area as possible or as scientific information and impact analysis suggests.	degradation, the BLM will consider voluntary compensatory mitigation actions only as a component of compliance with a State mitigation plan, program, or authority, or when offered voluntarily by a project proponent. Project-specific analysis will be necessary to determine how a compensatory mitigation proposal addresses impacts from a proposed action. The BLM will cooperate with the State to determine appropriate project design and alignment with State policies and requirements, including those regarding compensatory mitigation. When the BLM is considering compensatory mitigation as a component of the project proponent's submission or based on a mitigation requirement from the State, the BLM's NEPA analysis would evaluate the need to avoid or minimize impacts of the proposed project and achieve the goals and objectives of this RMPA. The BLM will defer to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action.	
MD SSS 5: Greater Sage-Grouse leks inside PHMA: Surface occupancy and surface-disturbing activities will be prohibited on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks (Map 2-8). The AO may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, will not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse.	Greater Sage-Grouse leks inside PHMA: Surface occupancy and surface-disturbing activities will be prohibited on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) (Map 2-8). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SSS 4).	Partially revised (2019) – to update map referenced and update EO referenced and to reference Fluid Mineral Appendix with fluid mineral exceptions, waivers, and modifications (updated to reflect rangewide and state-specific)

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MD SSS 6: Greater Sage-Grouse leks outside PHMA: Surface occupancy and surface-disturbing activities will be prohibited on or within a 0.25-mile radius of the perimeter of occupied Greater Sage-Grouse leks (Map 2-8). The AO may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, will not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse.	Greater Sage-Grouse leks outside PHMA: Surface occupancy and surface-disturbing activities will be prohibited on or within a 0.25-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) (Map 2-8). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4)(see MD SSS 4).	Partially revised (2019) – to update map referenced and update EO referenced and to reference Fluid Mineral Appendix with fluid mineral exceptions, waivers, and modifications (updated to reflect rangewide and state-specific)
MD SSS 7: Greater Sage-Grouse breeding, nesting, and early brood-rearing habitat inside PHMA (core only): Surface-disturbing and/or disruptive activities will be prohibited from March 15–June 30 to protect Greater Sage-Grouse breeding, nesting, and early brood rearing habitat. This timing limitation will be applied throughout the PHMA (core only). Activities in unsuitable habitats will be evaluated under the exception and modification criteria and shall be allowed on a case by case basis. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.	Greater Sage-Grouse breeding, nesting, and early brood-rearing habitat inside PHMA (core only): Surface-disturbing and/or disruptive activities will be prohibited from March 15–June 30 to protect Greater Sage-Grouse breeding, nesting, and early brood rearing habitat. This timing limitation will be applied throughout the PHMA (core only). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SSS 4). Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates, but not both.	Partially revised (2019) – to update EO referenced and to reference Fluid Mineral Appendix with fluid mineral exceptions, waivers, and modifications (updated to reflect rangewide and state-specific)

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MD SSS 8: Sage-Grouse breeding, nesting, and early brood-rearing habitat inside PHMA (connectivity only): Surface-disturbing and/or disruptive activities will be prohibited within PHMA (connectivity only) from March 15–June 30 to protect breeding, nesting, and early brood-rearing habitats within 4 miles of the lek or lek perimeter of any occupied Greater Sage-Grouse lek within identified PHMA (connectivity only). This timing limitation will be applied throughout the PHMA (connectivity only Activities in unsuitable habitats will be evaluated under the exception and modification criteria and may be allowed on a case-by-case basis. Where credible data support different timeframes for this seasonal restriction, dates can be shifted by 14 days prior or subsequent to the above dates.	Greater Sage-Grouse breeding, nesting, and early brood-rearing habitat inside PHMA (connectivity only): Surface-disturbing and/or disruptive activities will be prohibited from March 15–June 30 to protect breeding, nesting, and early brood-rearing habitats within 4 miles of the perimeter of any occupied Greater Sage-Grouse lek (or lek center if no perimeter is yet mapped) within identified PHMA (connectivity only). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SSS 4).-Where credible data support different timeframes for this seasonal restriction, dates can be shifted by 14 days prior or subsequent to the above dates, but not both.	Partially revised (2019) – to update EO referenced and to reference Fluid Mineral Appendix with fluid mineral exceptions, waivers, and modifications (updated to reflect rangewide and state-specific)
MD SSS 9: Greater Sage-Grouse breeding, nesting, and early brood-rearing habitat outside PHMA: Surface-disturbing and/or disruptive activities will be prohibited from March 15—June 30 to protect Greater Sage-Grouse nesting and early brood rearing habitat within 2 miles of the lek or lek perimeter of an occupied lek located outside PHMA. Where credible data support different timeframes for this seasonal restriction, dates may be expanded up to 14 days prior to or subsequent to the above dates.	Greater Sage-Grouse breeding, nesting, and early brood-rearing habitat outside PHMA: Surface-disturbing and/or disruptive activities will be prohibited from March 15—June 30 to protect Greater Sage-Grouse breeding, nesting, and early brood rearing habitat within 2 miles of the perimeter of an occupied lek (or lek center if no perimeter is yet mapped) located outside PHMA. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SSS 4). Where credible data support different timeframes for this seasonal restriction, dates may be expanded up to 14 days prior to or subsequent to the above dates but not both.	Partially revised (2019) – to update EO referenced and to reference Fluid Mineral Appendix with fluid mineral exceptions, waivers, and modifications (updated to reflect rangewide and state-specific)

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MD SSS 10: Sage-Grouse Winter Concentration Areas: Surface-disturbing and/or disruptive actives in Greater Sage-Grouse winter concentration areas would be prohibited from December 1—March 14. Activities in unsuitable habitats within PHMA would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis. Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are identified as supporting populations of Greater Sage-Grouse that attend leks within PHMA (core only). Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated on consultation with the WGFD in all identified winter concentration areas.	Greater Sage-Grouse Winter Concentration Areas: Surface-disturbing and/or disruptive actives in Greater Sage-Grouse winter concentration areas would be prohibited from December 1—March 14. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SSS 4). Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated on consultation with the WGFD in all identified winter concentration areas.	Partially revised (2019) – to update EO referenced, include SHMA, and to reference Fluid Mineral Appendix (updated to reflect rangewide and state-specific) for winter concentration areas in PHMA
MD SSS 11: The BLM will support other agencies in their efforts to minimize impacts from predators. The BLM will implement strategies and techniques in land management decisions that address predators shown to pose a threat to Greater Sage-Grouse (Appendix N). The BLM will support and encourage other agencies in their efforts to minimize impacts from predators on Greater Sage-Grouse where needs have been documented.	The BLM will support other agencies in their efforts to minimize impacts from predators. The BLM will implement strategies and techniques in land management decisions that address predators shown to pose a threat to Greater Sage-Grouse (2015 ARMPA Appendix N). The BLM will support and encourage other agencies in their efforts to minimize impacts from predators on Greater Sage-Grouse where needs have been documented.	Completely revised – revised by rangewide

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MD SSS 12: New project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek from 6:00 pm to 8:00 am during the breeding season (March 1–May 15). Specific noise protocols for measurement and implementation will be developed as additional research and information emerges.	Within PHMA (core only), new project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek (or lek center if no perimeter is yet mapped) from 6:00 pm to 8:00 am during the breeding season (March 1–May 15). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SSS 4). In coordination with the State of Wyoming, specific noise protocols for measurement and implementation will be developed as additional research and information emerges. These measures would be considered at the site-specific project level where and when appropriate.	Partially revised (2019) – to update EO referenced
MD SSS 13: The Greater Sage-Grouse adaptive management plan (Appendix D) provides a means of addressing and responding to unintended negative impacts on Greater Sage-Grouse, and its habitat will be addressed before consequences become severe or irreversible. The Wyoming Greater Sage-Grouse ARMPA will include the requirement for projects requiring an EIS to develop adaptive management strategies in support of the population management objectives for Greater Sage-Grouse set by the State of Wyoming. Wyoming ADPPs will include an adaptive management plan, as reviewed by the BLM WO, Solicitor's Office, and USFWS, which includes: Upon determination that a hard trigger is tripped, the BLM will immediately defer issuance of discretionary authorizations for new actions for a period of 90 days.	The Greater Sage-Grouse adaptive management plan (2019 Wyoming GrSG ARMPA Appendix C) provides a means of addressing and responding to unintended negative impacts on Greater Sage-Grouse, and its habitat will be addressed before consequences become severe or irreversible. The Wyoming Greater Sage-Grouse ARMPA will include the requirement for projects requiring an EIS to develop adaptive management strategies in support of the population management objectives for Greater Sage-Grouse set by the State of Wyoming. Wyoming ADPPs will include an adaptive management plan, as reviewed by the BLM WO, Solicitor's Office, and USFWS, which includes: Upon determination that a hard trigger is tripped, the BLM will immediately defer issuance of discretionary authorizations for	Completely revised – revised by rangewide

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In addition, within 14 days of a determination, the AMWG will convene to develop an interim response strategy and initiate an assessment to determine the causal factors. Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives. With respect to Greater Sage-Grouse, all regulatory entities in Wyoming, including the BLM, use soft and hard triggers. Soft and hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts. In making amendments to this plan, the BLM will coordinate with the USFWS as the BLM continues to meet its objective of conserving, enhancing, and restoring Greater Sage-Grouse habitat by reducing, minimizing, or eliminating threats to that habitat. The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter. <u>Soft Triggers:</u> Soft triggers are indicators that management or specific activities may not be achieving the intended results of conservation action or that unanticipated changes to populations or habitats have occurred that have the potential to place habitats or populations at risk. The soft trigger is any deviation from normal trends in habitat or population in any given year. Metrics include, but are not limited to, annual lek counts, wing counts, aerial surveys, habitat monitoring, and DDCT evaluations. BLM field offices, with the assistance of their respective land and resource management plan implementation	new actions for a period of 90 days. In addition, within 14 days of a determination, the AMWG will convene to develop an interim response strategy and initiate an assessment to determine the causal factors. The AMWG would define a process to review and reverse adaptive management actions once the identified causal factor is resolved (e.g., returning to previous management once objectives of interim management strategy have been met). Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives. With respect to Greater Sage-Grouse, all regulatory entities in Wyoming, including the BLM, use soft and hard triggers. Soft and hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts. In making amendments to this plan, the BLM will coordinate with the USFWS as the BLM continues to meet its objective of conserving, enhancing, and restoring Greater Sage-Grouse habitat by reducing, minimizing, or eliminating threats to that habitat. The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter. <u>Soft Triggers:</u> Soft triggers are indicators that management or specific activities may not be achieving the intended results of conservation action or that unanticipated changes to populations or habitats have occurred that have the potential to place habitats or populations at risk. The soft trigger is any deviation from normal trends in habitat or	

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groups, local WGFD offices, and local Greater Sage-Grouse working groups, will evaluate the metrics with the AMWG on an annual basis. For population metrics, normal population trends are calculated as the 5-year running mean of annual population counts. The purpose of these strategies is to address localized Greater Sage-Grouse population and habitat changes by providing the framework in which management will change if monitoring identifies negative population and habitat anomalies in order to avoid crossing a hard trigger threshold. Hard Triggers: Hard triggers are indicators that management is not achieving desired conservation results. Hard triggers will be considered a catastrophic indicator that the species is not responding to conservation actions, or that a larger-scale impact or set of impacts is having a negative effect. Within the range of normal population variables (5-year running mean of annual population counts), hard triggers shall be determined to take effect when two of the three metrics exceeds 60 percent of normal variability for the area under management in a single year, or when any of the three metrics exceeds 40 percent of normal variability for a 3-year time period within a 5-year range of analysis. A minimum of 3 consecutive years in a 5-year period is used to determine trends (i.e., Y1-2-3, Y2-3-4, Y3-4-5).	population in any given year. Metrics include, but are not limited to, annual lek counts, wing counts, aerial surveys, habitat monitoring, and DDCT evaluations. BLM field offices, with the assistance of their respective land and resource management plan implementation groups, local WGFD offices, and local Greater Sage-Grouse working groups, will evaluate the metrics with the AMWG on an annual basis. For population metrics, normal population trends are calculated as the 5-year running mean of annual population counts. The purpose of these strategies is to address localized Greater Sage-Grouse population and habitat changes by providing the framework in which management will change if monitoring identifies negative population and habitat anomalies in order to avoid crossing a hard trigger threshold. Hard Triggers: Hard triggers are indicators that management is not achieving desired conservation results. Hard triggers will be considered a catastrophic indicator that the species is not responding to conservation actions, or that a larger-scale impact or set of impacts is having a negative effect. Within the range of normal population variables (5-year running mean of annual population counts), hard triggers shall be determined to take effect when two of the three metrics exceeds 60 percent of normal variability for the area under management in a single year, or when any of the three metrics exceeds 40 percent of normal variability for a 3-year time period within a 5-year range of analysis. A minimum of 3 consecutive years in a 5-year period is used to determine trends (i.e., Y1-2-3, Y2-3-4, Y3-4-5).	

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MD SSS 14: Designate SFAs as shown on Map 1-2 (1,915,990 acres). SFAs will be managed as PHMA, with the following additional management: Recommended for withdrawal from the General Mining Act of 1872, subject to valid existing rights, the lands shown in Map 2-3 (252,160 acres), and 2) Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration (see specific management sections).	Lands identified as Sagebrush Focal Areas (SFAs) will no longer be designated as SFAs. Lands previously identified as SFAs will be managed as Priority Habitat Management Areas (PHMAs), consistent with Core Area boundaries.	No change (same as 2019)
MD VEG 1: Manage vegetation composition, diversity, and structure, as determined by ESD, or other methods that reference site potential, and WGFD protocols, to achieve Greater Sage-Grouse habitat management objectives, in cooperation with stakeholders.	No changes made.	No change (same as 2015)
MD VEG 2: Within PHMA in northeast Wyoming (as mapped in EO 2015-4), vegetation treatments in nesting and wintering habitat that will reduce sagebrush canopy to less than 15 percent will not be conducted.	No changes made.	Partially revised – to update EO referenced
MD VEG 3: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: For vegetation treatments in sagebrush within PHMA, refer to 2015 ARMPA Appendix H, WGFD Protocols for Treating Sagebrush to Benefit Sage-Grouse (WGFD 2011, as updated) and BLM Washington Office Instruction Memorandum 2013-128 (Sage-grouse Conservation Related to Wildland Fire and Fuels Management). These recommended protocols will be used in determining whether proposed treatment constitutes a "disturbance" that will contribute	No changes made.	Partially revised – to update Appendix referenced and WGFD Protocols for Treating Sagebrush version referenced

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toward the 5 percent threshold within PHMA maintenance. Additionally, these protocols will be used to determine whether the proposed treatment configuration is expected to have neutral or beneficial impacts for PHMA (core only) populations or if they represent additional habitat loss or fragmentation. Treatments to enhance sagebrush/grasslands habitat for Greater Sage-Grouse will be evaluated based on habitat quality and the functionality/use of treated habitats post-treatment. The BLM will work collaboratively with partners at the state and local level to maintain and enhance Greater Sage-Grouse habitats. Seasonal restriction would be applied, as needed, for implementing fuels management treatments according to the type of seasonal habitat present. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Green River RMP:</u> Prescribed burns generally will be conducted in areas having greater than 35 percent sagebrush composition, 20 percent desirable grass composition, and greater than 10 inches of precipitation. Other vegetation manipulation methods will be considered on a case-by-case basis depending on objectives and cost benefits. <u>Casper RMP:</u> Decision 4053: The areas (Bates Hole and Fish Creek/Willow Creek) will have priority for vegetative treatments to improve Greater Sage-Grouse habitats and for vegetation monitoring to ensure residual herbaceous vegetation is maintained for nesting cover on public lands.		

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MD VEG 4: Within PHMA, grazing will be deferred on treated areas for two full growing seasons unless vegetation objectives or vegetation recovery indicates a shorter or longer rest period is necessary based on vegetation monitoring results.	No changes made.	No change (same as 2015)
MD VEG 5: Reclamation of surface disturbances in PHMA will be consistent with the Wyoming Reclamation Policy (BLM 2009a), vegetation objectives (Table 2-2 and 2-3), and Appendix M. A monitoring plan will be developed for each restoration or reclamation project and will report progress and changes in resource condition.	No changes made.	Partially revised – to update vegetation objectives Tables referenced and Appendix referenced
MD VEG 6: Areas for vegetation restoration and/or restoration criteria that include state Greater Sage-Grouse conservation plans and appropriate local information will be identified. The use of native plants and seeds for restoration will be required unless the probability for success is low (nonnative plants and seeds may be used as long as they meet Greater Sage-Grouse habitat objectives), and restoration management will be designed to obtain long-term persistence based on ESD. Reestablishment of sagebrush cover and desirable understory plants will be the highest priority for restoration efforts. Landscape patterns that most benefit Greater Sage-Grouse will be restored and created, considering potential changes in climate.	No changes made.	No change (same as 2015)
MD VEG 7: Within PHMA, implementation of restoration projects will be prioritized based on environmental variables that improve chances for project success in areas most likely to benefit Greater Sage-Grouse. Restoration will be prioritized in seasonal habitats that are thought to be limiting Greater Sage-Grouse distribution and/or abundance.	No changes made.	No change (same as 2015)

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MD VEG 8: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Where probability of success or native seed availability is low or where there is a specific identified purpose that cannot be met with natives, nonnative seeds can be used provided they meet Greater Sage-Grouse habitat conservation and vegetation (see Tables 2-2 and 2-3) objectives. The use of native seeds for fuels management treatment will be prioritized based on availability, adaptation (site potential), and probability of success. Where probability of success or native seed availability is low, non- native seeds may be used to meet Greater Sage-Grouse habitat objectives to trend toward restoring the fire regime. When reseeding, use fire resistant native and nonnative species, as appropriate, to provide for fuel breaks. Native seed allocation will be prioritized for use in Greater Sage-Grouse habitat. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Kemmerer RMP:</u> Require the use of certified weed-free seed and mulch for rehabilitation projects. <u>Pinedale RMP:</u> Disturbed areas will be reclaimed to native site plant composition. If reclamation of original plant composition is impossible or not desirable, reclamation will achieve a native plant community that meets the Wyoming Standards for Rangeland Health.	No changes made.	Partially revised – to update vegetation objectives Tables referenced

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MD VEG 9: Post emergency stabilization and rehabilitation (ES&R) and burn area emergency rehabilitation (BAER) management will be designed to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse, and travel management, etc., to achieve and maintain the desired condition of ES&R and BAER projects to benefit Greater Sage-Grouse (Eiswerth and Shonkwiler 2006).	No changes made.	No change (same as 2015)
MD VEG 10: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to Greater Sage-Grouse habitat to determine if they should be restored to sagebrush or habitat of higher quality for Greater Sage-Grouse. If these seedings provide value in conserving or enhancing Greater Sage-Grouse habitats, then no restoration would be necessary. Assess the compatibility of these seedings for Greater Sage-Grouse habitat during the land health assessments.	No changes made.	No change (same as 2015)
MD VEG 11: Priority will be given for implementing specific Greater Sage-Grouse habitat restoration projects in areas invaded by annual grasses first to sites that are adjacent to or surrounded by PHMA. Areas invaded by annual grasses will be second priority for restoration when the sites are not adjacent to PHMA, but are within 2 miles of PHMA. The third priority for areas invaded by annual grasses habitat restoration projects will be sites beyond 2 miles of PHMA. The intent will be to focus restoration outward from existing, intact habitat.	No changes made.	No change (same as 2015)

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MD VEG 12: In fire prone areas where sagebrush seed is required for Greater Sage-Grouse habitat restoration, the BLM will consider establishing seed harvest areas that are managed for seed production and are a priority for protection from outside disturbances.	No changes made.	No change (same as 2015)
MD VEG 13: Vegetation treatment proposals must include evaluation of soils, precipitation, invasive/exotic plants, as well as the current condition of PHMA. Avoid aerial pesticide/herbicide spraying in favor of ground applications to minimize drift into nontarget areas in Greater Sage-Grouse habitat unless benefits of treatments are likely to outweigh impacts.	No changes made.	No change (same as 2015)
MD VEG 14: Treat areas that contain cheatgrass and other invasive or noxious species to minimize competition and favor establishment of desired species.	No changes made.	No change (same as 2015)
MD VEG 15: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: The BLM can implement treatments within PHMA where outbreaks of grasshopper or Mormon cricket populations are expected to rise above economic levels. Treatments must be conducted only following reduced agent-area treatments protocols. The BLM will work collaboratively with partners at the federal, state, and local levels, including the Wyoming Weed and Pest Districts within the counties where the treatment is to occur, to maintain and enhance Greater Sage-Grouse habitats in a manner consistent with the core population area strategy for conservation. The BLM will be directed to utilize the Wyoming Grasshopper and Mormon Cricket Control website as a resource for updated information when conducting analysis of grasshopper and	No changes made.	No change (same as 2015)

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Mormon cricket control in Greater Sage-Grouse habitats. Avoid aerial pesticide/herbicide spraying in favor of ground applications to minimize drift into nontarget areas in Greater Sage-Grouse habitat unless benefits of treatments are likely to outweigh impacts. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Casper RMP:</u> Work with Animal and Plant Health Inspection Service to control outbreaks of grasshoppers and Mormon crickets on public lands in the planning area in accordance with the MOU between U.S. Department of the Interior and Animal and Plant Health Inspection Service.		
MD FIRE 1: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: For Wildland Fire Management, the protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection. The goal is to restore, enhance, and maintain areas suitable for Greater Sage-Grouse. Greater Sage-Grouse habitat (GHMA) will be prioritized commensurate with local fire plans, property values and other important habitat to be protected, with the goal to restore, enhance, and maintain areas suitable for Greater Sage-Grouse. PHMA (and Priority Areas for Conservation, if so determined by individual RMP efforts) will be the highest priority for conservation	No changes made.	Partially revised – to update Appendix referenced and to include SHMA

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
and protection during fire operations and fuels management decision-making. The PHMA will be viewed as more valuable than GHMA when priorities are established. When suppression resources are widely available, maximum efforts will be placed on limiting fire growth in GHMA polygons as well. These priority areas will be further refined following completion of the Greater Sage-Grouse Landscape Wildfire and Invasive Species Habitat Assessments described in Appendix L. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: Casper RMP: Appropriate management response will be used on all wildfires in the planning area. Full protection strategies and tactics will be used in the following areas: 1. Wildland Urban Interface (WUI) 2. Wildland industrial interface 3. Developed recreation sites 4. Developed electronics sites of all types. In all other areas appropriate management response (AMR) strategies and tactics will be determined by (but not limited to) the following: 1. Firefighter and public safety 2. Resource values at risk 3. Proximity to private land 4. Firefighting resource availability. Tactical constraints follow: 1. The use of retardant within 300 feet of surface water (standing or running) is prohibited. 2. No trees are to be cut during suppression activities within 200 yards of an identified bald eagle roost. No heavy equipment will be used within the following areas, except when human safety is at risk:		

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1. Areas of cultural resource sensitivity 2. Riparian/wetland habitats 3. Big game crucial winter range habitats 1. Greater Sage-Grouse leks 2. Areas of highly erosive soils. In areas not identified as full protection, heavy equipment usage will be limited to existing roads and trails or immediately adjacent to them. <u>Kemmerer RMP:</u> In areas of high-density urban and (or) industrial interface with intermingled BLM-administered lands, suppression objectives will follow the AMR in an approved fire management plan for the planning area to provide first for human health and safety, while minimizing loss of property and threats to other surface owners. Generally, wildland fires are suppressed in these areas. In areas of low-density urban and (or) industrial interface where BLM-administered lands occur in large contiguous blocks, fire suppression objectives will follow the AMR in an approved fire management plan for the planning area to provide first for human health and safety, while allowing for achievement of resource objectives. <u>Newcastle RMP:</u> Full suppression will be used on fires endangering human life or that spread to within 0.25 miles of state or private lands, structures and facilities, oil and gas fields, important riparian habitat, or other sensitive resources. All wildfires will be evaluated to determine the need for rehabilitation or restoration measures. Restoration of burned areas will be by natural succession unless a special need is identified to prevent further resource damage. <u>Pinedale RMP:</u> Wildland fire mitigation and fuels activities will be managed to		

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provide for firefighter and public safety as a first priority. Public lands within intermixed land ownership areas will be managed in association with the adjoining and nearby private and state lands. Areas of mixed land ownership, communities at risk as identified in the *Federal Register*, Volume 66, Number 160, 2001 (Antelope Run, Beaver Creek area, Boulder, Cottonwood Creek, Daniel, Forty Rod, Hoback Ranches, New Fork, Pinedale, Pocket Creek, and Upper Green); urban and industrial interface areas; and areas containing high-priority resource values have high priority for response to wildland fires and/or for fuels reduction and mitigation. Wildland fire suppression activities will be based on the AMR. Rawlins RMP: A high priority for fire management activities will be given to areas identified as communities at risk, industrial interface areas, and areas containing resource values considered high priority within the RMP planning area. Green River RMP: Wildfire suppression will emphasize AMR. Immediate control actions will be used only in cases of arson, direct threat to public safety, or a strong potential threaten structural property. Fire suppression actions will be based on achieving the most efficient control and allowing historical acres burned to increase. Activity plans will be developed for designated fire management areas defining specific parameters for all fire occurrences. JMH CAP: Appropriate management response to protect the basin big sagebrush/lemon scurfpea plant communities will be applied. Wildland and prescribed fires will be managed in all vegetation types		

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to maintain or improve biological diversity and the overall health of the public lands. In particular, plant species and age class diversity will be a priority; thus, AMR for all wildland fires will be identified and implemented depending on the resources and management objectives for the area. Suppression techniques and hazardous fuels reduction activities will be identified to reduce wildland fire severity and occurrence on portions of the landscape where fire causes undesirable changes in plant community composition and structure. A site-specific analysis will be prepared for sensitive resource areas, such as special status plant species sites, heritage sites, historic trails, and areas of critical environmental concern (ACECs), to determine the type of fire suppression activity that will be acceptable. Fire equipment and fire suppression techniques, such as vegetation clearing, will be limited to existing roads and trails in special status plant species habitat. As appropriate, the Fire Management Plan will be updated to reflect the appropriate suppression activity in sensitive resource areas.		
MD FIRE 2: In PHMA, fuels treatments will be designed and implemented with an emphasis on protecting existing sagebrush ecosystems and enhancing and protecting future sagebrush ecosystems (refer to WGFD Protocols for Treating Sagebrush to Benefit Sage-grouse [WGFD 2011, as updated]) and 2015 ARMPA Appendix H. These recommended protocols will be used in determining whether proposed treatment constitutes a "disturbance" that will contribute toward the 5 percent threshold for habitat maintenance. Fuel treatments will be designed	No changes made.	Partially revised – to update Appendices referenced

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
through an interdisciplinary process to expand, enhance, maintain, and protect Greater Sage-Grouse habitat. Green strips (using native fire resistant/resilient species) and/or fuel breaks will be used, where appropriate, to protect seeding efforts from subsequent fire events. In coordination with the USFWS and relevant state agencies, BLM planning units (Districts) with large blocks of Greater Sage-Grouse habitat will develop, using the assessment process described in 2015 ARMPA Appendix L, a fuels management strategy which considers an up-to-date fuels profile, land use plan direction, current and potential habitat fragmentation, sagebrush and Greater Sage-Grouse ecological factors, and active vegetation management steps to provide critical breaks in fuel continuity, where appropriate. When developing this strategy, planning units will consider the risk of increased habitat fragmentation from a proposed action versus the risk of large scale fragmentation posed by wildfires if the action is not taken. Utilizing an interdisciplinary approach, a full range of fuel reduction techniques will be available. Fuel reduction techniques such as grazing, prescribed fire, chemical, biological, and mechanical treatments will be acceptable. Upon project completion, fuels projects will be monitored and managed to ensure long-term success, including persistence of seeded species and/or other treatment components. Invasive vegetation post-treatment will be controlled. Wildfire prevention plans will be developed that explain the resource value of Greater Sage-Grouse habitat and include fire prevention messages and actions to reduce human-caused ignitions.		

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MD FIRE 3: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: For fuels management, the BLM will consider multiple tools for fuels reduction and will analyze in NEPA compliance documentation before electing to implement prescribed fire in PHMA. If prescribed fire is used in Greater Sage-Grouse habitat, the NEPA analysis for the Burn Plan will address: • Why alternative techniques were not selected as a viable options • How Greater Sage-Grouse goals and objectives will be met by its use • How the COT (Conservation Objectives Team) report objectives will be addressed and met • A risk assessment to address how potential threats to Greater Sage-Grouse habitat will be minimized. Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that protect Greater Sage-Grouse habitat in PHMA (e.g., creation of fuel breaks that disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce	No changes made.	Partially revised – to update Appendix referenced

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
wildfire risk around and/or in the winter range and designed to protect winter range habitat quality. Refer to 2015 ARMPA Appendix H, WGFD Protocols for Treating Sagebrush to Benefit Sage-grouse (WGFD 2011, as updated) and BLM Washington Office Instruction Memorandum 2013-128. If prescribed fire activities are not in compliance with these protocols, the treatment will be considered a PHMA disturbance. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: Casper RMP: Use prescribed burning to achieve measurable 5th-order watershed objectives from (1) other resources, including, but not limited to, forestry, wildlife, range, vegetation, and watershed; (2) the reduction of hazardous fuels; and (3) the introduction of fire into fire-adapted ecosystems. Green River RMP/JMH CAP: Prescribed fire will generally be the preferred method of vegetation manipulation to convert decadent stands of brushland to grasslands and to stimulate sprouting of old, decadent aspen stands and/or shrub species. Prescribed burns are preferred in areas having greater than 35 percent sagebrush composition, 20 percent desirable grass composition, and greater than 10 inches of precipitation. Rawlins RMP: Fuel treatments, including prescribed fire, mechanical, chemical, and biological treatments will be used for fuels reduction and to meet other multiple-use resource objectives, including returning fire to its natural role in the ecosystem. WUIs and communities at risk will receive priority for fuels reduction.		

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MD FIRE 4: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Remove conifers encroaching into sagebrush habitats in a manner that considers tribal cultural values. Prioritize treatments closest to occupied Greater Sage-Grouse habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those included in the FIAT (Fire and Invasive Species Assessment) report (Chambers et. al., 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: Casper RMP: Treat woodland encroachment in grassland, sagebrush, aspen, and other vegetative communities where it is determined to be detrimental to other resource values or uses. Manage 630,180 acres of sagebrush communities toward Desired Plant Community.	No changes made.	No change (same as 2015)
MD FIRE 5: The following RMP decisions remain in effect for both PHMA and GHMA: <u>Pinedale RMP:</u> In the WUI or industrial interface, fuels reduction methods best suited to the area will be used to reduce the risk of catastrophic fire to these areas. <u>Casper RMP:</u> Use prescribed burning to achieve measurable 5th-order watershed objectives from (1) other resources, including, but not limited to, forestry, wildlife, range, vegetation, and watershed; (2) the reduction of hazardous fuels; and (3) the introduction of fire into fire-adapted	No changes made.	Partially revised – to include SHMA

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
ecosystems. Utilize an integrated management technique approach (defined as prescribed fire, mechanical, chemical, or biological, followed by desired reseeding) to reduce fuels to protect high priority areas or resource values defined as, but not limited to the following: • Urban and industrial interface areas • Developed recreation areas • Commercial timber areas • Wildlife habitats • Range-improvement facilities • Communication sites • Municipal watersheds. Decision 3008 Fuels Management. <u>Rawlins RMP:</u> A high priority for fire management activities will be given to areas identified as communities at risk, industrial interface areas, and areas containing resource values considered high priority within the RMP planning area. <u>JMH CAP:</u> Appropriate management response to protect the basin big sagebrush/lemon scurfpea plant communities will be applied. Wildland and prescribed fires will be managed in all vegetation types to maintain or improve biological diversity and the overall health of the public lands. In particular, plant species and age class diversity will be a priority; thus, AMR for all wildland fires will be identified and implemented depending on the resources and management objectives for the area. Suppression techniques and hazardous fuels reduction activities will be identified to reduce wildland fire severity and occurrence on portions of the landscape where fire can cause undesirable changes in plant community composition and structure. A site-specific analysis will be prepared for sensitive resource areas, such as special status plant		

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species sites, heritage sites, historic trails, and ACECs, to determine the type of fire suppression activity that will be acceptable. Fire equipment and fire suppression techniques, such as vegetation clearing, will be limited to existing roads and trails in special status plant species habitat. As appropriate, the Fire Management Plan will be updated to reflect the appropriate suppression activity in sensitive resource areas.		
MD FIRE 6: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Burned areas within PHMA will be restored to suitable habitat with consideration given to ESDs, reference sites, site potential, habitat objectives and local variability. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: Kemmerer RMP: Implement BLM Emergency Stabilization and Rehabilitation standards located in the DOI Interagency Burned Area Emergency Response Guidebook and BLM Burned Area Emergency Stabilization and Rehabilitation Handbook on wildland fires to protect and sustain healthy ecosystems and protect life and property. Newcastle RMP: All wildfires will be evaluated to determine the need for rehabilitation or restoration measures. Restoration of burned areas will be by natural succession unless a special need is identified to prevent further resource damage. Rawlins RMP: Rehabilitation and restoration efforts specific to a fire event will be undertaken to protect and sustain ecosystems, public health and safety, and to help communities protect infrastructure.	No changes made.	No change (same as 2015)

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MD FIRE 7: Within PHMA, post fuels management projects will be designed to ensure long-term persistence of seeded or pre-treatment native plants (while controlling for erosion and treating infestation of invasive plant species), to return to suitable sage-grouse habitat.	No changes made.	No change (same as 2015)
MD LG 1: The BLM policy in WO-IM-2009-007 and BLM Handbook H-4180-1 will be used to evaluate land health standards achievement in PHMA (core only) and, where not achieved, to determine if existing grazing management practices or levels of grazing use on public lands are significant factors in failing to achieve the standards and conform with the guidelines, which through this process will identify appropriate actions to address nonachievement and nonconformance. When determining appropriate actions to address nonachievement of land health standards and nonconformance with the guidelines due to existing grazing management practices or levels of grazing use, management actions including but not limited to the following will be considered singly or in combination: 1. Season or timing of use 2. Numbers of livestock (includes temporary nonuse or livestock removal) 3. Distribution of livestock use 4. Intensity of use 5. Kind of livestock (e.g., cattle, sheep, horses, llamas, alpacas and goats) 6. Class of livestock (e.g., yearlings versus cow calf pairs) 7. Range improvements. Refer to the document, "Grazing Influence, Management, and Objective Development in Wyoming's Greater Sage-Grouse Habitat" (Cagney et al. 2010) for guidance when considering appropriate management actions to achieve conformance.	No changes made.	Completely revised – revised by rangewide

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MD LG 2: Within PHMA the BLM will work cooperatively with permittees, lessees, and other landowners to develop voluntary grazing management strategies that integrate both public and private lands into single management units to improve Greater Sage-Grouse habitat.	No changes made.	No change (same as 2015)
MD LG 3: The following RMP decisions remain in effect: Casper RMP: Grazing leases will be adjusted where an evaluation of monitoring, field observations, or other data indicate changes, and either increases or decreases, in forage allocation are needed or when necessary or required by other applicable law or regulation. Kemmerer RMP: Vegetative communities will be managed in accordance with Wyoming Standards for Healthy Rangelands. Appropriate livestock grazing management actions will be developed and integrated to address rangeland health standards, improve forage for livestock, and enhance rangeland health. Newcastle RMP: Any adjustments in livestock grazing use will be made as a result of monitoring and consultation with grazing permittees. Monitoring studies will be conducted using the current BLM-approved methodology. Pinedale RMP: Monitoring of the range and the vegetation resource will be conducted at a level sufficient to detect changes in grazing use, trend, and range conditions. Monitoring will be tied to land health standards and indicators that help determine change in status and progress toward meeting objectives. Data will be used to direct and support grazing management decisions consistent	No changes made.	Completely revised – revised by rangewide

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with national policy. Rawlins RMP: Livestock grazing will be managed to meet the Wyoming Standards for Healthy Rangelands. Green River RMP/JMH CAP: The kinds and seasons of livestock grazing use will continue to be licensed until monitoring, negotiation, consultation, or a change in resources conditions indicate that a modification is needed. Monitoring will be continued or initiated following adjustments in grazing use to assure that grazing and other management objectives are being met.		
MD LG 4: Within PHMA, all BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives. If monitoring data show the habitat objectives have not been met nor progress being made toward meeting them, there will be an evaluation and a determination made as to the cause. If it is determined that the authorized use is a significant factor in failing to achieve the standards for healthy rangelands, the use will be adjusted by the response specified in the instrument that authorized the use. The NEPA analysis for renewals and modifications of livestock grazing permits/leases that includes lands within SFAs and PHMA will include specific management thresholds based on GRSG habitat objectives (Tables 2-2 and 2-3) and Land Health Standards (43 CFR 4180.2), and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.	Within PHMA, if monitoring data show the wildlife/special status species standard has not been met nor progress being made toward meeting that standard, there would be an evaluation and a determination made as to the cause. If it is determined that the current authorized livestock use is a significant causal factor in failing to achieve the wildlife/special status species standards, the BLM would address the achievement or progress toward achieving the LHSs (43 CFR 4180.2) and, if needed, Greater Sage-Grouse habitat maintenance or improvement. When NEPA analysis is required for a specific implementation action, one alternative would include mechanisms to make adjustments to meet or make progress toward meeting the wildlife/special status species standard. The analysis should also identify the BLM-approved data collection methodologies used for monitoring conditions and determining when adjustments are necessary. If current grazing management meets land health standards and provides for Greater Sage-Grouse habitat, there would	Completely revised – revised by rangewide

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	be no need to analyze an alternative for Greater Sage-Grouse. Authorized uses in PHMA that incorporate habitat objectives for Greater Sage-Grouse must develop desired conditions based on Greater Sage-Grouse habitats present in the allotment and the ecological potential of sites that supports these habitats. Metrics used to monitor for objectives must be developed and inform the wildlife/SSS portion of the Standards for Healthy Rangelands. Within PHMA, seasonal habitat objectives for Greater Sage-Grouse apply only to those habitats delineated within an allotment during the specific season (e.g., breeding season objectives during breeding season). Data needed to inform the relationship between the authorized use and habitat condition would come from sample locations that appropriately reflect the impact of the authorized use on habitat conditions. Data points should fall within Greater Sage-Grouse seasonal habitat areas and be collected on ecological sites that have the potential to produce Greater Sage-Grouse habitat.	
MD LG 5: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: BLM monitoring would be used to evaluate progress toward achieving land health standards within PHMA and, where not achieved, to determine if existing grazing management practices or levels of grazing use on public lands are significant factors in failing to meet, maintain or make progress toward achieving the standards and conform with the guidelines, which through this process will identify appropriate actions to address nonachievement and nonconformance.	Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: BLM monitoring would be used to evaluate progress toward achieving land health standards within PHMA and, where not achieved, to determine if existing grazing management practices or levels of grazing use on public lands are significant factors in failing to meet, maintain or make progress toward achieving the standards and conform with the guidelines, which through this process will identify appropriate actions to address nonachievement and nonconformance.	Completely revised by rangewide for All RMPs amended for management of GRSG in PHMA No change (same as 2019) for decisions that remain in effect with the modification described above

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Allotments within SFAs, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks include monitoring for actual use, utilization, and use supervision. The BLM would prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in SFAs followed by PHMA outside of the SFAs. In setting workload priorities, precedence would be given to existing permits/leases in these areas not meeting LHSs, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Casper RMP:</u> Conversions in kinds of livestock and changes in season of use will be considered on a case-by-case basis through an environmental analysis. Such changes will be consistent with rangeland health objectives. Grazing leases will be adjusted to accurately reflect the kind of livestock use on public land in all allotments. <u>Kemmerer RMP:</u> Current amounts, kinds, and seasons of livestock grazing uses will be authorized until rangeland health standards assessment results and (or) monitoring indicates a grazing use adjustment is necessary, or that a kind and (or) class of livestock or season of use	The BLM would prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence would be given to existing permits/leases in these areas not meeting LHSs, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Casper RMP:</u> Conversions in kinds of livestock and changes in season of use will be considered on a case-by-case basis through an environmental analysis. Such changes will be consistent with rangeland health objectives. Grazing leases will be adjusted to accurately reflect the kind of livestock use on public land in all allotments. <u>Kemmerer RMP:</u> Current amounts, kinds, and seasons of livestock grazing uses will be authorized until rangeland health standards assessment results and (or) monitoring indicates a grazing use adjustment is necessary, or that a kind and (or) class of livestock or season of use modification can be accommodated. <u>Newcastle RMP:</u> Any adjustments in livestock grazing use will be made as a result of monitoring and consultation with grazing permittees. Monitoring studies will be conducted using the current BLM-approved methodology. <u>Pinedale RMP:</u> Conversions from one type of	

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modification can be accommodated. Newcastle RMP: Any adjustments in livestock grazing use will be made as a result of monitoring and consultation with grazing permittees. Monitoring studies will be conducted using the current BLM-approved methodology. Pinedale RMP: Conversions from one type of livestock to another will be evaluated on a case-by-case basis, including an environmental analysis, and will be authorized in conformance with the goals and objectives of the RMP. Rawlins RMP: The current amounts, kinds, and seasons of livestock grazing use will be authorized until monitoring, field observations, ecological site inventory, or other data acceptable to BLM indicates a grazing use adjustment is needed, as appropriate. Requests for changes in season-of use or kind-of-livestock will be considered on a case-by-case basis. Any decision regarding changes in grazing use will include cooperation, consultation, and coordination with the grazing permittees and the interested public. Green River RMP: The Wyoming Standards for Healthy Rangelands (BLM 1997a) will apply to all resource uses on BLM- administered lands. These standards are the minimal acceptable conditions that address the health, productivity, and sustainability of the rangeland. The standards describe healthy rangelands rather than rangeland by-products. Achievement of a standard is determined through observing, measuring, and monitoring appropriate indicators. An indicator is a component of a	livestock to another will be evaluated on a case-by-case basis, including an environmental analysis, and will be authorized in conformance with the goals and objectives of the RMP. Rawlins RMP: The current amounts, kinds, and seasons of livestock grazing use will be authorized until monitoring, field observations, ecological site inventory, or other data acceptable to BLM indicates a grazing use adjustment is needed, as appropriate. Requests for changes in season-of use or kind-of-livestock will be considered on a case-by-case basis. Any decision regarding changes in grazing use will include cooperation, consultation, and coordination with the grazing permittees and the interested public. Green River RMP: The Wyoming Standards for Healthy Rangelands (BLM 1997a) will apply to all resource uses on BLM- administered lands. These standards are the minimal acceptable conditions that address the health, productivity, and sustainability of the rangeland. The standards describe healthy rangelands rather than rangeland by-products. Achievement of a standard is determined through observing, measuring, and monitoring appropriate indicators. An indicator is a component of a system whose characteristics (e.g., presence, absence, quantity, and distribution) can be observed, measured, or monitored based on sound scientific principles. The standards will direct the management of public lands and focus the implementation of this activity plan toward the maintenance or attainment of healthy rangelands.	

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system whose characteristics (e.g., presence, absence, quantity, and distribution) can be observed, measured, or monitored based on sound scientific principles. The standards will direct the management of public lands and focus the implementation of this activity plan toward the maintenance or attainment of healthy rangelands.		
MD LG 6: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3.	No changes made.	Completely revised – revised by rangewide
MD LG 7: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: When periods of drought occur, where appropriate, the AO will evaluate strategies to address drought through coordination with grazing permittee/lessee and annual billings processes. In cooperation with livestock grazing permittees/lessees, drought contingency plans will be developed at the appropriate landscape unit that provide for a consistent/appropriate BLM response. Contingency plans shall establish strategies for addressing ongoing drought and post-drought recovery. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Casper RMP:</u> Other management considerations for use of stock driveway withdrawals (SDW) will include	No changes made.	Completely revised – revised by rangewide

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providing emergency use for relief from fire, drought, or other natural causes or to meet management objectives in adjoining allotments that require rest. These other uses will be addressed on a case-by-case basis and may occur any time during the year provided the AO has determined adequate forage is available and it does not interfere with regular trail use. The decision determining there is adequate forage will be documented and filed in the appropriate SDW file. Consultation and coordination with livestock owners who regularly use the respective SDW will be made prior to authorizing this type of use. This use will be authorized in accordance with federal grazing regulations (also see MD LG 9). A drought contingency plan will be developed to maintain adequate habitat components for viable fish, wildlife, and SSS populations.		
MD LG 8: In GHMA and PHMA, existing range improvements (e.g., fences, livestock/wildlife watering facilities) would continue to be evaluated and modified when necessary. The potential risk to Greater Sage-Grouse and its habitats from existing structural range improvements will be evaluated. The potential for modification of those structural range improvements identified as posing a risk will be addressed. Supplements and supplemental feeding would continue to be authorized where appropriate. Outside of PHMA and GHMA, and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Casper RMP:</u> Identified hazard fences will be modified and new fences will be constructed in accordance with the BLM Fencing Handbook 1741-1.	In PHMA, existing range improvements (e.g., fences, livestock/wildlife watering facilities) would continue to be evaluated and modified when necessary. Supplements and supplemental feeding would continue to be authorized where appropriate. Outside of PHMA and GHMA, and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Casper RMP:</u> Identified hazard fences will be modified and new fences will be constructed in accordance with the BLM Fencing Handbook 1741-1. Decision 4010. Placement of salt, mineral, or forage supplements for livestock will not be allowed within 0.25 miles of water, wetlands, and riparian areas, unless written analysis shows that watershed, riparian, wetland, wildlife, and vegetative values will not be	Completely revised by rangewide for management in PHMA Partially revised – "Outside GHMA" removed as requirement from Field Office-specific direction No change (same as 2019) for decisions that remain in effect with the modification described above

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Decision 4010. Placement of salt, mineral, or forage supplements for livestock will not be allowed within 0.25 miles of water, wetlands, and riparian areas, unless written analysis shows that watershed, riparian, wetland, wildlife, and vegetative values will not be adversely affected. Forage supplements will be required to be "certified weed- free." <u>Kemmerer RMP:</u> BLM fencing standards will be applied to newly constructed fences on BLM-administered lands within the planning area. Existing fences will be eliminated or modified to reduce conflicts on a case-by-case basis. Livestock salt or mineral supplements will be located a minimum of 0.25 miles away from water sources, riparian areas, and aspen stands. Buffers will be based on resource concerns on a case-by-case basis. <u>Newcastle RMP:</u> Fence construction will be required to meet current BLM fence standards. Fences on BLM-administered land surface that cause documented wildlife conflicts will be removed, reconstructed, or modified, as appropriate or necessary, to eliminate or reduce the conflict. Construction of fences that interfere with movements of big game species in crucial big game winter range will not be allowed on BLM-administered land surface. <u>Pinedale RMP:</u> Mineral supplement blocks will be placed in locations that promote proper grazing distribution and prevent inappropriate livestock use on riparian habitat; for example, by locating supplements on ridgetops and/or approximately 0.25 miles from riparian habitat. Placement of supplements near water sources,	adversely affected. Forage supplements will be required to be "certified weed- free." <u>Kemmerer RMP:</u> BLM fencing standards will be applied to newly constructed fences on BLM-administered lands within the planning area. Existing fences will be eliminated or modified to reduce conflicts on a case-by-case basis. Livestock salt or mineral supplements will be located a minimum of 0.25 miles away from water sources, riparian areas, and aspen stands. Buffers will be based on resource concerns on a case-by-case basis. <u>Newcastle RMP:</u> Fence construction will be required to meet current BLM fence standards. Fences on BLM-administered land surface that cause documented wildlife conflicts will be removed, reconstructed, or modified, as appropriate or necessary, to eliminate or reduce the conflict. Construction of fences that interfere with movements of big game species in crucial big game winter range will not be allowed on BLM-administered land surface. <u>Pinedale RMP:</u> Mineral supplement blocks will be placed in locations that promote proper grazing distribution and prevent inappropriate livestock use on riparian habitat; for example, by locating supplements on ridgetops and/or approximately 0.25 miles from riparian habitat. Placement of supplements near water sources, such as wells and reservoirs, will consider rangeland objectives, such as grazing distribution, wildlife habitat requirements, and reclamation success. Mineral supplement blocks will not be placed within 0.25 miles of an occupied Greater Sage-Grouse lek. Mineral supplement blocks will not	

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
such as wells and reservoirs, will consider rangeland objectives, such as grazing distribution, wildlife habitat requirements, and reclamation success. Mineral supplement blocks will not be placed within 0.25 miles of an occupied Greater Sage-Grouse lek. Mineral supplement blocks will not be placed within 0.25 miles of known Special Status Plant Species locations. Rawlins RMP: New fence construction will be authorized according to BLM standards unless modified following consultation with affected parties. Existing fences will be modified according to current BLM standards and according to wildlife and livestock management needs. Green River RMP/JMH CAP: Where documented wildlife conflicts with fencing on public lands occur, fences will be modified, reconstructed, or, if necessary, removed. Herding control of livestock will be encouraged as an alternative to fencing. Fence construction will be in accordance with BLM design standards and located so as not to overly impede wildlife movement. Consideration will also be given to SSS and wild horse movement. Green River RMP: Livestock water developments and range improvements will be considered to maintain or improve resource conditions, enhance livestock distribution, or both. Compatibility with special status plant species will be required. Water developments and/or range improvements proposed in sensitive areas will be considered only if wildlife habitat and resource conditions are maintained or improved and no significant or irreversible adverse effects will occur. Salt or nutritional supplements will	be placed within 0.25 miles of known Special Status Plant Species locations. Rawlins RMP: New fence construction will be authorized according to BLM standards unless modified following consultation with affected parties. Existing fences will be modified according to current BLM standards and according to wildlife and livestock management needs. Green River RMP/JMH CAP: Where documented wildlife conflicts with fencing on public lands occur, fences will be modified, reconstructed, or, if necessary, removed. Herding control of livestock will be encouraged as an alternative to fencing. Fence construction will be in accordance with BLM design standards and located so as not to overly impede wildlife movement. Consideration will also be given to SSS and wild horse movement. Green River RMP: Livestock water developments and range improvements will be considered to maintain or improve resource conditions, enhance livestock distribution, or both. Compatibility with special status plant species will be required. Water developments and/or range improvements proposed in sensitive areas will be considered only if wildlife habitat and resource conditions are maintained or improved and no significant or irreversible adverse effects will occur. Salt or nutritional supplements will be prohibited within 500 feet of riparian habitat and National Historic and Scenic Trails unless analysis shows that these resources will not be adversely affected. These supplements also will be prohibited on areas inhabited by special status plant species. Placement of supplements at least 500 feet away	

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
be prohibited within 500 feet of riparian habitat and National Historic and Scenic Trails unless analysis shows that these resources will not be adversely affected. These supplements also will be prohibited on areas inhabited by special status plant species. Placement of supplements at least 500 feet away from wells, troughs, and other human-made water sources will be encouraged to better distribute livestock. JMH CAP: Livestock water developments and range improvements will be considered to maintain or improve resource conditions, enhance livestock distribution, or both. Compatibility with special status plant species will be required. Water developments and/or range improvements proposed in sensitive areas will be considered only if wildlife habitat and resource conditions were maintained or improved and no significant or irreversible adverse effects will occur. Salt or nutritional supplements will be prohibited within 500 feet of riparian habitat and National Historic and Scenic Trails unless analysis shows that these resources will not be adversely affected. These supplements also will be prohibited on areas inhabited by special status plant species. Placement of supplements at least 500 feet away from wells, troughs, and other human-made water sources will be encouraged to better distribute livestock.	from wells, troughs, and other human-made water sources will be encouraged to better distribute livestock. JMH CAP: Livestock water developments and range improvements will be considered to maintain or improve resource conditions, enhance livestock distribution, or both. Compatibility with special status plant species will be required. Water developments and/or range improvements proposed in sensitive areas will be considered only if wildlife habitat and resource conditions were maintained or improved and no significant or irreversible adverse effects will occur. Salt or nutritional supplements will be prohibited within 500 feet of riparian habitat and National Historic and Scenic Trails unless analysis shows that these resources will not be adversely affected. These supplements also will be prohibited on areas inhabited by special status plant species. Placement of supplements at least 500 feet away from wells, troughs, and other human-made water sources will be encouraged to better distribute livestock.	

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MD LG 9: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Livestock trailing that is authorized will include a trailing plan to utilize non-habitat to the extent possible, include specific routes and timeframes for trailing, utilize existing trails, and avoid stopovers on occupied leks, as appropriate. The following RMP decisions remain in effect with the modification described above: <u>Casper RMP:</u> The revocation of withdrawals for those trails that are no longer active will be reviewed and recommended and these lands will be incorporated into adjacent allotments (46,050 acres). Grazing leases will be offered to the respective grazing lessees. All remaining SDW lands for trail use (55,680 acres) will be retained. <u>Kemmerer RMP:</u> Current livestock trails will be retained. Livestock trailing use will occur within 0.5 miles of the mapped centerline. <u>Pinedale RMP:</u> Adequate stock trails will be maintained to support livestock trailing needs.	No changes made.	Completely revised – revised by rangewide
MD LG 10: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Grazing between riparian habitats and upland habitats will be balanced to promote the production and availability of beneficial forbs to GRSG for use during nesting and brood-rearing. Grazing in meadows, mesic habitats, and riparian pastures also will be balanced to promote the production and availability of beneficial grasses and forbs for use during late brood-rearing within PHMA, while maintaining upland conditions and functions.	Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: In PHMA, for riparian habitats and/or wet meadow communities utilized by Greater Sage-Grouse, livestock grazing would be managed to promote the production and availability of beneficial forbs for use during brood-rearing, while maintaining upland conditions and functions. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above:	Completely revised – revised by rangewide

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Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: Casper RMP: Lotic and lentic wetland/riparian areas will be managed toward Proper Functioning Condition (PFC). The BLM will manage toward PFC and identified Desired Plant Community on 350 miles of lotic and adjacent riparian habitat and 10,000 acres of lentic habitat to meet fish, wildlife, and SSS habitat requirements. Kemmerer RMP: Livestock conversions will be allowed in allotments with riparian concerns only when a plan is approved to address riparian issues. Management actions and range improvements proposed to address riparian issues will have to be implemented prior to authorizing the conversion. Livestock conversions may be approved only after completion of a suitability study for the conversion. The conversion may be authorized if it is determined that riparian habitats will be maintained or improved by the conversion. Pinedale RMP: Meet the Wyoming Standards for Rangeland Health and maintain or enhance wetland and riparian vegetation to achieve PFC. Grazing systems will be designed to maintain or improve watershed and range condition; for example, through changing seasons of use, implementing rotational or other grazing management systems, or developing infrastructure for livestock management. In allotments with riparian habitat, grazing management actions will be designed to maintain or achieve proper functioning condition. Green River RMP:	Casper RMP: Lotic and lentic wetland/riparian areas will be managed toward Proper Functioning Condition (PFC). The BLM will manage toward PFC and identified Desired Plant Community on 350 miles of lotic and adjacent riparian habitat and 10,000 acres of lentic habitat to meet fish, wildlife, and SSS habitat requirements. Kemmerer RMP: Livestock conversions will be allowed in allotments with riparian concerns only when a plan is approved to address riparian issues. Management actions and range improvements proposed to address riparian issues will have to be implemented prior to authorizing the conversion. Livestock conversions may be approved only after completion of a suitability study for the conversion. The conversion may be authorized if it is determined that riparian habitats will be maintained or improved by the conversion. Pinedale RMP: Meet the Wyoming Standards for Rangeland Health and maintain or enhance wetland and riparian vegetation to achieve PFC. Grazing systems will be designed to maintain or improve watershed and range condition; for example, through changing seasons of use, implementing rotational or other grazing management systems, or developing infrastructure for livestock management. In allotments with riparian habitat, grazing management actions will be designed to maintain or achieve proper functioning condition. Green River RMP: Range improvements will be directed at resolving or reducing resource concerns, improvement of wetland/riparian areas, and overall improvement of	

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Range improvements will be directed at resolving or reducing resource concerns, improvement of wetland/riparian areas, and overall improvement of vegetation/ground cover. New range improvements may be implemented in "I" and "M" category allotments. Maintenance of range improvements will be required in accordance with the BLM Rangeland Improvement Policy. JMH CAP: Implementation of grazing management systems will assist in improving or maintaining the desired range condition. Approved AMPs, or other activity plans intended to serve as the functional equivalent to an AMP, for each of the designated grazing allotments will provide the necessary guidance for achieving grazing management objectives. Appropriate actions for improving degraded rangeland and riparian habitat (i.e., meeting Wyoming Standards for Healthy Rangelands (BLM 1997a)) include, but will not be limited to, reduction of permitted animal unit months, modified turnout dates, livestock water developments, range improvements, modified grazing periods, growing season rest, riparian pastures, exclosures, implementation of forage utilization levels, and livestock conversions. These improvements will be considered individually using the method outlined in Appendix 2 of the JMH CAP ROD to ensure conformance with management objectives for the planning area and other resource values.	vegetation/ground cover. New range improvements may be implemented in "I" and "M" category allotments. Maintenance of range improvements will be required in accordance with the BLM Rangeland Improvement Policy. JMH CAP: Implementation of grazing management systems will assist in improving or maintaining the desired range condition. Approved AMPs, or other activity plans intended to serve as the functional equivalent to an AMP, for each of the designated grazing allotments will provide the necessary guidance for achieving grazing management objectives. Appropriate actions for improving degraded rangeland and riparian habitat (i.e., meeting Wyoming Standards for Healthy Rangelands (BLM 1997a)) include, but will not be limited to, reduction of permitted animal unit months, modified turnout dates, livestock water developments, range improvements, modified grazing periods, growing season rest, riparian pastures, exclosures, implementation of forage utilization levels, and livestock conversions. These improvements will be considered individually using the method outlined in Appendix 2 of the JMH CAP ROD to ensure conformance with management objectives for the planning area and other resource values.	

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MD LG 11: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Range improvement projects will be planned and authorized in a way that contributes to rangeland health and maintains and/or improves Greater Sage-Grouse and its habitat. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Green River RMP:</u> Water sources may be developed in crucial wildlife winter ranges only when consistent with wildlife habitat needs. Such sources will be designed to benefit livestock, wild horses, and wildlife. Alternative water supplies or facilities for livestock may be provided to relieve livestock grazing pressure along stream bottoms and improve livestock distribution. <u>JMH CAP:</u> Livestock water developments and range improvements will be considered to maintain or improve resource conditions, enhance livestock distribution, or both. Compatibility with special status plant species will be required. Water developments and/or range improvements proposed in sensitive areas will be considered only if wildlife habitat and resource conditions are maintained or improved and no significant or irreversible adverse effects will occur.	No changes made.	Completely revised by rangewide for All RMPs amended for management of GRSG in PHMA No change (same as 2015) for decisions that remain in effect with the modification described above
MD LG 12: Existing water developments associated with springs and seeps will be evaluated and associated pipelines/structures to those developments having a negative effect on PHMA will be modified.	No changes made.	Completely revised – revised by rangewide

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MD WHB 1: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Manage herd management areas (HMAs) in Greater Sage-Grouse habitat within established appropriate management level range to achieve and maintain Greater Sage-Grouse habitat (see Tables 2-2 and 2-3). Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Green River RMP/JMH CAP:</u> Specific habitat objectives for herd management areas will be developed. Consideration will be given to desired plant communities, wildlife, watershed, livestock grazing, and other resource needs.	No changes made.	Completely revised by rangewide and state-specific for All RMPs amended for management of GRSG in PHMA No change (same as 2015) for decisions that remain in effect with the modification described above
MD WHB 2: PHMA (core only) management objectives will be considered when evaluating appropriate management levels.	No changes made.	Completely revised – revised by rangewide and state-specific
MD WHB 3: PHMA (core only) management objectives will be considered when conducting land health assessments in BLM HMAs.	No changes made.	Completely revised – revised by rangewide and state-specific
MD WHB 4: When conducting NEPA analysis for wild horse management activities, water developments or other rangeland improvements for wild horses in PHMA, the direct and indirect effects on Greater Sage-Grouse populations and habitat will be addressed. Water developments or rangeland improvements will be implemented using the criteria identified for domestic livestock identified above in PHMA.	No changes made.	No change (same as 2015)
MD WHB 5: Coordinate with other resources (Range, Wildlife, and Riparian) to conduct land health assessments within all BLM HMAs.	No changes made.	No change (same as 2015)

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MD MR 1: Fluid Minerals (Unleased Estate) Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: The BLM will allow oil and gas leasing consistent and subject to the leasing stipulations analyzed in the timing, distance, disturbance, and density restrictions sections (Map 2-2) (see Appendix B – Fluid Mineral Stipulations). Ensure that leasing activities in PHMA comply with Greater Sage-Grouse resource management plan decisions and remain in compliance with laws, regulations and policy. Fluid mineral leasing will be allowed in PHMA (core only), except in areas that are closed to leasing due to the need to protect other sensitive resources.	No changes made.	No change (same as 2015) – however, the exceptions, waivers, and modifications in the referenced Appendix B would be revised by rangewide language
MD MR 2: Fluid Minerals (Unleased Estate) Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Geophysical exploration projects that are designed to minimize habitat fragmentation within PHMA will be allowed, except where prohibited or restricted by existing RMP decisions, and in conformance with timing and distances Management Decisions (see Decisions MD SSS 5 through MD SSS 10). Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Casper RMP:</u> The blocks of public land identified as mapped in the Casper Field Office GIS database will be managed to retain intact blocks of native vegetation (192,550 acres, of which 131,880 acres are BLM-administered surface). In these	No changes made.	Partially revised – to update Management Decisions referenced No change (same as 2015) for decisions that remain in effect with the modification described above

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areas, the following restrictions apply: 1. These blocks are (1) unavailable for oil and gas leasing, and (2) a geophysical operation on public surface for the life of the plan. Activities for existing oil and gas leases are managed intensively (see Appendix U of the Casper RMP). Existing leases will be allowed to expire and not be renewed. 2. Within these blocks, a withdrawal from the operation of the public land laws, including the mining laws will be pursued. 3. These blocks are closed to mineral material disposal. Existing permits will be allowed to expire without renewal or expansion. 4. These blocks are not open to wind/renewable energy development. 5. These blocks remain open to livestock grazing. 6. All allowed surface-disturbing activities within the designated blocks are subject to a Controlled Surface Use restriction, minimizing surface disturbance to meet management objectives. Decision 4024 The North Platte River Special Recreation Management Area will continue to be open to oil and gas leasing and geophysical operations. Decision 7039 The area is unavailable for oil and gas leasing and geophysical exploration is not allowed. Decision 7047 The MA is unavailable for new oil and gas leasing. No geophysical operations will be allowed on public surface. Activities on existing leases will be managed intensively to meet the objectives of the MA (see Appendix U of the Casper RMP – Intensive Management). To		

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minimize surface-disturbing activities, oil and gas exploration and development will use directional drilling techniques and well twinning whenever practicable. Decision 7059 The Red Wall/Gray Wall complex is located entirely within the South Bighorns/Red Wall Management Area and is unavailable for new oil and gas leasing. No geophysical operations will be allowed on public surface. Activities on existing leases will be intensively managed to meet the objectives of the MA (see Appendix U of the Casper RMP–Intensive Management). To minimize surface-disturbing activities, oil and gas exploration and development will use directional drilling techniques and well twinning whenever practicable. Decision 7063 Those lands currently open to oil and gas leasing will continue to be open to geophysical operations. Those lands open to oil and gas leasing, but subject to a NSO restriction, may be open to geophysical operations should site specific NEPA analysis disclose a finding of no significant impact. No geophysical operations are allowed in areas closed for oil and gas leasing. Decision 2019 <u>Kemmerer RMP:</u> Allow for geophysical exploration on lands throughout the planning area subject to identified conditions of approval. <u>Newcastle RMP:</u> Surface-disturbing and disruptive activities associated with all types of minerals exploration and development and with geophysical exploration will be subject to appropriate mitigation measures determined through, but not limited to, use of MD SSS 4. <u>Pinedale RMP:</u>		

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Vehicle-based geophysical activities will be assessed on a case-by-case basis. The use of surface and/or aboveground (Poulter shot) explosive charges for geophysical exploration will be assessed case by case. Geophysical projects, including projects proposed in areas with an NSO restriction, will be analyzed and mitigation developed on a case-by-case basis. Geophysical activities that are considered casual use actions are allowed within 0.25 miles of active Greater Sage-Grouse leks provided that: • Operations are conducted on designated roads and trails. • Operations during the breeding season (March 1 through May 15) are conducted between the hours of 8:00 a.m. and 8:00 p.m. • A 150-foot wide strip of undisturbed sagebrush is maintained around the perimeter of the lek for hiding and escape cover. <u>Rawlins RMP:</u> All lands open to oil and gas leasing consideration will also be open to geophysical exploration, subject to appropriate resource surveys, surface protection measures, adequate bonding, and adherence to State of Wyoming standards for geophysical operations. Vehicular use for "necessary tasks" (as defined in the glossary), such as geophysical exploration including project survey and layout, will be permitted except where specifically prohibited (e.g., some SD/MAs). <u>Green River RMP:</u> Geophysical exploration (vehicles and detonation) activities will be prohibited within 0.5 miles of the Pinnacles Geologic Feature. Areas of sensitive heritage resources and geologic features, such as Boars Tusk, White		

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Mountain Petroglyphs, special status plant species, wilderness study areas (WSAs), and historic trails, will remain closed. Receiver lines may be laid using foot traffic within these areas. Exceptions to these restrictions may be granted on a case-by-case basis subject to appropriate site-specific analysis and mitigation requirements. The remainder of the planning area will be open to geophysical exploration, with application of appropriate mitigation. Rights-of-way limitations in the planning area apply to on- and off-road vehicle traffic used for geophysical activities. Exploration activities will be allowed in sensitive resource areas only if they can be performed with acceptable mitigation of impacts. <u>JMH CAP:</u> Geophysical exploration (vehicles and detonation) activities will be prohibited within 0.5 miles of the Pinnacles Geologic Feature. Areas of sensitive heritage resources and geologic features, such as Boars Tusk, White Mountain Petroglyphs, special status plant species, WSAs, and historic trails, will remain closed. Receiver lines may be laid using foot traffic within these areas. Exceptions to these restrictions may be granted on a case-by-case basis subject to appropriate site-specific analysis and mitigation requirements. The remainder of the planning area will be open to geophysical exploration, with application of appropriate mitigation. ROW limitations in the planning area apply to on- and off-road vehicle traffic used for geophysical activities. Exploration activities will be allowed in sensitive resource areas only if they can be performed with acceptable mitigation of impacts.		

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MD MR 3, Fluid Minerals, Leased Estate: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: In cases where federal oil and gas leases have been issued with stipulations varying from those in Appendix B for the protection of Greater Sage-Grouse or their habitats, as provided in the applicable RMP decision, as revised or amended, their inclusion as APD COAs will be considered when approving exploration and development activities through completion of the environmental record of review (43 CFR 3162.5 and 36 CFR 228.108), including appropriate documentation of compliance with NEPA. Overall consideration shall be given to minimizing the impact on Greater Sage-Grouse through a project design that avoids, minimizes, reduces, rectifies, and/or adequately compensates for direct and indirect impacts on PHMA or use and includes applicable and technical COAs. Selection and application of these measures shall be based on current science and research on the effects on important breeding, nesting, brood-rearing, and wintering areas. For proposed operations in PHMA, the Surface Use Plan of Operations (see 43CFR 3162.3-1(f)) shall address, at a minimum, the anticipated noise, density and amount of disturbance, mechanical movement (e.g., pump jacks), permanent and temporary facilities, traffic, phases of development over time, off-site mitigation, and expected periods of use associated with the proposed project. Seasonal habitats or project features related to potential Greater Sage-Grouse impacts that are not addressed in the Surface Use Plan of Operations based on site- specific or project-specific considerations shall be noted	No changes made.	Completely revised by rangewide for All RMPs amended for management of GRSG in PHMA No change (same as 2015) for decisions that remain in effect with the modification described above

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in the project file, along with a rationale for not including them. In this process the BLM will evaluate, among other things: Whether the conservation measure is "reasonable" (43 CFR 3101.1-2) and consistent with valid existing rights Whether the action is in conformance with the approved LUP; and the effectiveness of the proposed mitigation measures (See MD SSS 4). The BLM will work with project proponents in these situations to promote measurable Greater Sage-Grouse conservation objectives such as, but not limited to, consolidation of project related infrastructure to reduce habitat fragmentation and loss and to promote effective conservation of seasonal habitats and PHMA (connectivity only) that support population management objectives set by the state. The BLM will continue to work with project proponents and the WGFD to site their projects in locations that meet the purpose and need for their project, but have been determined to contain the least sensitive habitats (based on vegetation, topography, or other habitat features) and resources whether inside or outside of PHMA (utilizing DDCT analysis process). Valid existing rights will be recognized and respected. For values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Kemmerer RMP:</u> Choose and implement appropriate mitigation in a timely manner to minimize decreases in habitat function. Utilize appropriate voluntary off-site compensatory mitigation to reduce impacts. This will be necessary if (1) all on-site mitigation has been accomplished and adverse effects		

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have not been mitigated; or (2) if on-site mitigation is not feasible. Pinedale RMP: Off-site mitigation proposed by oil and gas or other operators can be considered and analyzed in future environmental documents as mitigation for proposed activities within the planning area. Proposed off-site mitigation will be described and analyzed for effectiveness in detail on a project-specific basis. Off-site mitigation will conform to requirements in the Pinedale RMP regarding the order of use of mitigation methods, stipulations applied to off-site mitigation measures, and priority order for mitigating resource impacts on-site or off-site. Green River RMP: Development actions will be analyzed on a case-by-case basis to identify mitigation needs to meet RMP objectives, provide for resource protection, and provide for logical development. Limitations on the amount, sequence, timing, or level of development may occur. This may result in transportation planning and in limitations in the number of roads and drill pads, or deferring development in some areas until other areas have been restored to previous uses. JMH CAP: COAs attached to an APD will be based on site-specific NEPA or other analysis and will establish specific, necessary mitigation measures not covered by stipulations for resource and environmental protection. Some areas will need more intensive mitigation measures to protect sensitive resources and provide for public health and safety. These intensive mitigation measures or COAs will mostly apply to areas with overlapping sensitive resources (e.g., Areas 2 and 3). Examples of intensive mitigation that can apply to all activities based on site- specific		

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analysis include off-site placement of facilities, remote control monitoring, restricted or prohibited surface use including road construction, multiple wells from a single pad, central tank batteries/facilities, and pipelines and power lines concentrated in specific areas. In addition, refer to Section 3.12.3 for additional mitigation measures that may apply as part of the transportation plan.		
MD MR 4: Within PHMA, field offices will work with project proponents (including those within BLM) to site their projects in locations that minimize impacts on sensitive resources.	No changes made.	No change (same as 2015)
MD MR 5: Master Development Plans will be considered and encouraged for projects involving multiple proposed disturbances within PHMA.	No changes made.	No change (same as 2015)
MD MR 6: Within PHMA, unitization will be encouraged as a means of minimizing adverse impacts on Greater Sage-Grouse to reduce fragmentation and surface-disturbing and disruptive activities.	No changes made.	No change (same as 2015)
MD MR 7: The BLM shall closely examine the applicability of categorical exclusions in PHMA and GHMA. If extraordinary circumstances review is applicable, the BLM shall determine whether those circumstances exist. For proposed actions in PHMA, determine whether a categorical exclusion is applicable and if so, closely examine the extraordinary circumstances, if applicable, to determine whether one or more exists that will require preparation of a NEPA analysis. If a categorical exclusion applies, and no extraordinary circumstances exist, determine whether preparing a NEPA analysis will help inform decision making.	No changes made.	No change (same as 2015)

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MD MR 8: Federal Regulations, 43 CFR 3104.1 requires that a bond be furnished before any drilling or surface disturbance activities begin. The lessee, sublessee or the operator must furnish a surety or personal bond in the amount of at least $10,000 to ensure compliance with all the lease terms, including protection of the environment. With the consent of the surety and principal, the operator may use the bond of another party, such as the lessee. Each time there is a new operator, that operator must notify the BLM that he/she is the responsible operator, giving the particulars of the bond under which he/she will operate. The BLM can require an increase in a bond amount any time conditions warrant such an increase. A reclamation bond will be required on all projects that is commensurate with the scope, scale, size of the project within PHMA. Partial bonding may be appropriate depending on these factors.	No changes made.	No change (same as 2015)
MD MR 9: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Produced water from coalbed natural gas wells will be treated and disposed of in collaboration and consistent with the requirements of the state, and RDFs specified in Management Action 10 (Appendix C). Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Pinedale RMP:</u> Produced water from coalbed natural gas wells will be treated and disposed of in collaboration and consistent with the requirements of the state.	No changes made.	Partially revised – to update Management Action referenced and Appendix referenced No change (same as 2015) for decisions that remain in effect with the modification described above

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MD MR 10: Specific to management for Greater Sage-Grouse, within PHMA (core only), all RMPs are amended as follows: Where the federal government owns the mineral estate, and the surface is in nonfederal ownership, apply the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. Within PHMA (non-core only) and outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Pinedale RMP:</u> BLM-permitted actions on split estate lands are subject to the same stipulations as leased federal mineral estate on federal surface lands, provided the stipulations do not adversely affect the surface owner's land use or actions. Exceptions to surface development restrictions may be granted if requested or agreed to by the surface owner.	No changes made.	No change (same as 2015)
MD MR 11: Within PHMA where the federal government owns the surface and the mineral estate is in nonfederal ownership, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.	No changes made.	No change (same as 2015)
MD MR 12: Locatable Minerals Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: 252,160 acres within SFAs (see MD SSS 14 for identification of SFAs)	Locatable Minerals Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: A total of approximately 21,251,690 acres are open to	Partially revised – to update acreage estimates, map referenced, and Management Decisions referenced

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
will be recommended for withdrawal from the General Mining Act of 1872, subject to valid existing rights. A total of approximately 21,251,690 acres are open to locatable mineral location and entry (Map 2-3). Operators may be requested to submit modifications to the accepted notice or approved plan of operations so that the operations minimally impact PHMA. The AO may convey to the operator suggested conservation measures, based on the notice or plan level operations and the geographic area of those operations (also called the project area which is defined in 43 CFR 3809.5 and 36 CFR 228.3). These suggested conservation measures include measures that support the overall goals and objectives of the core population area strategy, though measures listed for protection of Greater Sage-Grouse breeding, nesting, brood- rearing, and wintering may not be reasonable or applicable to the BLM's determination of whether the proposed operations will cause unnecessary or undue degradation under 43 CFR 3809.5 and 36 CFR 228.3. The request containing the suggested conservation measures must make clear that the operator's compliance is not mandatory. Notices or Plans of Operation, or modifications thereto, submitted following the issuance of this guidance: As part of the 15-day completeness review of notices [or modifications thereto] and 30-day completeness review of plans of operations [or modifications thereto], the proposed project area(s) where exploration, development, mining, access and reclamation will take place shall be reviewed for overlap of PHMA in the corporate GIS database. If there is overlap, the BLM AO may	locatable mineral location and entry (Map 2-3). Operators may be requested to submit modifications to the accepted notice or approved plan of operations so that the operations minimally impact PHMA. The AO may convey to the operator suggested conservation measures, based on the notice or plan level operations and the geographic area of those operations (also called the project area which is defined in 43 CFR 3809.5 and 36 CFR 228.3). These suggested conservation measures include measures that support the overall goals and objectives of the core population area strategy, though measures listed for protection of Greater Sage-Grouse breeding, nesting, brood- rearing, and wintering may not be reasonable or applicable to the BLM's determination of whether the proposed operations will cause unnecessary or undue degradation under 43 CFR 3809.5 and 36 CFR 228.3. The request containing the suggested conservation measures must make clear that the operator's compliance is not mandatory. Notices or Plans of Operation, or modifications thereto, submitted following the issuance of this guidance: As part of the 15-day completeness review of notices [or modifications thereto] and 30-day completeness review of plans of operations [or modifications thereto], the proposed project area(s) where exploration, development, mining, access and reclamation will take place shall be reviewed for overlap of PHMA in the corporate GIS database. If there is overlap, the BLM AO may notify the operator of ways that they may minimize impacts on PHMA and request the operator to amend its notice or plan to include such measures. The request to	

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
notify the operator of ways that they may minimize impacts on PHMA and request the operator to amend its notice or plan to include such measures. The request to amend the submitted notice or plan of operations must make clear that the operator's compliance is not mandatory and that including such measures is not a requirement for completeness of either the notice or a plan of operations, nor is it a condition of acceptance of the notice or approval of the plan of operations. For values other than Greater Sage-Grouse, the following RMP decisions remain in effect: 1,785,230 acres are withdrawn from mineral entry for the protection of sensitive resources.	amend the submitted notice or plan of operations must make clear that the operator's compliance is not mandatory and that including such measures is not a requirement for completeness of either the notice or a plan of operations, nor is it a condition of acceptance of the notice or approval of the plan of operations. (see also MD SSS 4 through MD SSS 10 and MD SSS 12) For values other than Greater Sage-Grouse, the following RMP decisions remain in effect: 1,785,230 acres are withdrawn from mineral entry for the protection of sensitive resources.	
MD MR 13: Salable Minerals PHMA will be open to mineral material exploration, sales, and free use permits, except in areas that are unavailable due to the need to protect other resource values. All salable mineral activities within PHMA will be considered, provided they can be completed in compliance within surface occupancy, seasonal restrictions, and disturbance and density stipulations (Map 2-4 and MD SSS 2, 3,5 through 10) analyzed through the DDCT process.	No changes made.	Completely revised – revised by rangewide and state-specific
MD MR 14: Salable Minerals Within PHMA closure and restoration of salable mineral pits no longer in use will be considered to meet Greater Sage-Grouse habitat conservation objectives. Emphasis will be given to reclamation/restoration of PHMA as a viable long term goal to improve Greater Sage-Grouse habitat.	No changes made.	No change (same as 2015)
MD MR 15: Nonenergy Leasable Minerals Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as	No changes made.	Completely revised by rangewide and state-specific for All RMPs amended for management of GRSG in PHMA

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follows: All nonenergy leasable mineral activities will be considered in PHMA, provided that the activities can be completed in compliance with all occupancy, timing, density and disturbance restrictions (Map 2-5). Exploration licenses and prospecting permits will be considered with appropriate mitigating measures. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: Portions of PHMA will be unavailable for leasing in accordance with existing RMP decisions for resource values other than Greater Sage-Grouse. <u>Kemmerer RMP:</u> Sodium: All public lands (outside of the Raymond Mountain WSA and exceptions identified below) within the planning area are available for sodium leasing consideration. Exploration for sodium will be considered on a case-by-case basis. Limited surface occupancy criteria contained in the Sodium Mineral Development Environmental Assessment will be applied on a case-by-case basis. No new sodium leases or exploration licenses may be issued on lands within the Raymond Mountain WSA. No new sodium exploration and leasing will be considered for Rock Creek/Tunp and Bear River Divide management areas. Phosphate: All public lands (outside of the Raymond Mountain WSA and exceptions identified below) within the planning area are available for phosphate leasing consideration. Exploration for phosphate will be considered on a case-by-case basis. No new phosphate exploration and leasing will be considered for Rock		No change (same as 2015) for decisions that remain in effect with the modification described above

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Creek/Tunp and Bear River Divide management areas. Pinedale RMP: Should interest in other leasable minerals materialize in the future, leasing will be considered on a case-by- case basis, and the RMP will be amended as appropriate and necessary. The same surface disturbance restrictions will be used in analyzing leasing proposals and determining the issuance of any leases (for example, geothermal steam, coal, sodium, oil shale, and phosphate). Green River RMP/JMH CAP: The known sodium leasing area is open to exploration and consideration for leasing and developments, but is closed to prospecting permits. The remainder of the planning area is open to sodium prospecting except for areas that are closed to mineral leasing, surface mining, or mechanical prospecting type activities (areas closed to drilling, off road vehicle use, and explosive charges). Sodium (trona) leasing will be considered on a case-by-case basis, and is subject to the same conditional requirements as oil and gas and coal, and the general management direction applied in this RMP.		
MD MR 16: Solid Leasable Minerals Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining Greater Sage-Grouse for purposes of the suitability criteria set forth at 43	No changes made.	Completely revised by rangewide for All RMPs amended for management of GRSG in PHMA No change (same as 2015) for decisions that remain in effect with the modification described above

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CFR 3461.5(o)(1). The BLM will also consider that USFWS has found "the core area strategy…if implemented by all landowners via regulatory mechanisms, would provide adequate protection for Greater Sage-Grouse and their habitats in the state" when considering leasing coal in PHMA under the criteria set for at 43 CFR 3461.5(o)(1). Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Casper RMP:</u> If coal development potential is shown to exist, all BLM-administered lands outside the Coal Development Potential Area (CDPA) will be considered for coal leasing, unless specifically closed to mineral leasing. The coal-screening process will be completed on all newly identified lands having coal development potential. All BLM-administered lands within the CDPA identified in the 2001 Buffalo RMP maintenance action are acceptable for further consideration for coal leasing. The only exceptions are those lands determined unacceptable within the area or those lands that fall within PHMA. The coal unsuitability criteria are re-evaluated whenever new coal lease applications are received. <u>Kemmerer RMP:</u> Process new coal lease applications by using the coal screening process. The coal screening process results will determine which lands may be available for further consideration for coal leasing and development. Appropriate NEPA analysis will be required prior to leasing. Federal land within the proposed Haystack project area outside of the PHMA is determined acceptable for further consideration for coal		

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leasing and development. No coal LBAs will be considered for Rock Creek/Tunp and Bear River Divide management areas. Pinedale RMP: Decisions on lands acceptable for leasing consideration for coal development will be made after an application is received and the coal screening process is conducted. Rawlins RMP: Federal coal lease applications will be accepted only on those federal coal lands with development potential identified as suitable for further leasing consideration after application of the coal unsuitability criteria (the above-mentioned approximately 51,250 acres and 2,318.7 million tons of surface minable federal coal). Green River RMP/JMH CAP: Federal coal lands within the Coal Occurrence and Development Potential area (about 422,000 acres) are open to further consideration for coal leasing and development (i.e., new competitive leasing, emergency leasing, lease modifications, and exchange proposals, under the Federal Coal Management Program) with appropriate and necessary conditions and requirements for protection of other land and resource values and uses.		
MD MR 17: Solid Leasable Minerals Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Upon receipt of a coal lease application proposing underground mining methods that include surface operations and impacts within PHMA, Criterion 15 will be applied and the area will be identified as suitable for further coal leasing consideration after consultation with the state and, where applicable, surface management agency to determine that all or certain	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
stipulated methods of coal mining will not have a significant long-term impact on Greater Sage-Grouse. Stipulated methods may include, but not limited to, underground mining methods with no placement of surface facilities except for purposes of health and human safety. Unsuitability is not applied to underground operations without surface impacts (43 CFR 3461.1) This will be consistent with IM WY-2012-019 says that the BLM will assess potential impacts on Greater Sage-Grouse through the NEPA process, and that the state regulatory agency will apply this mitigation, as well as protective measures consistent with the state policy for solid leasable mining action at the permitting stage. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: Casper RMP: If coal development potential is shown to exist, all BLM-administered lands outside the CDPA will be considered for coal leasing, unless specifically closed to mineral leasing. The coal-screening process will be completed on all newly identified lands having coal development potential. All BLM-administered lands within the CDPA identified in the 2001 Buffalo RMP maintenance action are acceptable for further consideration for coal leasing. The only exceptions are those lands determined unacceptable within the area. The coal unsuitability criteria are re-evaluated whenever new coal lease applications are received. Kemmerer RMP: Process new coal lease applications by using the coal screening process. The coal screening process results will determine which lands may be available for further consideration		

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
for coal leasing and development. Appropriate NEPA analysis will be required prior to leasing. Federal land within the proposed Haystack project area is determined acceptable for further consideration for coal leasing and development. No coal LBAs will be considered for Rock Creek/Tunp and Bear River Divide management areas. Pinedale RMP: Decisions on lands acceptable for leasing consideration for coal development will be made after an application is received and the coal screening process is conducted. Rawlins RMP: Federal coal lease applications will be accepted only on those federal coal lands with development potential identified as suitable for further leasing consideration after application of the coal unsuitability criteria (the above-mentioned approximately 51,250 acres and 2,318.7 million tons of surface minable federal coal). Green River RMP/JMH CAP: Federal coal lands within the Coal Occurrence and Development Potential area (about 422,000 acres) are open to further consideration for coal leasing and development (i.e., new competitive leasing, emergency leasing, lease modifications, and exchange proposals, under the Federal Coal Management Program) with appropriate and necessary conditions and requirements for protection of other land and resource values and uses.		
MD MR 18: Coal exploration activities will be allowed in PHMA if they can be completed in compliance to surface occupancy and disturbance and density stipulations analyzed through the DDCT process.	No changes made.	No change (same as 2015)

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MD MR 19: Exceptions to lease stipulations, COA, and terms and conditions: Exceptions waivers, and modifications to lease stipulations, COAs, and terms and conditions, for Greater Sage-Grouse will continue to be considered on a case-by-case basis consistent with approved LUPs and other BLM policy and regulations as they relate to exceptions within PHMA and GHMA.	No changes made.	Completely revised – revised by rangewide
MD RE 1: Within PHMA, all RMPs are amended as follows: Wind energy development would be avoided in PHMA (Map 2-6), and not allowed unless it can be sufficiently demonstrated that the development activity would not result in declines of PHMA populations. Sufficient demonstration of "no declines" should be coordinated with the WGFD and USFWS. For values other than Greater Sage-Grouse, the following RMP decisions remain in effect: Areas that are currently unavailable due to the need to protect sensitive resources would remain unavailable to wind energy development.	No changes made.	Completely revised by rangewide for All RMPs amended for management of GRSG in PHMA No change (same as 2015) for decisions that remain in effect
MD RE 2: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: The use of guy wires for meteorological towers (MET) tower supports would be avoided within PHMA. All existing and any new unavoidable guy wires should be marked with recommended bird deterrent devices. The siting of new temporary MET towers within PHMA would be avoided within 2 miles of occupied Greater Sage-Grouse leks, unless they are out of the direct line of sight of the occupied lek. Outside of PHMA, the following RMP decisions remain in effect:	No changes made.	Completely revised by rangewide for All RMPs amended for management of GRSG in PHMA No change (same as 2015) for decisions that remain in effect

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Kemmerer RMP: New MET towers would be avoided within 1 mile of occupied sagebrush obligate habitats, unless anti-perch devices are installed. MET towers relying on guy wires for support would be prohibited in these habitats. Exceptions could be made if NEPA analysis shows little or no impact on sagebrush obligate species. Rawlins RMP: MET towers would be authorized on a case-by-case basis from 0.25 miles to 1 mile of an occupied Greater Sage-Grouse and sharp-tailed grouse lek.		
MD LR 1: *Land Use Authorizations* Specific to management for Greater Sage-Grouse, all RMPs are amended as follows: PHMA will be managed as ROW avoidance areas for new ROW or Special Use Authorization (SUA) permits (Map 2-7). Within PHMA where new ROWs/SUAs are necessary, new ROWs/SUAs will be located within designated RMP corridors or adjacent to existing ROWs/SUAs where technically feasible. Subject to valid existing rights including nonfederal land inholdings, required new ROWs/SUAs will be located adjacent to existing ROWs/SUAs or where it best minimizes Greater Sage-Grouse impacts. Consider the likelihood of development of not-yet-constructed surface-disturbing activities, as defined in Table 2 of the Monitoring Framework (Appendix D under valid existing rights. For values other than Greater Sage-Grouse, the following RMP decisions remain in effect: Portions of PHMA will be managed as ROW exclusion areas in accordance with existing RMP decisions for resource values other than Greater Sage-Grouse.	No changes made.	Partially revised by rangewide for All RMPs amended for management of GRSG in PHMA for major ROWs. No change (same as 2015) for decisions that remain in effect

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MD LR 2: Specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Within GHMA where new ROWs/SUAs are necessary, new ROWs/SUAs will be collocated within existing ROWs/SUAs where technically feasible. Appropriate Greater Sage-Grouse seasonal timing constraints will be applied. For values other than Greater Sage-Grouse, the following RMP decisions remain in effect: Portions of GHMA will be managed as ROW avoidance areas in accordance with existing RMP decisions for resource values other than Greater Sage-Grouse.	No changes made.	Partially revised – to include SHMA
MD LR 3: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: <u>New Transmission Lines (greater than 115 kV):</u> New transmission lines greater than 115 kV in PHMA (core only) will be allowed only (1) within the 2-mile wide transmission line route through PHMA (core only) population areas in south-central and southwestern Wyoming (Attachment 1 from EO 2015-4); (2) when located within 0.5 miles or less of an existing 115 kV or greater transmission line constructed prior to 2008; or (3) in designated RMP corridors authorized for aboveground transmission lines. Transmission lines routed using one or more of the three criteria listed above will not be counted against the DDCT 5 percent disturbance cap. New transmission lines greater than 115 kV proposed outside of these areas will be considered where it can be demonstrated that declines in Greater Sage-Grouse populations can be avoided through project design and/or mitigation. These projects will be subject to the	No changes made.	Partially revised by rangewide for All RMPs amended for management of GRSG in PHMA to incorporate major ROW rangewide language No change (same as 2015) for decisions that remain in effect

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density and disturbance restrictions for PHMA. Construction of new transmission lines will adhere to the restrictions associated with conducting activities within PHMA. Review of transmission line proposals will incorporate the Framework for Sage-grouse Impacts Analysis for Interstate Transmission Lines and other appropriate documents consistent with the three routing criteria described above. New projects within PHMA that may require future utility lines, including distribution and transmission lines or pipelines, will include the proposed utility lines in their DDCT as part of the proposed disturbance. Lines permitted but not located in the above mentioned routes or a designated corridor will be counted toward the 5 percent disturbance calculation (line disturbance is equal to the anticipated construction footprint or construction ROW width multiplied by length and includes all access roads, staging areas, and other surface disturbance associated with construction outside of the construction ROW). <u>New Electric Distribution Lines (less than 115 kV):</u> New electric distribution lines will be buried where feasible and economically feasible. If not economically feasible, distribution lines may be authorized when effectively designed/mitigated to protect Greater Sage-Grouse and the AO determines that overhead installation is the action alternative with the fewest adverse impacts while still meeting the project need. Agricultural and residential lines will be considered to be adequately mitigated for Greater Sage-Grouse if constructed at least 0.6 miles from the lek perimeter		

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with appropriate timing constraints and constructed to the latest APLIC guidance. These ROW authorizations will be subject to approval by the State Director. Priority Transmission Lines: PHMA are designated as avoidance areas for high voltage transmission line and pipeline ROWs, except for the transmission projects specifically identified below. All authorizations in these areas, other than the following identified projects, must comply with the conservation measures outlined in this proposed plan, including the RDF and avoidance criteria presented Appendix C of this document. The BLM is currently processing an application for Gateway South, Gateway West, and TransWest Express and the NEPA review for these projects is well underway. The BLM is analyzing Greater Sage-Grouse mitigation measures through the project's NEPA review process. Pipelines: New pipelines through PHMA will be allowed: (1) within an RMP corridor currently authorized for that use or designated through future RMP amendments; or (2) constructed in or adjacent to existing utilities (buried and aboveground) or roads. Pipelines constructed in RMP corridors or adjacent to existing utilities or roads will require completion of a DDCT analysis for baseline data collection but the project is not required to meet the threshold of 5 percent. However, within 6 months of the completion of construction, the project proponent will provide the AO with as-built drawings so that total disturbance within core area can be calculated annually. The following RMP decisions remain in effect with the modification described above:		

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Casper RMP: No new corridor designations will be made in Bates Hole. When placement of a major ROW facility within a designated corridor is not possible, and for smaller ROW and other linear facilities, placement will be adjacent to existing facilities or disturbances. Cross-country placement of ROW and other linear facilities will be allowed only when placement in a designated corridor or adjacent to an existing facility is not practical or feasible. The extent of all surface disturbances will be minimized. No new corridors will be established in the Sand Hills Management Area; ROWs will be allowed when management objectives for the area can still be achieved. All currently designated corridors will be maintained. All special restrictions that apply to types of use/facilities on the corridors will be removed, except as noted for the Oregon Trail Road ROW Corridor, Segment A. The corridors include 351,020 acres, of which 94,580 acres are federal surface. The widths/size of designated corridors will not change. Special restrictions applying to types of use/facilities on the corridors will be removed on a case-by-case basis. Existing corridors include: 1. Oregon Trail Road Corridor, Segment A 2. Oregon Trail Road Corridor, Segment B 3. Oregon Trail Road Corridor, Segment C 4. Poison Spider/Gas Hills Road Corridor 5. Highway 20-26 Corridor 6. Wyoming Highway 259/U.S. 87 Corridor 7. Wyoming Highway 387 Corridor		

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
8. Lost Cabin-Arminto Road Corridor 9. RMP Change No. 2012-03, including the West-Wide Energy Corridor 10. Cabin Creek Corridor 11. Existing Oregon Trail Road ROW Corridor, Segment A. Oregon Trail Road ROW Corridor, Segment A allows additional ROW facilities provided they are subsurface, surface, or low profile developments. ROW facilities that introduce visual intrusions on the skyline along the corridor will not be allowed. Special restrictions applying to types of use/facilities on the corridors will be removed on a case-by-case basis, and a new corridor, to be called the Cabin Creek Corridor, will be designated. Future Corridor Adjustments and New Corridor Designations: Future corridor adjustments and new corridor designations will be made only when facility placement within an existing designated corridor is incompatible, unfeasible, or impractical and when the environmental consequences can be adequately mitigated. Problems of technical compatibility between facilities and spacing of facilities in corridors will be solved on a case-by-case basis. Special restrictions applying to types of use/facilities on the corridors will be removed on a case-by-case basis. South Bighorns/Red Wall Management Area: No corridors will be designated; however, ROWs will be allowed on a case-by-case basis when management objectives for the area can still be achieved. <u>Kemmerer RMP:</u> Utility corridors will be designated, based on use (i.e., power lines, pipelines, and fiber optic lines). Preferred utility corridors will be 2 miles wide (width will be determined based on resource		

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
values) and designated as follows, but variances will be allowed based on application where conflicts with other resources were minimal or can be mitigated through resource-specific stipulations: High-voltage power line corridors will be established north of and parallel to I-80, and along Wyoming State Highway 89 from the junction of I-80 and the Wyoming state line. Fiber optic and low-voltage power line corridors will be located along currently established road systems (e.g., interstate or state highways and paved county roads). <u>Newcastle RMP:</u> Utility/transportation systems will be located adjacent to existing utility/transportation systems whenever practical. Areas to be avoided for new facility placement and routes will be identified on a case-by-case basis, rather than attempting to establish utility corridors. <u>Pinedale RMP:</u> Utility facilities will be restricted to existing routes and designated corridors where practicable, including environmental and socioeconomic considerations. Corridor routes include U.S. Highways 189 and 191 and State Highways 189, 191, 350, 351, 352, 353, and 354. New corridors may be established as oil and gas fields are developed. <u>Rawlins RMP:</u> All BLM-administered lands, except WSA and some SD/MAs (including ACEC/Special Interest Areas), will be open to consideration for placement of utility ROW systems. Each utility ROW will be located adjacent to existing facilities, when possible. Areas with important or sensitive resource values will be avoided. Existing major transportation and utility ROW routes will be designated corridors. However,		

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
major transportation routes within the planning area that are located east of the Carbon County-Albany County line will not be considered for ROW corridor designation because of the scattered public land ownership pattern in the area. All corridors will be designated for power lines (aboveground and buried), telephone lines, and fiber optic lines. Specific proposals will require site-specific environmental analysis and compliance with established permitting processes. Activities generally excluded from ROW corridors include mineral materials disposal, range and wildlife habitat improvements involving surface disturbance and facility construction, campgrounds, and public recreation facilities and other facilities that will attract public use. ROW facilities will not be placed adjacent to each other if issues with safety or incompatibility or resource conflicts were identified. The designated width, allowable uses, and excluded uses for each corridor may be modified during implementation of the Approved RMP. <u>Green River RMP:</u> Areas designated as utility windows will be preferred locations for future grants. Five windows have been identified: 2 east-west, 3 north-south. Other areas will be considered for rights-of-way on a case-by-case basis. Windows 0.5 miles in width have been identified for the placement of utilities. The northern east-west window will be for underground facilities only, and the southern east-west window will be for both above and below ground facilities. A 0.5-mile wide north-south window on the west side of Flaming Gorge, a window south along Highway 430, and a north-south window along the east		

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
side of Flaming Gorge have been identified for above and below ground utilities. JMH CAP: The planning area, with the exception of defined exclusion and avoidance areas, will be open to considering grants of rights-of-way if area objectives can be met. Exclusion areas are closed to rights-of-way. Avoidance and special management areas not identified as exclusion areas will be open to consideration only after site-specific analysis demonstrates area objectives can be met (see glossary) in Greater Sage-Grouse potential nesting habitat.		
MD LR 4: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Maintenance/replacement of existing structures will be allowed subject to valid and existing rights. Upgrades will be considered, subject to mandatory RDFs (Appendix C). Existing guy wires shall be removed or appropriately marked with bird flight diverters to make them more visible to Greater Sage-Grouse in flight. Power lines (distribution and transmission) will be designed to minimize wildlife-related impacts and constructed to the latest APLIC standards. Outside of PHMA the following RMP decisions remain in effect: Kemmerer RMP: New utility lines will be buried or BLM-approved anti-perch devices will be installed on all new utility lines within sagebrush and/or semiarid shrub-dominated habitats, unless NEPA analysis shows little or no impact without burial or modification.	No changes made.	Partially revised – to update Appendix referenced

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD LR 5: Within PHMA where existing authorizations, ROWs, or SUAs have had some level of development (e.g., road, fence, and well) and are expired and are no longer in use, the site will be reclaimed by removing these features and restoring the habitat. Power lines (distribution and transmission) will be designed to minimize wildlife-related impacts and constructed to the latest APLIC standards.	No changes made.	No change (same as 2015)
MD LR 6: Within PHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: The use of guy wires for MET tower supports will be avoided within PHMA. All existing and any new unavoidable guy wires shall be marked with recommended bird deterrent devices. The siting of new temporary MET towers within PHMA will be avoided within 2 miles of occupied Greater Sage-Grouse leks, unless they are out of the direct line of sight of the occupied lek. Outside of PHMA, the following RMP decisions remain in effect: <u>Kemmerer RMP:</u> New MET towers will be avoided within 1 mile of occupied sagebrush obligate habitats, unless anti-perch devices are installed. MET towers relying on guy wires for support will be prohibited in these habitats. Exceptions can be made if NEPA analysis shows little or no impact on sagebrush obligate species. <u>Rawlins RMP:</u> MET towers will be authorized on a case-by-case basis from 0.25 miles to 1 mile of an occupied Greater Sage-Grouse and sharp-tailed grouse lek.	No changes made.	Completely revised by rangewide for All RMPs amended for management of GRSG in PHMA No change (same as 2015) for decisions that remain in effect
MD LR 7: Within PHMA and GHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Lands classified as PHMA for	No changes made.	Partially revised – to include SHMA

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
Greater Sage-Grouse will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, that disposal of the parcel is in the public's best interest or (2) the agency can demonstrate that the disposal of the lands, including land exchanges, will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse. Exceptions will be considered where there is mixed ownership and land exchanges will allow for additional or more contiguous federal ownership patterns within PHMA. For PHMA with minority federal ownership, an additional, effective mitigation agreement will be included for any disposal of federal land. As a final preservation measure, consideration shall be given to pursuing a permanent conservation easement. For lands in GHMA that are identified for disposal, the BLM will only dispose of such lands consistent with the goals and objectives of this plan, including, but not limited to, the RMP goal to conserve, recover, and enhance Greater Sage-Grouse habitat on a landscape scale. For values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Casper RMP:</u> 224,830 acres of public lands are identified as potentially suitable for disposal. At the implementation stage, site-specific analysis with public participation will be conducted. Based on the analysis and public comments received, a determination will be made on whether disposal of the parcel is in the public's best interest. If it is not in the public's best interest, the		

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
parcel will be retained in public ownership. Restricted Disposal – dispose of 5,450 acres on a restricted basis. Allow land-use authorizations under FLPMA Section 302(b) leases and permits to meet public demand. Evaluate on a case-by-case basis as proposals are presented. Potential lease and permit areas may include, but are not limited to the following: • Areas where there are documented or existing trespass facilities that can be resolved by an authorization under this section • Areas along major highways where developments may facilitate public needs • Areas in or adjacent to residential, agricultural, commercial, or industrial developments. The BLM will pursue acquisition of lands and interest in lands in the South Bighorns/Red Wall area.		
MD LR 8: Within PHMA and GHMA, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Areas where acquisitions (including subsurface mineral rights) or conservation easements will benefit Greater Sage-Grouse habitat will be identified. Outside of PHMA and GHMA, and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: <u>Casper RMP:</u> The BLM will pursue acquisition of lands and interest in lands in the Bolton Creek Drainage and Bates Creek areas.	No changes made.	Partially revised – to include SHMA
MD LR 9: Greater Sage-Grouse habitat requirements will be utilized to prioritize parcels for exchange or acquisition within PHMA.	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD LR 10: Within PHMA, non-mineral withdrawals will be evaluated to determine if the withdrawal action is consistent with Greater Sage-Grouse conservation.	No changes made.	No change (same as 2015)
MD REC 1: Specific to management for Greater Sage-Grouse or PHMA, all RMPs are amended as follows: BLM Special Recreation Permits will be allowed in PHMA, unless negative impacts on Greater Sage-Grouse cannot be adequately mitigated. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: Casper RMP: The entire planning area will remain open to dispersed recreation. The camping limit on public lands is set by BLM policy and is currently limited to 14 days. Emphasis will be placed on providing interpretive and information signs and materials for public land visitors, maintaining existing facilities to a high standard consistent with the recreational setting, and limiting development of additional facilities to those areas where public recreational use of surrounding public lands requires. Work with state, local groups, and adjacent landowners will be conducted to identify and develop recreational trails, both motorized and nonmotorized, when the opportunities presents themselves. Special Recreation Permits will be allowed for commercial, noncommercial, and competitive events on a case-by-case basis. Cooperation will be maintained with a variety of user groups, especially in the local area, to provide diverse recreational opportunities for enjoyment of public lands. BLM will pursue acquisition of lands and interest in lands in the Rattlesnake Range and Pine Ridge areas, as well	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
as promote and support recreation-based tourism. Kemmerer RMP: Allow dispersed recreation and permit special recreational activities (e.g., outfitting and guiding permits and OHV events permitted on an annual basis after evaluation). Green River RMP: Special recreation permits will be considered on a case-by-case basis. Appropriate mitigation will be included in special recreation permits, commercial recreation uses, and major competitive recreation events to provide resource protection and public safety. JMH CAP: Special recreation use permits for managed activities that occur in the JMH CAP planning area will be reviewed and subject to recommendations made by the Rock Springs Field Office. This will allow the Rock Springs Field Office to track the amount, location, and timing of organized activity occurring within the planning area to monitor resource pressure. The permit evaluation process will consider the nature of the event, potential impacts on resources, conflicts with other events, and impacts on the quality of other visitors' experiences. Mitigation measures necessary to protect the resources will be included in any permit issued. A plan of operation will be required for all commercial recreational operators and outfitters. The plan will describe the type, extent, and location of the recreation use and the mechanisms by which the operator/outfitter will prevent impacts on environmental resources. Any requests in special recreation use permit applications to remove natural resources will be evaluated on a case-by-case basis after an environmental analysis process.		

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD REC 2: Construction of recreation facilities within PHMA must conform with the avoidance and minimization measures of this plan. If it is determined that these conservation measures are inadequate for the conservation of Greater Sage-Grouse, the BLM will consider and ensure compensatory mitigation that provides a net conservation gain to the species.	Construction of recreation facilities within PHMA must conform to the avoidance and minimization measures of this plan. If it is determined that these conservation measures are inadequate for the conservation of Greater Sage-Grouse, the BLM will consider mitigation consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4 (see also MD SSS 4).	Partial revision – to update EO referenced and update mitigation reference
MD TTM 1: Specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Within PHMA, designate the non-sand dune portions of the following OHV Open Areas as OHV Limited Area. The OHV limitation will ultimately be to "Designated Routes" as determined through a subsequent implementation/activity level Travel Management Plan. In the interim, motorized use on existing routes may occur; however, no new routes may be created without specific authorization: Rawlins Field Office: Dune Pond Cooperative Management Area. Rock Springs Field Office: Portion of the Greater Sand Dunes Recreation Area. The following RMP decisions remain in effect: The Casper Field Office Poison Spider OHV Park (290 acres) will remain as an "open" OHV area.	No changes made.	No change (same as 2015)
MD TTM 2: Within PHMA and GHMA, all motorized use (of which OHVs are a subset) will be limited to designated routes. Route designations will occur in subsequent implementation/activity level Travel Management Plans. In the interim motorized use on existing routes may occur; however, no new routes may be created without specific authorization. In PHMA and	No changes made.	Partially revised – to include SHMA

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
GHMA, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use). Temporary closure or restriction orders under these authorities are enacted at the discretion of the AO to resolve management conflicts and protect persons, property, and public lands and resources. Where an AO determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR 8341.2) A closure or restriction order shall be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders shall be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.		

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD TTM 3: New local or collector roads (as defined in BLM Manual 9113) will be avoided within 1.9 miles of the perimeter of occupied Greater Sage-Grouse leks within PHMA. All new roads will be prohibited within 0.6 miles of the perimeter of occupied Greater Sage-Grouse leks within PHMA.	No changes made.	No change (same as 2015)
MD TTM 4: Within PHMA, no upgrading of existing routes that will change route category or capacity will be allowed unless the upgrading will have minimal impact on Greater Sage-Grouse in PHMA, was necessary for motorist safety, or eliminated the need to construct a new road.	No changes made.	No change (same as 2015)
MD TTM 5: In PHMA, existing roads or realignments will be used to access valid existing rights that are not yet developed. If valid existing rights cannot be accessed via existing roads, any new road will be constructed to the absolute minimum standard necessary, and the surface disturbance will be added to the total disturbance in the PHMA.	No changes made.	No change (same as 2015)
MD TTM 6: Specific to management for Greater Sage-Grouse or PHMA, all RMPs are amended as follows: For roads, primitive roads and trails not designated in travel management plans within PHMA, natural reclamation of roads and trails will be allowed in appropriate situations where additional resource damage is not foreseeable. This will include primitive route/roads that were not designated in wilderness study areas and within lands with wilderness characteristics that have been selected to be managed to retain those characteristics for protection. In PHMA, locate new roads that will have relatively high levels of activity	No changes made.	No change (same as 2015)

2015 BLM GRSG Approved RMP Amendment	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
(accessing multiple wells, housing development) greater than 1.9 miles from the perimeter of occupied Greater Sage-Grouse leks. Locate new other roads used to provide facility site access and maintenance >0.6 miles from the perimeter of occupied Greater Sage-Grouse leks. Outside of PHMA and/or for values other than Greater Sage-Grouse, the following RMP decisions remain in effect with the modification described above: Kemmerer RMP: Roads and two-track routes determined to be unauthorized or redundant and unnecessary for resource management purposes will be reclaimed to achieve surrounding native conditions. Rawlins RMP: Roads or trails that are eroding beyond a reasonable level will be fixed or closed. JMH CAP: Transportation planning will provide for access to achieve multiple-use goals while providing maximum protection for crucial habitats and sensitive resources and will consider: Closing and rehabilitating unused roads and trails and those causing resource damage. This will be subject to county review of existing rights-of-way needs.		
MD TTM 7: Within PHMA, when reseeding roads and trails, appropriate seed mixtures will be used and the use of transplanted sagebrush will be considered.	No changes made.	No change (same as 2015)
MD Special Designations and Other Management Areas: New Greater Sage-Grouse conservation ACECs will not be designated.	No changes made.	No change (same as 2015)

[From Tables A-2 through A-5 in Appendix A from the 2019 Wyoming Greater Sage-Grouse ARMPA]:

Table 2. Seasonal Habitat Objectives for GRSG

Table 2 Completely revised by rangewide and state-specific

Attribute	Indicators	Desired Condition[6]	Reference
Breeding and Nesting (Seasonal Use Period March 1–June 15 (Doherty 2008; Holloran and Anderson 2005)			
Lek Security	Proximity of trees	Trees absent or uncommon shrub/grassland ecological sites within 1.8 miles (approximately 3 kilometers) of occupied leks	Baruch-Mordo et al. 2013; Stiver et al. 2015
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 330 feet (approximately 100 meters) of an occupied lek	Stiver et al. 2015
Cover	% of seasonal habitat meeting desired conditions	>80% of the nesting habitat meets the recommended vegetation characteristics, where appropriate (relative to ecological site potential, etc.).	Connelly et al. 2000
	Sagebrush cover[2]	5 to 25%	Connelly et al. 2000; Connelly et al. 2003; Hagen et al. 2007
	Sagebrush height Arid sites[3] Mesic sites[4]	 4–31 inches (10–80 centimeters) 12–31 inches (30–80 centimeters)	Connelly et al. 2000
	Predominant sagebrush shape	Predominantly spreading shape[5]	Stiver et al. 2015
	Perennial grass cover (such as native bunchgrass)[2] Arid sites[3] Mesic sites[4]	 >10% >15% Cool-season bunchgrasses preferred	Connelly et al. 2000; Stiver et al. 2015; Cagney et al. 2010
	Perennial grass and forb height (including residual grasses)	Adequate nesting cover ~~of >7" or~~ **would be** as determined by ESD site potential ~~and~~ **or best available science in consideration of** local variability.	Connelly et al. 2000; Connelly et al. 2003; Doherty et al. 2014; Hagen et al. 2007; Stiver et al. 2015
	Perennial forb cover[2] Arid sites[3] Mesic sites[4]	 >5% >10%	Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun 2000.

Attribute	Indicators	Desired Condition[6]	Reference
Brood-Rearing/Summer[1] (Seasonal Use Period June 16–October 31)			
Cover	% of seasonal habitat meeting desired condition	>40% of the summer/brood habitat meets recommended brood habitat characteristics where appropriate (relative to ecological site potential, etc.)	Connelly et al. 2000
	Sagebrush cover[2]	5–25%	Connelly et al. 2000
	Sagebrush height	4–32 inches (20.3–80 centimeters)	Connelly et al. 2000
	Perennial grass cover and forbs[2]	>5% arid sites >10% mesic sites	Connelly et al. 2000
	Riparian areas/mesic meadows[2]	Proper functioning condition	Preferred forbs are listed in Stiver et al. 2015
	Upland and riparian perennial forb availability	Preferred forbs are common with several preferred species present	Stiver et al. 2015
Winter (Seasonal Use Period November 1–February 28)			
Cover and Food	% of seasonal habitat meeting desired conditions	>80% of the wintering habitat meets winter habitat characteristics where appropriate (relative to ecological site, etc.).	Connelly et al. 2000
	Sagebrush cover above snow[2]	>5%	Connelly et al. 2000; Stiver et al. 2015
	Sagebrush height above snow	>10 inches (>25 centimeters)	Connelly et al. 2000

Notes:

1 Where credible data support different seasonal dates than those identified, dates may be shifted, but the amount of days cannot be shortened or lengthened by the local unit.

2 Absolute cover is the actual recorded cover and can exceed 100% when recorded across all species and all layers. It is not relative cover, which is the proportions of each species, and equals 100%. Note that cover is reported for only those species (e.g., sagebrush and preferred forbs) that are sampled to determine suitability of habitat for Greater Sage-Grouse. Overall cover at the site will be greater than that sampled for Greater Sage-Grouse habitat, due to other species present. 3 Arid corresponds to the 10-12-inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush subspecies for this type site (Stiver et al. 2015).

4 Mesic corresponds to the ≥12-inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush subspecies for this type site (Stiver et al. 2015).

5 Collectively, the indicators for sagebrush (cover, height, and shape), perennial grass, and perennial forb (cover, height, and/or availability) represent the desired condition range for nesting/early brood-rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. 2015. Sagebrush plants that are more tree or columnar shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush) and a natural part of the plant community; however, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site-specific scales.

6 All desired conditions will be dependent upon site capability and local variation (e.g., weather patterns, localized drought, and ESD state).

2.16.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 plans have management direction that would change by the Proposed RMP Amendment. Note that if 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The appendices can be found on the Wyoming GRSG ePlanning website.

ARMPA Appendix Name	Year	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Approved RMP Amendment Maps	2015	Completely Revised-revised by rangewide
A: Approved RMP Amendment with Management Goals, Objectives, and Decisions	2019	Partially Revised based on changes in Proposed RMP Amendment
B: Fluid Mineral Stipulations	2015	Partially Revised- Applies rangewide exceptions, modifications, and waivers
C: Required Design Features	2015, 2019	No change (same as 2019)
D: The Greater Sage-Grouse Habitat Management Strategy	2015	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
C: Greater Sage-Grouse Habitat Management Strategy	2019	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
F: Mitigation Guidelines for Surface-Disturbing and Disruptive Activities on Wyoming BLM Lands	2015	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
G: Federal Oil and Gas Operations on Split Estate Lands	2015	No change (same as 2015)
H: Wyoming Game and Fish Department Protocols for Treating Sagebrush in Greater Sage-Grouse Habitat	2015	No change based on this amendment, but updated to incorporate version as revised by WGFD Jan 2024
J: Disturbance Density Calculation Tool Manual	2015	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
L: Greater Sage-Grouse Wildfire and Invasive Species Habitat Assessment	2015	No change (same as 2015)
M: Reclamation Plan	2015	No change (same as 2015)
N: Predator Management	2015	Completely Revised-revised by rangewide

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Appendix 2.17
Buffalo, Wyoming RMP Revisions

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2.17 BUFFALO, WYOMING RMP REVISIONS

This appendix presents the approved RMP revision language from the record of decision for the Buffalo RMP that relate to GRSG management, and changes that were made in the 2019 GRSG amendment effort. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment (RMPA), either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMPA include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable RMP appendices that are listed in **Section 2.17.2** of this appendix. For the additional state-specific Wyoming management direction for the Proposed RMPA, see Chapter 2, Table 2-13.

2.17.1 Buffalo RMP (Wyoming)

Table 1. Comparison of Proposed RMP Amendment to Existing GRSG RMP Management Decisions in the Buffalo RMP (Wyoming)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
MG BR:10: Distribution and abundance of all special status species are optimized.	No changes made.	No change (same as 2015)
MO BR:10.1: Maintain or enhance special status species plant communities and habitats.	No changes made.	No change (same as 2015)
MO:10.2: Manage BLM-administered lands to maintain or restore populations and habitat consistent with conservation requirements for special status species.	No changes made.	No change (same as 2015)
MO:10.3: Develop effective conservation and cooperative management plans, strategies, and agreements with stakeholders.	No changes made.	No change (same as 2015)
MG BR:11: Sustainable sagebrush habitats that provide the quantity, quality, and connectivity that is necessary to maintain sustainable populations of Greater Sage-Grouse and other special status species.	No changes made.	Completely revised – revised by rangewide
MO BR:11.1: Maintain large patches of high quality interconnected sagebrush habitats, with emphasis on patches occupied by Greater Sage-Grouse.	No changes made.	No change (same as 2015)
MO BR:11.2: Maintain connectivity between and within sagebrush habitats with emphasis on communities occupied by Greater Sage-Grouse.	No changes made.	Completely revised – revised by rangewide

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MO BR:11.3: In all PHMA, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6).	No changes made.	No change (same as 2015)
MG BR:12: Successful restoration and rehabilitation of potential Greater Sage-Grouse habitat across the planning area.	No changes made.	No change (same as 2015)
MO BR:12.1: Reestablish sagebrush corridors, where feasible, between Greater Sage-Grouse occupied habitats.	No changes made.	No change (same as 2015)
MO BR:12.2: Reconnect large patches of sagebrush habitat with emphasis on reconnecting patches occupied by stronghold and isolated populations of Greater Sage-Grouse.	No changes made.	No change (same as 2015)
MD SS WL-4001: Utilize current research, management and conservation plans, and similar related documents to guide special status species habitat management.	No changes made.	No change (same as 2015)
MD SS WL-4002: Implement actions set forth in recovery plans, conservation measures, terms and conditions, protection measures, and appropriate BMPs and reasonable and prudent measures within biological opinions for Threatened and/or Endangered wildlife species, including those specific to this RMP and any future statewide programmatic biological opinions.	No changes made.	No change (same as 2015)
MD SS WL-4003: Maintain (size and quality) or enhance current habitat utilized by special status species. Enlarge/restore habitat on a site-specific basis.	No changes made.	No change (same as 2015)

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MD SS WL-4004: Maintain or enhance the integrity of identified special status wildlife species migration corridors. Manage identified special status wildlife species travel corridors consistent with other resource values.	No changes made.	No change (same as 2015)
MD SS WL-4005: Locate and manage facilities to mitigate noise impacts on special status species.	No changes made.	No change (same as 2015)
MD SS WL-4006: Manage surface-disturbing and disruptive activities to mitigate impacts on special status wildlife species and their habitats.	No changes made.	No change (same as 2015)
MD SS WL-4007: Apply a CSU stipulation to fluid mineral leases containing special status species habitat. Surveys required for clearance.	No changes made.	No change (same as 2015)
*MD SS WL-4010: The BLM will coordinate new recommendations, mitigation, and Greater Sage-Grouse habitat objectives and management considerations with the WGFD and other appropriate agencies, local government cooperators, and the Wyoming SGIT. These measures will be analyzed in site-specific NEPA documents, as necessary. The Greater Sage-Grouse adaptive management plan (Appendix D (p. 325)) provides regulatory assurance that unintended negative impacts to Greater Sage-Grouse habitat will be addressed before consequences become severe or irreversible. Projects requiring an EIS shall develop adaptive management strategies in support of the population management objectives for Greater Sage-Grouse set by the State of Wyoming (State of WY EO 2015-4). Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives. With respect to Greater Sage-Grouse, all regulatory entities in Wyoming, including the BLM, use	The BLM will coordinate new recommendations, mitigation, and Greater Sage-Grouse habitat objectives and management considerations with the WGFD and other appropriate agencies, local government cooperators, and the Wyoming Sage-Grouse Implementation Team. These measures will be analyzed in site-specific NEPA documents, as necessary. The Greater Sage-Grouse adaptive management plan (2019 Wyoming GrSG ARMPA Appendix C) provides regulatory assurance that unintended negative impacts to Greater Sage-Grouse habitat will be addressed before consequences become severe or irreversible. Projects requiring an EIS shall develop adaptive management strategies in support of the population management objectives for Greater Sage-Grouse set by the State of Wyoming (State of WY EO 2015-4). Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives.	Completely revised – revised by rangewide

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soft and hard triggers. Soft and hard triggers are focused on three metrics: (1) number of active leks, (2) acres of available habitat, and (3) population trends based on annual lek counts. **Soft Triggers Response**: Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short- or long-term, as allowed by law. The project level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal factor. The management agency (BLM) and the Adaptive Management Working Group will implement an appropriate response strategy to address causal factors not attributable to a specific project or to make adjustments at a larger regional or statewide level. **Hard Trigger Response**: Upon determination that a hard trigger has been tripped, the BLM will immediately defer issuance of discretionary authorizations for new actions within the Biologically Significant Unit for a period of 90 days. In addition, within 14 days of a determination that a hard trigger has been tripped, the Adaptive Management Working Group will convene to develop an interim response strategy and initiate an assessment to determine the causal factor or factors (hereafter called the causal factor assessment).	With respect to Greater Sage-Grouse, all regulatory entities in Wyoming, including the BLM, use soft and hard triggers. Soft and hard triggers are focused on three metrics: (1) number of active leks, (2) acres of available habitat, and (3) population trends based on annual lek counts. Soft Triggers Response: Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short- or long-term, as allowed by law. The project level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal factor. The management agency (BLM) and the Adaptive Management Working Group will implement an appropriate response strategy to address causal factors not attributable to a specific project or to make adjustments at a larger regional or statewide level. Hard Trigger Response: Upon determination that a hard trigger has been tripped, the BLM will immediately defer issuance of discretionary authorizations for new actions within the Biologically Significant Unit for a period of 90 days. In addition, within 14 days of a determination that a hard trigger has been tripped, the Adaptive Management Working Group will convene to develop an interim response strategy and initiate an assessment to determine the causal factor or factors (hereafter called the causal factor assessment). The Adaptive Management Working Group would define a process to review and reverse adaptive management actions once the identified causal factor is resolved (e.g., returning to previous management once objectives of interim management strategy have been met).	

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MD SS WL-4011: Develop avoidance areas restricting the application of broad-spectrum pesticides in areas containing Greater Sage-Grouse nesting and brood-rearing habitats.	No changes made.	No change (same as 2015)
MD SS WL-4012: Restore Greater Sage-Grouse brood-rearing habitats in wetland/riparian areas. Maintain seeps, springs, wet meadows, and riparian vegetation in a functional and diverse condition for young Greater Sage-Grouse and other species that depend on forbs and insects associated with these areas.	No changes made.	No change (same as 2015)
**MD SS WL-4013: Manage vegetation composition, diversity and structure, as determined by ecological site description and WGFD protocol, to achieve Greater Sage-Grouse habitat management objectives, in cooperation with stakeholders. Vegetation treatments in nesting and wintering habitat that would reduce sagebrush canopy cover to less than 15% would not be conducted unless it can be shown to be beneficial to Greater Sage-Grouse habitat and removal of sagebrush canopy cover below 15% will be subject to the DDCT. For vegetation treatments in sagebrush within PHMAs, refer to Appendix A, WGFD Protocols for Treating Sagebrush to Benefit Sage-Grouse (WGFD 2011, as updated). These recommended protocols, subject to seasonal conditions of approval, would be used in determining whether proposed treatment constitutes a "disturbance" that would contribute toward the 5% threshold for habitat maintenance. Additionally, these protocols would be used to determine whether the proposed treatment configuration would be expected to have neutral or beneficial impacts for PHMA (core only) populations or if they represent additional habitat loss or fragmentation.	Manage vegetation composition, diversity and structure, as determined by ecological site description and WGFD protocols, to achieve Greater Sage-Grouse habitat management objectives, in cooperation with stakeholders. Vegetation treatments in nesting and wintering habitat that would reduce sagebrush canopy cover to less than 15% would not be conducted unless it can be shown to be beneficial to sage-grouse habitat and removal of sagebrush canopy cover below 15% will be subject to the DDCT. For vegetation treatments in sagebrush within PHMAs, refer to 2015 Buffalo RMP Appendix A, WGFD Protocols for Treating Sagebrush to Benefit Sage-Grouse (WGFD 2015, as updated). These recommended protocols, subject to seasonal conditions of approval, would be used in determining whether proposed treatment constitutes a "disturbance" that would contribute toward the 5% threshold for habitat maintenance. Additionally, these protocols would be used to determine whether the proposed treatment configuration would be expected to have neutral or beneficial impacts for PHMA (core only) populations or if they represent additional habitat loss or fragmentation. Treatments to enhance sagebrush/grasslands habitat for sage-grouse would be evaluated	Partially revised – to update Appendix referenced

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Treatments to enhance sagebrush/grasslands habitat for Greater Sage-Grouse would be evaluated based upon habitat quality and the functionality/use of treated habitats post-treatment. The BLM would work collaboratively with partners at the state and local level to maintain and enhance Greater Sage-Grouse habitats. Seasonal restrictions would be applied, as needed, for implementing fuels management treatments according to the type of seasonal habitat present. Wildland fire burns will be treated as disturbance if sagebrush is reduced below 5% canopy cover, unless there is an implementation plan outlining restoration efforts and 3 years of data showing a trend back to suitable habitat. Burned areas within PHMAs would be restored to suitable habitat with consideration given to ESDs, reference sites, site potential and local variability.	based upon habitat quality and the functionality/use of treated habitats post-treatment. The BLM would work collaboratively with partners at the state and local level to maintain and enhance sage-grouse habitats. Seasonal restrictions would be applied, as needed, for implementing fuels management treatments according to the type of seasonal habitat present. Wildland fire burns will be treated as disturbance if sagebrush is reduced below 5% canopy cover, unless there is an implementation plan outlining restoration efforts and 3 years of data showing a trend back to suitable habitat. Burned areas within PHMAs would be restored to suitable habitat with consideration given to ESDs, reference sites, site potential and local variability.	
MD SS WL-4014: Minimize disturbances that would result in alterations to springs and riparian Greater Sage-Grouse habitat. In coordination with stakeholders, develop alternative water sources to replace natural sources that have been affected or destroyed.	No changes made.	No change (same as 2015)
MD SS WL-4015: Manage stored water to control mosquitoes and prevent the spread of WNv to Greater Sage-Grouse.	No changes made.	No change (same as 2015)
MD SS WL-4016: Design water facilities with protective features to reduce mortality of Greater Sage-Grouse from drowning or entrapment.	No changes made.	No change (same as 2015)
MD SS WL-4017: Design and locate fences to reduce impacts to important Greater Sage-Grouse habitat.	No changes made.	Completely revised – revised by rangewide

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MD SS WL-4018: Use the Fire Management Plan to incorporate the most current sagebrush habitat information and to guide fire suppression priorities in sagebrush habitats.	No changes made.	No change (same as 2015)
MD SS WL-4019: Remove conifers where they have encroached upon Greater Sage-Grouse habitat in cooperation with stakeholders. Reduce the density of conifers that have encroached into, but do not yet dominate sagebrush plant communities.	No changes made.	No change (same as 2015)
MD SS WL-4020: Inventory, record, and report existing type and condition of BLM fences. Prioritize areas and annually implement modifications to existing fences to reduce hazards to flying Greater Sage-Grouse, in cooperation with stakeholders. All new fences, in priority areas, will be properly designed and located to avoid hazards to flying Greater Sage-Grouse.	No changes made.	No change (same as 2015)
MD SS WL-4021: Avoid renewable energy (solar and wind) projects in Greater Sage-Grouse Core Population Areas unless it can be demonstrated that the activity would not result in declines of core Greater Sage-Grouse populations. Sufficient demonstration of "no declines" should be coordinated with the WGFD and USFWS.	No changes made.	Completely revised – revised by rangewide
**MD SS WL-4022: Powerlines (distribution and transmission) will be designed to minimize wildlife related impacts. This action includes but is not limited to: • Avoid areas of high avian use such as water bodies (including ponds, lakes, rivers, streams and wetlands), ridge tops, prairie dog colonies, Greater Sage-Grouse Core Population and Core Population Connectivity Corridors, and sharp-tailed grouse leks (PRB Final EIS, EO 2011-05).	Powerlines (distribution and transmission) will be designed to minimize wildlife related impacts. This action includes but is not limited to: • Avoid areas of high avian use such as water bodies (including ponds, lakes, rivers, streams and wetlands), ridge tops, prairie dog colonies, Greater Sage-Grouse Core Population and Core Population Connectivity Corridors, and sharp-tailed grouse leks (PRB Final EIS, EO 2015-4).	Partially revised – revised by rangewide to add GRSG major ROW language

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• Prohibit above ground distribution powerlines unless identified in an approved distribution plan. • PHMA: o New transmission lines greater than 115 kV in PHMA (core only) would be allowed only: (1) when located within 0.5 mile or less of an existing 115 kV or greater transmission line or constructed prior to 2008; or (2) in designated RMP corridors authorized for aboveground transmission lines. Transmission lines routed using one or more of the two criteria listed above will not be counted against the DDCT 5% disturbance cap. New transmission lines greater than 115 kV proposed outside of these areas would be considered where it can be demonstrated that declines in Greater Sage-Grouse populations could be avoided through project design and/or mitigation. These projects will be subject to the density and disturbance restrictions for PHMA. Construction of new transmission lines will adhere to the restrictions associated with conducting activities within PHMAs. Review of transmission line proposals would incorporate the Framework for Sage-grouse Impacts Analysis for Interstate Transmission Lines and other appropriate documents consistent with the three routing criteria described above. New electric distribution lines (less than 115 kV) would be buried where feasible and economically feasible. If not economically feasible, distribution lines may be authorized when effectively designed/mitigated to protect Greater Sage-Grouse and the authorized officer determines that overhead installation is the action alternative with the	• Prohibit above ground distribution powerlines unless identified in an approved distribution plan. • PHMA: o New transmission lines greater than 115 kV in PHMA (core only) would be allowed only: (1) when located within 0.5 mile or less of an existing 115 kV or greater transmission line or constructed prior to 2008; or (2) in designated RMP corridors authorized for aboveground transmission lines. Transmission lines routed using one or more of the two criteria listed above will not be counted against the DDCT 5% disturbance cap. New transmission lines greater than 115 kV proposed outside of these areas would be considered where it can be demonstrated that declines in Greater Sage-Grouse populations could be avoided through project design and/or mitigation. These projects will be subject to the density and disturbance restrictions for PHMA. Construction of new transmission lines will adhere to the restrictions associated with conducting activities within PHMAs. Review of transmission line proposals would incorporate the Framework for Sage-grouse Impacts Analysis for Interstate Transmission Lines and other appropriate documents consistent with the three routing criteria described above. New electric distribution lines (less than 115 kV) would be buried where feasible and economically feasible. If not economically feasible, distribution lines may be authorized when effectively designed/mitigated to protect Greater Sage-Grouse and the authorized officer determines that overhead installation is the	

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fewest adverse impacts while still meeting the project need. Agricultural and residential lines will be considered to be adequately mitigated for Greater Sage-Grouse if constructed at least 0.6 mile from the lek perimeter with appropriate timing constraints and constructed to the latest APLIC guidance. These ROW authorizations will be subject to approval by the State Director. Within GHMA: Within general Greater Sage-Grouse habitat (outside core population and connectivity areas) overhead • powerlines will be located at least 0.5 mile from occupied Greater Sage-Grouse leks (modified from PRB Final EIS). Any new powerlines authorized within the above identified areas will be buried or if overhead then constructed to the latest APLIC guidance (modified from PRB Final EIS). • New pipelines through PHMA would be allowed: (1) within an RMP corridor currently authorized for that use or designated through future RMP amendments; or (2) constructed in or adjacent to existing utilities (buried and above-ground) or roads. Pipelines constructed in RMP corridors or adjacent to existing utilities or roads will require completion of a DDCT analysis for baseline data collection but the project is not required to meet the threshold of 5%. However, within 6 months of the completion of construction, the project proponent will provide the authorized officer with as-built drawings so that total disturbance within core area can be calculated annually. PHMA is designated as avoidance areas for high voltage transmission line	action alternative with the fewest adverse impacts while still meeting the project need. Agricultural and residential lines will be considered to be adequately mitigated for Greater Sage-Grouse if constructed at least 0.6 mile from the lek perimeter (or lek center if no perimeter is yet mapped) with appropriate timing constraints and constructed to the latest APLIC guidance. These ROW authorizations will be subject to approval by the State Director. Within GHMA: Within general Greater Sage-Grouse habitat (outside core population and connectivity areas) overhead powerlines will be located at least 0.5 mile from occupied Greater Sage-Grouse leks (modified from PRB Final EIS). Any new powerlines authorized within the above identified areas will be buried or if overhead then constructed to the latest APLIC guidance (modified from PRB Final EIS). New pipelines through PHMA would be allowed: (1) within an RMP corridor currently authorized for that use or designated through future RMP amendments; or (2) constructed in or adjacent to existing utilities (buried and above-ground) or roads. Pipelines constructed in RMP corridors or adjacent to existing utilities or roads will require completion of a DDCT analysis for baseline data collection but the project is not required to meet the threshold of 5%. However, within 6 months of the completion of construction, the project proponent will provide the authorized officer with as-built drawings so that total disturbance within core area can be calculated annually. PHMA is designated as avoidance areas for high voltage	

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and pipeline ROWs. All authorizations must comply with the conservation measures outlined in this approved plan, including the RDFs and avoidance criteria presented in Appendix C (p. 285) of this document.	transmission line and pipeline ROWs. All authorizations must comply with the conservation measures outlined in this approved plan, including the RDF and avoidance criteria presented in 2019 Wyoming GrSG ARMPA Appendix B.	
**MD SS WL-4023: Lease fluid minerals dependent upon lease location and habitat suitability. Ensure that leasing activities in PHMA comply with Greater Sage-Grouse RMP decisions and remain in compliance with laws, regulations and policy.	Lease fluid minerals dependent upon lease location and habitat suitability. Ensure that leasing activities in PHMA comply with Greater Sage-Grouse resource management plan decisions and remain in compliance with laws, regulations and policy (see also MD SS WL-4024 and MS SS WL-4036).	Completely revised – revised by rangewide
*MD SS WL-4024: Apply the following stipulations to fluid mineral leases within Greater Sage-Grouse Core Population Areas: • NSO prohibiting surface occupancy and disturbing activities, within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks (independent of habitat suitability). • CSU within Greater Sage-Grouse Core Population Areas o In Greater Sage-Grouse core population areas, the density of disturbance of a facility (oil and gas or mining) would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights and applicable law. The one location and cumulative value of existing disturbances will not exceed 5% of suitable habitat of the DDCT area using the DDCT process. Inside Greater Sage-Grouse (priority habitat) core population areas, all suitable habitat disturbed (any program area) will not exceed 5% of suitable habitat within the DDCT area using the DDCT process. o Design and manage facilities to prevent WNv transmission.	Apply the following stipulations to fluid mineral leases within Greater Sage-Grouse Core Population Areas: • NSO prohibiting surface occupancy and disturbing activities, within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) (independent of habitat suitability). • CSU within Greater Sage-Grouse Core Population Areas: o In Greater Sage-Grouse core population areas, the density of disturbance of a facility (oil and gas or mining) would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights and applicable law. The one location and cumulative value of existing disturbances will not exceed 5% of suitable habitat of the DDCT area using the DDCT process. Inside Greater Sage-Grouse (priority habitat) core population areas, all suitable habitat disturbed (any program area) will not exceed 5% of suitable habitat within the DDCT area using the DDCT process. o Design and manage facilities to prevent WNv transmission.	Completely revised – revised by rangewide and state-specific for NSO in PHMA, and for waivers, exceptions, and modifications (WEMs) in PHMA and GHMA Partially revised – to update references included in CSU and TLS in PHMA Partially revised – to update references included in Connectivity Corridors, Winter Concentration Areas, and GHMA, and to include SHMA (GHMA is habitats outside of PHMA and Connectivity Corridors)

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○ Locate new Local or Collector roads (as defined in BLM Manual 9113) greater than 1.9 miles from the perimeter of occupied Greater Sage-Grouse leks. Locate new roads greater than 0.6 mile from the perimeter of occupied Greater Sage-Grouse leks. Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years. • TLS prohibiting surface-disturbing and/or disruptive activities from March 15 to June 30 (independent of habitat suitability). Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis. Where credible data support different timeframes for this seasonal restriction, dates may be adjusted by up to 14 days prior to or subsequent to the above dates. • TLS prohibiting surface-disturbing and disruptive activities within mapped Greater Sage-Grouse winter concentration areas, from December 1 to March 14. Activities in unsuitable habitats within PHMAs would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis. Where credible data support different timeframes for this seasonal restriction, dates may be	○ Locate new Local or Collector roads (as defined in BLM Manual 9113) greater than 1.9 miles from the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped). Locate new roads greater than 0.6 mile from the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped). Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years. • TLS prohibiting surface-disturbing and/or disruptive activities from March 15 to June 30 (independent of habitat suitability). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. • TLS prohibiting surface-disturbing and disruptive activities within mapped Greater Sage-Grouse	

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adjusted by up to 14 days prior to or subsequent to the above dates.
Apply the following stipulations to fluid mineral leases within Greater Sage-Grouse Core Population Connectivity Corridors:
• NSO prohibiting surface occupancy and disturbing activities, within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks (independent of habitat suitability).
• CSU within Greater Sage-Grouse Population Connectivity Corridors.
  ○ Inside Greater Sage-Grouse (priority habitat) core population area connectivity corridors, all suitable habitat disturbed (any program area) will not exceed 5% of suitable habitat within the DDCT area using the DDCT process.
  ○ Design and manage facilities to prevent WNv transmission. Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years.
• TLS prohibiting surface-disturbing and/or disruptive activities within 4.0 miles of an occupied Greater Sage-Grouse lek, from March 15 to June 30 (independent of habitat suitability and restricted to within Population Connectivity Corridors). Activities in unsuitable habitats would be evaluated under the exception and modification
	winter concentration areas, from December 1 to March 14. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.
	Apply the following stipulations to fluid mineral leases within Greater Sage-Grouse Core Population Connectivity Corridors:
	• NSO prohibiting surface occupancy and disturbing activities, within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) (independent of habitat suitability).
	• CSU within Greater Sage-Grouse Population Connectivity Corridors.
	  ○ Inside Greater Sage-Grouse (priority habitat) core population area connectivity corridors, all suitable habitat disturbed (any program area) will not exceed 5% of suitable habitat within the DDCT area using the DDCT process.	

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criteria and could be allowed on a case by case basis. Where credible data support different timeframes for this seasonal restriction, dates may be adjusted by up to 14 days prior to or subsequent to the above dates. • TLS prohibiting surface-disturbing and/or disruptive activities within mapped Greater Sage-Grouse winter concentration areas, from December 1 to March 14. Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case by case basis. Where credible data support different timeframes for this seasonal restriction, dates may be adjusted by up to 14 days prior to or subsequent to the above dates. Apply the following stipulations to fluid mineral leases within Greater Sage-Grouse habitat outside of Core Population Areas and Core Population Connectivity Corridors: • NSO prohibiting surface occupancy and disturbing activities, within 0.25 mile of the perimeter of occupied Greater Sage-Grouse leks. • CSU within 0.25 mile of occupied Greater Sage-Grouse leks. ○ Design and manage facilities to prevent WNv transmission. CSU – Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all	○ Design and manage facilities to prevent WNv transmission. ○ Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years. • TLS prohibiting surface-disturbing and/or disruptive activities within 4.0 miles of an occupied Greater Sage-Grouse lek, from March 15 to June 30 (independent of habitat suitability and restricted to within Population Connectivity Corridors). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. TLS prohibiting surface-disturbing and/or disruptive activities within mapped Greater Sage-Grouse winter concentration areas, from December 1 to March 14. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements,	

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planted shrubs shall have been in place for at least two years. Recommend for all surface-disturbing activities on BLM surface adjacent to Core or Connectivity Population Areas, or within or adjacent to lands involved in Greater Sage-Grouse conservation projects. • TLS prohibiting surface-disturbing and disruptive activities within 2.0 miles of occupied Greater Sage-Grouse leks, from March 15 to June 30 (independent of habitat suitability). Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case by case basis. Where credible data support different timeframes for this seasonal restriction, dates may be adjusted by up to 14 days prior to or subsequent to the above dates. TLS protecting mapped winter concentration areas, from December 1 to March 14, in GHMA would be implemented only where winter concentration areas are identified as supporting biologically significant numbers of Greater Sage-Grouse nesting in PHMA and/or attending leks within PHMA (core only). Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different timeframes for this seasonal restriction, dates may be adjusted by up to 14 days prior to or subsequent to the above dates. In cases where federal oil and gas leases are or have been issued without stipulated restrictions or requirements that are later found to be necessary, or with stipulated restrictions or requirements later found to be insufficient, consider	and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. Apply the following stipulations to fluid mineral leases within Greater Sage-Grouse habitat outside of Core Population Areas and Core Population Connectivity Corridors: • NSO prohibiting surface occupancy and disturbing activities, within 0.25 mile of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped). • CSU within 0.25 mile of occupied Greater Sage-Grouse leks. ○ Design and manage facilities to prevent WNv transmission. • CSU – Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all	

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their inclusion before approving subsequent exploration and development activities. Include these restrictions or requirements only as reasonable measures or as conditions of approval in authorizing APDs or Master Development Plans. Conversely, in cases where leases are or have been issued with stipulated restrictions or requirements that are later found to be excessive or unnecessary, the stipulated restrictions or requirements may be appropriately modified, excepted or waived in authorizing actions. Both the application of reasonable measures or COAs and the modification or exception of stipulated restrictions or requirements must first be based upon site-specific analysis including the necessary supporting NEPA. **Note (PHMA and GHMA):** The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse.	planted shrubs shall have been in place for at least two years. Recommend for all surface-disturbing activities on BLM surface adjacent to Core or Connectivity Population Areas, or within or adjacent to lands involved in Greater Sage-Grouse conservation projects. • TLS prohibiting surface-disturbing and disruptive activities within 2.0 miles of occupied Greater Sage-Grouse leks, from March 15 to June 30 (independent of habitat suitability). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. • TLS protecting mapped winter concentration areas, from December 1 to March 14, in GHMA would be implemented only where winter concentration areas are identified. Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days	

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	prior to or subsequent to the above dates. In cases where federal oil and gas leases are or have been issued without stipulated restrictions or requirements that are later found to be necessary, or with stipulated restrictions or requirements later found to be insufficient, consider their inclusion before approving subsequent exploration and development activities. Include these restrictions or requirements only as reasonable measures or as conditions of approval in authorizing APDs or Master Development Plans. Conversely, in cases where leases are or have been issued with stipulated restrictions or requirements that are later found to be excessive or unnecessary, the stipulated restrictions or requirements may be appropriately modified, excepted or waived in authorizing actions. Both the application of reasonable measures or COAs and the modification or exception of stipulated restrictions or requirements must first be based upon site-specific analysis including the necessary supporting NEPA. **Note (PHMA and GHMA):** The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036).	
*MD SS WL-4025: Manage Greater Sage-Grouse Core Population Areas as follows: • Prohibit surface-disturbing activities and occupancy within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks (independent of habitat suitability).	Manage Greater Sage-Grouse Core Population Areas as follows: • Prohibit surface-disturbing activities and occupancy within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) (independent of habitat suitability).	Completely revised – revised by rangewide and state-specific for surface disturbance threshold in PHMA Completely revised – revised by rangewide for WEMs Partially revised – to update references included in remainder of

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• In Greater Sage-Grouse core population areas, the density of disturbance of a facility (oil and gas or mining) would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights and applicable law. The one location and cumulative value of existing disturbances will not exceed 5 percent of suitable habitat of the DDCT area using the DDCT process. • Inside Greater Sage-Grouse (priority habitat) core population areas and connectivity corridors, all suitable habitat disturbed (any program area) will not exceed 5% of suitable habitat within the DDCT area using the DDCT process. ○ Design and manage facilities to prevent WNv transmission. ○ New project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek from 6:00 pm to 8:00 am during the breading season (March 1- May 15). • Specific noise protocols for measurement and implementation will be developed as additional research and information emerges. ○ Locate new Local or Collector roads (as defined in BLM Manual 9113) greater than 1.9 miles from the perimeter of occupied Greater Sage-Grouse leks. Locate new Resource roads greater than 0.6 mile from the perimeter of occupied Greater Sage-Grouse leks. ○ Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option	• In Greater Sage-Grouse core population areas, the density of disturbance of a facility (oil and gas or mining) would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights and applicable law. The one location and cumulative value of existing disturbances will not exceed 5 percent of suitable habitat of the DDCT area using the DDCT process. • Inside Greater Sage-Grouse (priority habitat) core population areas and connectivity corridors, all suitable habitat disturbed (any program area) will not exceed 5% of suitable habitat within the DDCT area using the DDCT process. ○ Design and manage facilities to prevent WNv transmission. New project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek (or lek center if no perimeter is yet mapped) from 6:00 pm to 8:00 am during the breading season (March 1- May 15). Specific noise protocols for measurement and implementation will be developed as additional research and information emerges. These measure would be considered at the site-specific project level where and when appropriate. ○ Locate new Local or Collector roads (as defined in BLM Manual 9113) greater than 1.9 miles from the perimeter of occupied Greater Sage-Grouse leks. Locate new Resource roads greater than 0.6 mile from the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped).	management direction (including density threshold) in PHMA Partially revised – to update references included in Connectivity Corridors, Winter Concentration Areas, and GHMA, and to include SHMA (GHMA is habitats outside of PHMA and Connectivity Corridors)

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III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years. • Prohibit surface-disturbing and disruptive activities from March 15 to June 30 (independent of habitat suitability). Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case by case basis. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. • Prohibit surface-disturbing and disruptive activities within mapped Greater Sage-Grouse winter concentration areas, from December 1 to March 14. Activities in unsuitable habitats within PHMAs would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. To the extent necessary to prevent unnecessary or undue degradation, manage as follows within Greater Sage-Grouse Core Population Connectivity Corridors: • Prohibit surface occupancy and disturbing activities, within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks	○ Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years. • Prohibit surface-disturbing and disruptive activities from March 15 to June 30 (independent of habitat suitability). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. Prohibit surface-disturbing and disruptive activities within mapped Greater Sage-Grouse winter concentration areas, from December 1 to March 14. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of	

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(independent of habitat suitability). • In Greater Sage-Grouse Core Population Connectivity Corridors, subject to valid existing rights and applicable law, the cumulative value of existing disturbances will not exceed 5% of suitable habitat of the DDCT area using the DDCT process. Inside Greater Sage-Grouse (priority habitat) core population areas and connectivity corridors, all suitable habitat disturbed (any program area) will not exceed 5% of suitable habitat within the DDCT area using the DDCT process. o Design and manage facilities to prevent WNv transmission. o Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years. • Prohibit surface-disturbing and disruptive activities within 4.0 miles of occupied Greater Sage-Grouse leks from March 15 to June 30 (independent of habitat suitability and restricted to within Population Connectivity Areas). Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case by case basis. Where credible data support different timeframes for this seasonal	Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. To the extent necessary to prevent unnecessary or undue degradation, manage as follows within Greater Sage-Grouse Core Population Connectivity Corridors: • Prohibit surface occupancy and disturbing activities, within 0.6 mile of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) (independent of habitat suitability). • In Greater Sage-Grouse Core Population Connectivity Corridors, subject to valid existing rights and applicable law, the cumulative value of existing disturbances will not exceed 5% of suitable habitat of the DDCT area using the DDCT process. Inside Greater Sage- Grouse (priority habitat) core population areas and connectivity corridors, all suitable habitat disturbed (any program area) will not exceed 5% of suitable habitat within the DDCT area using the DDCT process. o Design and manage facilities to prevent WNv transmission. Restore disturbed sagebrush communities on BLM surface	

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restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. Prohibit surface-disturbing and disruptive activities within mapped Greater Sage-Grouse winter concentration areas, from December 1 to March 14. Activities in unsuitable habitats within PHMAs would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. Manage as follows within occupied Greater Sage-Grouse habitat outside of Core Population and Core Population Connectivity Corridors: • Prohibit or restrict surface occupancy and disturbing activities within 0.25 mile of the perimeter of occupied Greater Sage-Grouse leks. • Reduce surface disturbance for authorizations within 0.25 mile of occupied Greater Sage-Grouse leks by: ○ Design and manage facilities to prevent WNv transmission. • Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years.	to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all planted shrubs shall have been in place for at least two years. • Prohibit surface-disturbing and disruptive activities within 4.0 miles of occupied Greater Sage-Grouse leks from March 15 to June 30 (independent of habitat suitability and restricted to within Population Connectivity Areas). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036).Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. • Prohibit surface-disturbing and disruptive activities within mapped Greater Sage-Grouse winter concentration areas, from December 1 to March 14. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable	

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Recommend for all surface-disturbing activities on BLM surface adjacent to core or connectivity population areas, within or adjacent to lands involved in Greater Sage-Grouse conservation projects. BLM parcels less than 640 acres that only meet the population density factor may be excluded. • Prohibit surface-disturbing and/or disruptive activities within 2.0 miles of occupied Greater Sage-Grouse leks, from March 15 to June 30 (independent of habitat suitability). Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case by case basis. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. • Protect mapped winter concentration areas, from December 1 to March 14, in GHMA would be implemented only where winter concentration areas are identified as supporting biologically significant numbers of Greater Sage-Grouse nesting in PHMA and/or attending leks within PHMA (core only). Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. **Note (PHMA and GHMA):** The authorized officer may grant an exception if an environmental record of review determines that	State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. Manage as follows within occupied Greater Sage-Grouse habitat outside of Core Population and Core Population Connectivity Corridors: Prohibit or restrict surface occupancy and disturbing activities within 0.25 mile of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped). • Reduce surface disturbance for authorizations within 0.25 mile of occupied Greater Sage-Grouse leks by: ○ Design and manage facilities to prevent WNv transmission. • Restore disturbed sagebrush communities on BLM surface to meet the Wyoming DEQ community-specific full shrub density standard (Chapter 4 Rules and Regulations, option III) for all predisturbance shrub species and 5% minimum canopy cover of sagebrush. A 90% confidence interval is required to demonstrate achievement of the standard. The standard must be demonstrated the last year of the responsibility period, and all	

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the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse.	planted shrubs shall have been in place for at least two years. Recommend for all surface-disturbing activities on BLM surface adjacent to core or connectivity population areas, within or adjacent to lands involved in Greater Sage-Grouse conservation projects. BLM parcels less than 640 acres that only meet the population density factor may be excluded. • Prohibit surface-disturbing and/or disruptive activities within 2.0 miles of occupied Greater Sage-Grouse leks, from March 15 to June 30 (independent of habitat suitability). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site- specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036). Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. Protect mapped winter concentration areas, from December 1 to March 14, in GHMA, only where winter concentration areas are identified. Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different	

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	timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates. **Note (PHMA and GHMA):** The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SS WL-4036).	
No similar action.	*MD SS WL-4035: The BLM will update its Greater Sage-Grouse habitat management areas, including biologically significant units (BSUs), in conjunction with the State of Wyoming's core areas, upon issuance of any Wyoming Governor's Executive Order revising or amending the core area boundaries and upon completion of appropriate NEPA analysis and process. The BLM will complete the appropriate NEPA documentation (including appropriate public comment) prior to adopting any revised core area boundaries (e.g., maintenance action or plan amendment, environmental assessment, etc.).	Partially revised – to change reference from BSUs to HAF multi-scale areas.
No similar action.	*MD SS WL-4036: Specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Adopt the State of Wyoming's Greater Sage-Grouse Compensatory Mitigation Framework to the extent consistent with federal law, regulations, and policy. In all Greater Sage-Grouse habitat, when authorizing third-party actions in designated Greater Sage-Grouse habitat, the BLM will seek to achieve the planning-level Greater Sage-Grouse management goals and objectives through implementation	Completely revised – revised by rangewide

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	of mitigation and management actions, consistent with valid existing rights and applicable law. Under this Plan Amendment, management would be consistent with the Greater Sage-Grouse goals and objectives, and in conformance with BLM Manual 6840, Special Status Species Management. In accordance with BLM Manual 6840, the BLM will undertake planning decisions, actions and authorizations "to minimize or eliminate threats affecting the status of [Greater Sage-Grouse] or to improve the condition of [Greater Sage-Grouse] habitat" across the planning area. Accordingly, before authorizing third-party actions that result in habitat loss and degradation, the BLM will complete the following steps, in alignment with the Governor of Wyoming's Executive Order 2015-4 (July 29, 2015): 1. Work jointly with the WGFD to evaluate projects and recommend mitigation in the form of avoidance and minimization. 2. The WGFD will determine if the State requires or recommends any additional mitigation – including compensatory mitigation – under State regulations, policies, or programs related to the conservation of Greater Sage-Grouse. 3. Incorporate state required or recommended mitigation into the BLM's NEPA decision-making process, if the WGFD determines that compensatory mitigation is required to address impacts to GRSG habitat as a part of State policy or authorization, or if a proponent voluntarily offers mitigation. 4. Analyze whether the compensatory mitigation (deferring to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the	

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	recommended compensatory mitigation action): • achieves measurable outcomes for Greater Sage-Grouse habitat function on a landscape scale as determined by WGFD that are at least equal to the lost or degraded values in accordance with the Governor of Wyoming's Executive Order 2015-4. • provides benefits that are in place for at least the duration of the impacts • accounts for a level of risk that the mitigation action may fail or not persist for the full duration of the impact 5. Ensure mitigation outcomes are consistent with the State of Wyoming's mitigation strategy and principles outlined in 2019 Wyoming GrSG ARMPA Appendix C, The Greater Sage-Grouse Habitat Management Strategy. The BLM has determined that compensatory mitigation must be voluntary unless required by other applicable law and in recognition that State authorities may also require compensatory mitigation (IM 2019-018, *Compensatory Mitigation*, December 6, 2018). Therefore, consistent with valid existing rights and applicable law, when authorizing third-party actions that result in habitat loss and degradation, the BLM will consider voluntary compensatory mitigation actions only as a component of compliance with a State mitigation plan, program, or authority, or when offered voluntarily by a project proponent. Project-specific analysis will be necessary to determine how a compensatory mitigation proposal addresses impacts from a proposed action. The BLM will cooperate with the State to determine appropriate project design and alignment with	

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	State policies and requirements, including those regarding compensatory mitigation. When the BLM is considering compensatory mitigation as a component of the project proponent's submission or based on a mitigation requirement from the State, the BLM's NEPA analysis would evaluate the need to avoid or minimize impacts of the proposed project and achieve the goals and objectives of this RMPA. The BLM will defer to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action.	
MO PR:2.1: Achieve and maintain Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming (Appendix I (p. 419)).	No changes made.	Partially revised – revised by rangewide (addition of GRSG-specific components)
MO PR:2.3: Rehabilitate all surface-disturbing activities consistent with applicable laws, regulations, and policies.	No changes made.	No change (same as 2015)
MD Soil-1002: Authorized surface-disturbing activities will include plans for reclamation; site-specific reclamation actions should reflect the complexity of the project, environmental concerns, and the reclamation potential of the site.	No changes made.	No change (same as 2015)
MG PR:3: Watershed, surface water, and groundwater resources are consistent with applicable state and federal standards and regulations.	No changes made.	No change (same as 2015)
MO PR:3.1: BLM actions maintain or improve watershed, wetland, and riparian functions to support desired surface-flow regimes and water quality.	No changes made.	No change (same as 2015)
MD Water-1007: Design and manage land use and surface-disturbing activities to reduce channel and bank erosion and the associated loss of riparian habitats.	No changes made.	No change (same as 2015)

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MD Water-1013: Allow surface disturbance within 500 feet of springs, non-CBNG reservoirs, water wells, or perennial streams with an approved site-specific plan that ensures construction, stabilization and reclamation methods are meeting water and other resource objectives including, but not limited to soil, slope, and vegetation, and wildlife habitat.	No changes made.	No change (same as 2015)
MD Water-1016: Evaluate unneeded reservoirs for removal and reclamation.	No changes made.	No change (same as 2015)
MO MR:1.1: Provide opportunities for the exploration and development of locatable minerals, as well as mill and tunnel site operations, while avoiding or mitigating the effects of these activities on other resource values so that unnecessary or undue degradation is prevented.	No changes made.	No change (same as 2015)
MO MR:2.1: Maintain coal leasing and exploration, while minimizing impacts to other resource values.	No changes made.	Partially Revised – addition of rangewide language

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MD Coal-2001: Coal planning was completed as part of the April 2001 BFO RMP update. At that time the four coal planning screens (i.e., coal development potential, unsuitability, multiple use and surface owner consultation) were applied to certain federal coal lands within the BFO planning area. The result of this planning effort was a decision identifying lands acceptable for further coal leasing consideration. The coal management decisions made in the BFO RMP update will be carried forward in this Approved RMP. Federal coal lands identified acceptable for further coal leasing consideration are available for Lease By Applications, lease modifications, emergency leases, and exchanges. Prior to offering a coal tract for sale, the need to reapply the unsuitability criteria will be reviewed, a tract specific NEPA analysis will be completed, and there will be opportunity for public comment. At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. Priority habitat (core population areas and core population connectivity corridors) is essential habitat for maintaining Greater Sage-Grouse for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1).	No changes made.	Partially Revised – revised by addition of rangewide language for applications for new coal lease or lease modification No change (same as 2015) for completed coal planning

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MO MR:3.4: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of Greater Sage-Grouse habitat. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in priority habitat (core population areas and core population connectivity corridors) and general habitat, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority will be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 CFR 3162.3-1(h). Where a proposed fluid mineral development project on an existing lease could adversely affect Greater Sage-Grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts to Greater Sage-Grouse or its habitat and will ensure that the best information about the Greater Sage-Grouse and its habitat informs and helps to guide development of such federal leases.	Leasing is allowed in PHMA. Where the BLM has a backlog of Expressions of Interest for leasing, the BLM will prioritize its work first in non-habitat management areas, followed by lower priority habitat management areas (e.g., GHMA) and then higher priority habitat management areas (i.e., PHMA). To the extent consistent with federal regulation, law, and policy, priority would be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority would be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 CFR 3162.3-1(h). Where a proposed fluid mineral development project on an existing lease could adversely affect Greater Sage-Grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts on the extent compatible with lessees' rights to drill and produce fluid mineral resources. To incentivize development to locate outside of PHMA, the BLM would work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts on Greater Sage-Grouse or its habitat and will ensure that the best information about the Greater Sage-Grouse and its habitat informs and helps to guide development of such federal leases.	Completely revised – revised by rangewide

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**MD O&G-2001: Continue to require lessees to conduct operations in a manner that minimizes adverse impacts to other resources and other land uses and users. Where the federal government owns the mineral estate in Greater Sage-Grouse habitat and the surface is in non-federal ownership, apply to BLM authorizations regulating the federal lessee the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered surface lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. Where the federal government owns the surface and the mineral estate is in non-federal ownership in Greater Sage-Grouse habitat, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.	Continue to require lessees to conduct operations in a manner that minimizes adverse impacts to other resources and other land uses and users. Where the federal government owns the mineral estate in Greater Sage-Grouse habitat and the surface is in non-federal ownership, apply to BLM authorizations regulating the federal lessee the same stipulations, COAs, and/or conservation measures and RDFs applied if the mineral estate is developed on BLM-administered surface lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. Where the federal government owns the surface and the mineral estate is in non-federal ownership in Greater Sage-Grouse habitat, apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee (see also MD SS WL-4024 and MD SS WL-4036).	No change (same as 2019)
**MD O&G-2006: Areas that are open to oil and gas leasing are open to geophysical exploration subject to appropriate mitigation developed through use of the mitigation guidelines described in Appendix F (p. 397). Areas closed to oil and gas leasing are closed to geophysical exploration. Geophysical exploration is subject to motorized travel limitations and restrictions on surface-disturbing and disruptive activities. Geophysical exploration projects that are designed to minimize habitat fragmentation within PHMA would be allowed, except where prohibited or restricted by LUP decisions, and in conformance with timing and distances Management Decisions (see SS WL-4024).	Areas that are open to oil and gas leasing are open to geophysical exploration subject to appropriate mitigation developed through use of the mitigation guidelines described in Appendix F (p. 397). Areas closed to oil and gas leasing are closed to geophysical exploration. Geophysical exploration is subject to motorized travel limitations and restrictions on surface-disturbing and disruptive activities. Geophysical exploration projects that are designed to minimize habitat fragmentation within PHMA would be allowed, except where prohibited or restricted by LUP decisions, and in conformance with timing and distances Management Decisions (see also MD SS WL- 4024 and MD SS WL-4036).	Partially revised – to update Appendix and Management Decisions referenced

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MG MR:4: Manage leasable minerals other than oil, gas, coal, and geothermal energy based on demand, while avoiding or mitigating impacts to other resource values.	No changes made.	Partially revised – revised by addition of rangewide and state-specific language specific to GRSG
MO MR:4.1: Make opportunities available for exploration and development of leasable minerals other than oil, gas, coal, and geothermal energy, while avoiding or mitigating impacts of these activities on other resource values.	No changes made.	Partially revised – revised by addition of rangewide and state-specific language specific to GRSG
MD OL-2001: All lands in the planning area are available to exploration and development of other leasable minerals unless closed to mineral leasing. All non-energy leasable mineral activities would be considered in PHMA, provided that the activities can be completed in compliance with all Greater Sage-Grouse occupancy, timing, density and disturbance restrictions (see SS WL-4024).	All lands in the planning area are available to exploration and development of other leasable minerals unless closed to mineral leasing. All non-energy leasable mineral activities would be considered in PHMA, provided that the activities can be completed in compliance with all Greater Sage-Grouse occupancy, timing, density and disturbance restrictions (see also MD SS WL-4024 and MD SS WL-4036).	Partially revised – revised by addition of rangewide and state-specific GRSG language
MO MR:5.1: Provide opportunities for exploration and development of salable minerals while avoiding or mitigating effects to other resource values.	No changes made.	Partially revised – revised by addition of rangewide and state-specific GRSG language
MG FM:1: Life, property, and resource values are protected. The protection of human life is the single, overriding priority. Setting priorities among protecting human communities and community infrastructure, other property and improvements, and natural and cultural resources will be done based on the values to be protected, human health and safety, and the costs of protection.	No changes made.	No change (same as 2015)
MO FM:1.1: Respond to unplanned wildfires based on: (1) ecological, (2) social, and (3) legal consequences while supporting other resource values.	No changes made.	No change (same as 2015)
MO FM:1.5: Implement appropriate emergency stabilization and rehabilitation actions following wildland fire.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MG FM:2: Plant community and hazardous fuel objectives are achieved.	No changes made.	No change (same as 2015)
MO FM:2.1: Improve fire regime condition class and maintain or improve conditions of fire-adapted landscapes by managing fire, planned and unplanned, to accomplish beneficial resource objectives.	No changes made.	No change (same as 2015)
MD Fire-3001: A Fire Management Plan for the Wyoming High Plains District will be maintained that more specifically outlines management response and implementation actions for wildland fire response of public lands.	No changes made.	No change (same as 2015)
MD Fire-3002: A resource advisor appropriate to the potentially affected resource will be consulted, or assigned, to all wildland fires that involve or threaten BLM-administered lands.	No changes made.	No change (same as 2015)
MD Fire-3006: Implement the BLM Emergency Stabilization and Burned Area Rehabilitation standards located in the DOI Interagency Burned Area Emergency Response Guidebook (DOI 2004) and BLM Burned Area Emergency Stabilization and Rehabilitation Handbook (BLM 2007a) as needed. Appendix P (p. 625) provides additional information regarding the BLM's approach to emergency stabilization and rehabilitation.	No changes made.	Partially revised – to update Appendix referenced
MD Fire-3007: Use the District Fire Management Plan to implement the objectives of this RMP; to address fire management on a landscape scale, to maintain or improve conditions in fire-adapted landscapes, and to accomplish resource management objectives.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD Fire-3008: Ensure all prescribed burning activities comply with Wyoming DEQ air quality standards and smoke management rules. For fuels management, the BLM would consider multiple tools for fuels reduction and would analyze in NEPA compliance documentation before electing to implement prescribed fire in PHMAs. If prescribed fire is used in Greater Sage-Grouse habitat, the NEPA analysis for the Burn Plan will address: • why alternative techniques were not selected as a viable options; • how Greater Sage-Grouse goals and objectives would be met by its use; • how the Conservation Objectives Team Report objectives would be addressed and met; • a risk assessment to address how potential threats to Greater Sage-Grouse habitat would be minimized. Prescribed fire as a vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect Greater Sage-Grouse habitat (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Prescribed fire in known Greater Sage-Grouse winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat would need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD Fire-3011: Response to wildfire varies from full protection in areas where fire is undesirable to monitoring fire behavior in areas where fire can be managed to accomplish other resource objectives. The entire planning area is available to manage wildfire for multiple objectives.	No changes made.	No change (same as 2015)
MD Fire-3012: Prohibit heavy equipment use within the following areas, except when human safety is at risk or if the expected fire effects would cause more resource damage than the use of heavy equipment: • Areas of cultural resource sensitivity • Riparian/wetland habitats • Identified Greater Sage-Grouse important habitats: Core Population Areas, nesting, brood-rearing, Core Population Connectivity Corridors, or winter habitat • Areas of highly erosive soils • Lands with wilderness characteristics Limit heavy equipment usage to existing roads and trails, or immediately adjacent to them, in areas not identified as full protection.	No changes made.	No change (same as 2015)
MD Fire-3013: Use protection strategies in the following areas: • WUI • Wildland Industrial Interface • Developed recreation • Developed electronic/communication sites of all types • Where sensitive or high value resources would be adversely affected by fire (i.e., Greater Sage-Grouse Core Population Area and Connectivity Corridor)	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD Fire-3014: Evaluate all fires and rehabilitate fire-damaged lands as needed to meet resource objectives. Repair suppression damages as necessary. Post ES&R and BAER management would be designed to ensure long-term persistence of seeded or pre-burn native plants. This may require temporary or long-term changes in livestock grazing, wild horse, and travel management, etc., to achieve and maintain the desired condition of ES&R and BAER projects to benefit Greater Sage-Grouse (Eiswerth and Shonkwiler 2006). The BLM could bring in BAR and BAER teams who would work collaboratively with partners at the federal, state, and local level to rehabilitate and restore Greater Sage-Grouse habitats in a manner consistent with the core habitat population area strategy for conservation. DDCT reviews would be conducted in coordination with the WGFD Habitat Protection Program located in Cheyenne, Wyoming at the WGFD headquarters. Areas within PHMAs would be high priority for restoration of Greater Sage-Grouse habitat beyond immediate response.	No changes made.	No change (same as 2015)
MD Fire-3015: Use wildland fire and other vegetation treatments to meet desired management objectives.	No changes made.	No change (same as 2015)
MG BR:1: Vegetation resources sustained in desired ecological conditions.	No changes made.	No change (same as 2015)
MO BR:1.1: Manage communities for a diversity of native species, habitats, seral stages, and distribution.	No changes made.	No change (same as 2015)
MO BR:1.2: Manage for healthy vegetation communities to ensure their capability to provide sufficient plant composition, cover, and litter accumulation to protect soils from wind and water erosion and enhance nutrient cycling and productivity.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MO BR:1.3: Reclaim areas affected by surface-disturbing activities to promote healthy functioning native plant communities.	No changes made.	No change (same as 2015)
MO BR:1.4: Manage habitat to facilitate the conservation, recovery, and maintenance of populations of native, desirable non-native, and special status plant species consistent with appropriate local, state, and federal conservation requirements and management plans.	No changes made.	No change (same as 2015)
MO BR:1.5: Manage for healthy native plant communities by reducing and managing invasive, non-native noxious species.	No changes made.	No change (same as 2015)
MD Forest-4006: Actively manage woodlands to prevent expansion into other communities consistent with multiple resource values, on a project-specific basis.	No changes made.	No change (same as 2015)
MG BR:3: A diverse landscape of native grasslands and shrublands sustained in desired ecological conditions.	No changes made.	No change (same as 2015)
MO BR:3.1: Manage for a full range of sagebrush, shrub, and grassland communities with diverse native species and subspecies, composition, canopies, densities, and age classes across the landscape.	No changes made.	No change (same as 2015)
MD GS-4001: Manage vegetative communities in accordance with Wyoming Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming.	No changes made.	Partially revised – revised by adding GRSG specific rangewide language
MD GS-4003: Use an integrated management approach (e.g., mechanical, chemical, biological treatments, prescribed fire, and grazing management techniques) to maintain, restore, and enhance the health and diversity of plant communities to achieve resource or multi-resource objectives.	No changes made.	No change (same as 2015)
MD GS-4005: Manage grasslands and shrublands to protect, preserve, or enhance plant communities.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD GS-4006: Manage the siting of facilities and related infrastructure (utility corridors, roads) to reduce impacts to vegetation resources.	No changes made.	No change (same as 2015)
MD GS-4007: Manage the planning and development of travel routes, recreational uses, mineral exploration and development sites, and ROW to reduce impacts to the vegetation resource.	No changes made.	No change (same as 2015)
MD GS-4008: Develop a contingency plan addressing catastrophic natural events such as drought, wildfires, and large-scale pest infestations, incorporating strategies that best protect vegetation resources.	No changes made.	No change (same as 2015)
MD GS-4009: Work with landowners on split estate lands to reestablish disturbed sites to healthy plant communities in accordance with the ecological site potential	No changes made.	No change (same as 2015)
MG BR:4: Health and functional capabilities in riparian/wetland systems.	No changes made.	No change (same as 2015)
MO BR:4.1: Manage lotic and lentic wetland/riparian systems at a minimum to achieve and/or maintain PFC.	No changes made.	No change (same as 2015)
MO BR:4.2: Improve riparian systems and wetlands in systems operating at less than PFC.	No changes made.	No change (same as 2015)
MO BR:4.3: Manage contributing watersheds to sustain riparian health and water quality.	No changes made.	No change (same as 2015)
MO BR:4.4: Manage and enhance riparian and wetland systems for plant, insect, fish and wildlife species that depend on these systems for their health and well being.	No changes made.	No change (same as 2015)
MO BR:4.5: CBNG created riparian and wetland systems will be evaluated, retained, or reclaimed to support vegetation and other resource values.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD Riparian-4002: Prioritize, and develop activity and implementation plans to manage riparian systems to be at or above, or continue to be improving toward, PFC while achieving the Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming.	No changes made.	No change (same as 2015)
MD Riparian-4003: Manage riparian and wetland systems to enhance forage conditions and improve water quality. Manage all riparian systems with sensitive species concerns to a succession stage appropriate for that system, including vertical as well as horizontal vegetative structure and composition.	No changes made.	No change (same as 2015)
MD Riparian-4004: Expand and enhance riparian/wetland systems and habitat in cooperation with stakeholders.	No changes made.	No change (same as 2015)
MD Riparian-4005: Prevent degradation, loss, or destruction of riparian/wetland habitat.	No changes made.	No change (same as 2015)
MD Riparian-4008: Allow surface-disturbing activities within 500 feet of riparian/wetlands systems with an approved site-specific plan that ensures construction, stabilization, and reclamation methods are meeting resource objectives, including, but not limited to soil, vegetation and wildlife habitat.	No changes made.	No change (same as 2015)
MD Riparian-4010: Identify and manage systems capable of achieving DFC.	No changes made.	No change (same as 2015)
MD Riparian-4011: Restore vegetation in CBNG supported wetland and riparian systems on BLM surface and/or lease in accordance with the ecological site potential.	No changes made.	No change (same as 2015)
MG BR:5: Healthy native communities with manageable levels of pathogens, undesirable, invasive, non-native, or noxious species.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MO BR:5.1: Develop and maintain baseline information regarding the extent, location, and potential impact(s) of pest species. From this baseline information develop and implement an Integrated Pest Management Plan. Integrated management would be used to control, suppress, and eradicate, where possible, noxious and invasive species per BLM Handbook H-1740-2. Manage noxious or invasive species treatments to maintain or improve Greater Sage-Grouse habitat. Apply Required Design Features as Conditions of Approval, such as those in Appendix C (p. 285). Encourage the use of voluntary BMPs.	Develop and maintain baseline information regarding the extent, location, and potential impact(s) of pest species. From this baseline information develop and implement an Integrated Pest Management Plan. Integrated management would be used to control, suppress, and eradicate, where possible, noxious and invasive species per BLM Handbook H-1740-2. Manage noxious or invasive species treatments to maintain or improve Greater Sage-Grouse habitat. Apply Required Design Features as Conditions of Approval, such as those in the 2019 Wyoming GrSG ARPMA Appendix B. Encourage the use of voluntary BMPs.	Partially revised – to update Appendix referenced
MO BR5.2: Facilitate support for an integrated approach for the detection, management, or eradication of new and minor infestations.	No changes made.	No change (same as 2015)
MO BR:5.3: Develop, implement, and maintain a management program for annual bromes and other invasive or undesirable species not listed as noxious, utilizing the best available science and BMPs.	No changes made.	No change (same as 2015)
MO BR:5.4: Coordinate with APHIS to facilitate pest and predator management.	No changes made.	Partially revised – addition of rangewide GRSG-specific predator management language
MD Pest-4002: Manage designated pests on public surface lands using an Integrated Pest Management Approach consistent with DOI Manual 517 (BLM 2007b).	No changes made.	No change (same as 2015)
MD Pest-4003: Limit surface disturbance to the minimum needed for safe project completion to limit the spread of noxious weeds.	No changes made.	No change (same as 2015)
MD Pest-4004: Use certified noxious weed seed-free products on all BLM-administered projects and lands.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD Pest-4005: Implement and maintain cooperative integrated pest management programs with county weed and pest districts, state agencies, private industry, grazing lessees, and other stakeholders in conjunction with BLM weed and pest control work on public lands adjoining deeded and state lands.	No changes made.	No change (same as 2015)
MD Pest-4006: Require surface or vegetation disturbance areas, including areas formerly receiving or holding water, be treated for invasive species and revegetated.	No changes made.	No change (same as 2015)
MD Pest-4009: Treat those plants on the State of Wyoming Designated list, the appropriate county lists, and other species of concern as determined by BLM resource specialists. Note: Priority treatments are those areas where infestations on private land are threatening public lands. Treat areas that contain annual bromes and/or other invasive species to minimize competition and favor establishment of desired species	No changes made.	No change (same as 2015)
MD Pest-4010: Designate and prioritize areas for the treatment of annual brome species.	No changes made.	No change (same as 2015)
MG BR:6: Distribution and abundance of all native and desirable non-native species are optimized.	No changes made.	No change (same as 2015)
MO BR:6.1: BLM actions prevent and/or reduce impacts to desirable species.	No changes made.	No change (same as 2015)
MO BR:6.2: In coordination with cooperating agencies, develop and implement an achievable Wildlife Monitoring and Protection Plan.	No changes made.	No change (same as 2015)
MO BR:6.3: Maintain, restore, or improve the continuity and productivity of fish and wildlife habitats to support WGFD population objectives.	No changes made.	No change (same as 2015)
MO BR:6.4: Develop and implement an adaptive conservation and management strategy.	No changes made.	No change (same as 2015)
MG BR:7: Sufficient functional habitat for native and desirable non-native species.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MO BR:7.1: Evaluate, update, and revise as necessary existing Wildlife Habitat Management Plans.	No changes made.	No change (same as 2015)
MO BR:7.2: Develop Wildlife Habitat Management Plans for areas with important habitats.	No changes made.	No change (same as 2015)
MO BR:7.3: Manage habitat consistent with local, state, and federal management plans, as applicable.	No changes made.	No change (same as 2015)
MO BR:7.4: Continue to gather habitat and population data while concurrently monitoring human and natural disturbance dynamics to improve habitat management.	No changes made.	No change (same as 2015)
MO BR:7.5: Provide security habitat, sufficient in amount and distribution, to support WGFD population objectives for fish and wildlife to escape from disruptive activities.	No changes made.	No change (same as 2015)
MO BR:7.6: Maintain and provide functioning sagebrush habitat to sustain sagebrush obligates and other sagebrush dependent species.	No changes made.	Partially revised – addition of rangewide GSRG specific habitat objective language
MG BR:8: Fish and wildlife are able to move between areas of functionally intact habitat.	No changes made.	No change (same as 2015)
MO BR:8.1: Develop Travel Management Plans for areas important for fish and wildlife while supporting other resource values.	No changes made.	No change (same as 2015)
MO BR:8.2: Develop a ROW Management Plan for utility corridors to manage impacts to areas of habitat important to fish and wildlife consistent with other resource values.	No changes made.	No change (same as 2015)
MO BR:8.3: Land acquisitions should support desirable fish and wildlife populations or habitat.	No changes made.	No change (same as 2015)
MO BR:8.4: Restore functionality to areas of degraded habitat important to fish and wildlife populations consistent with other resource values.	No changes made.	No change (same as 2015)
MD Fish-4008: Maintain or enhance streams and riparian areas associated with Class I and II streams (WGFD classifications), Powder River, Tongue River, and other appropriate areas for desired fisheries potential.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD Fish-4012: Allow surface-disturbing activities within 0.25 mile of naturally occurring water bodies containing native and desirable non-native fish species where fish resource objectives can be met.	No changes made.	No change (same as 2015)
MD WL-4001: Develop appropriate mitigation for surface-disturbing and disruptive activities associated with wildlife habitat management through use of the mitigation guidelines described in Appendix F (p. 397).	No changes made.	Completely revised – revised by rangewide
MD WL-4002: Maintain or improve important wildlife habitats through vegetative manipulations, habitat improvement projects, livestock grazing strategies and the application of The Wyoming Guidelines for Managing Sagebrush Communities with Emphasis on Fire Management (Wyoming Interagency Vegetation Committee 2002) and Appendix F (p. 397), WGFD Strategic Habitat Plan (WGFD 2001), State Wildlife Action Plan (WGFD 2010), and similar guidance updated over time.	No changes made.	Partially revised – to update Appendix referenced
MD WL-4003: Continue to use existing Habitat Management Plans and update as necessary to include management objectives and prescriptions for wildlife: South Big Horns Habitat Management Plan (BLM 1986b), including a portion or all of the Gardner Mountain and North Fork WSAs; Wetlands Habitat Management Plan (BLM 1986a); and Middle Fork Powder River Habitat Management Plan (BLM 1980).	No changes made.	No change (same as 2015)
MD WL-4005: Consult with the WGFD and USFWS, in accordance with MOUs, when applying mitigation for wildlife and before waiving, allowing exceptions to, or modifying wildlife-related land use restrictions and mitigation.	No changes made.	Completely revised – revised by rangewide and state-specific

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MD WL-4006: Provide, to the extent possible, suitable habitat and forage to support wildlife population objectives as defined by WGFD. BLM will cooperatively consider proposals by the WGFD to change population objective levels based on habitat capability and availability.	No changes made.	No change (same as 2015)
MD WL-4007: Manage access to protect crucial habitats in cooperation with WGFD and other stakeholders.	No changes made.	No change (same as 2015)
MD WL-4008: Utilize current research, management and conservation plans, and similar related documents to guide wildlife habitat management.	No changes made.	No change (same as 2015)
MD WL-4009: Construct new fences to avoid adverse impacts to wildlife and in accordance with BLM Fencing Handbook 1741-1 (BLM 1989) and WO Instruction Memorandum 2010-022: Managing Structures for the Safety of Sage-grouse, Sharp-tailed grouse, and Lesser prairie chicken (BLM 2009b).	No changes made.	Partially revised – revised by adding rangewide language for managing fences for GRSG No change (same as 2015) for other species
MD WL-4012: Inventory, record, and report existing type, condition, and location of BLM fences. Prioritize fence projects and annually implement modifications in accordance with appropriate wildlife needs and the BLM Fencing Handbook 1741-1.	No changes made.	No change (same as 2015)
MD WL-4013: Allow surface-disturbing and disruptive activities to occur throughout the entire life of projects during seasons important for wildlife when wildlife resource objectives can be met	No changes made.	Partially revised – revised by adding rangewide and state-specific GRSG language
MD WL-4014: Powerlines (distribution and transmission) will be designed to minimize wildlife related impacts and constructed to the latest APLIC guidance. Prohibit above ground distribution powerlines unless identified in an approved distribution plan.	No changes made.	Partially revised – revised by adding rangewide GRSG ROW language

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD Cultural-5007: Prohibit surface disturbance within the following sites: • Pumpkin Buttes • Cantonment Reno • Dull Knife Battle • Crazy Woman Battle • Contributing and Unevaluated Segments of the Bozeman Trail • All Rock Art Sites • All Rock Shelter Sites • All Native American Burials Allow surface disturbance and infrastructure within 3.0 miles of the following sites where development is either not visible, or will result in a weak contrast to the setting: • Pumpkin Buttes • Cantonment Reno • Dull Knife Battle • Crazy Woman Battle • Contributing and Unevaluated Segments of the Bozeman Trail • All Rock Art Sites • All Native American Burials	No changes made.	No change (same as 2015)
MD Paleo-5001: Retain public lands with significant paleontological values.	No changes made.	No change (same as 2015)
MD Paleo-5006: Avoid areas containing paleontological resources of high quality or importance when developing locatable minerals.	No changes made.	No change (same as 2015)
MD Paleo-5007: Apply an NSO stipulation to mineral leases in areas containing paleontological resources of high quality or importance.	No changes made.	No change (same as 2015)
MD Paleo-5008: Avoid areas containing paleontological resources of high quality or importance when developing salable minerals.	No changes made.	No change (same as 2015)
MD VRM-5002: Incorporate BMPs for visual resources into project planning for federal actions.	No changes made.	No change (same as 2015)
MG LR:2: Manage land tenure adjustments and land use authorizations to meet the needs of the customers while protecting other resource values.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MO LR:2.1: Develop and maintain a land-ownership pattern that improves access for public use, and improves management and protection of BLM-administered lands by: 1. Acquiring legal easements to BLM-administered lands for recreational opportunities and administrative use. 2. Responding to requests for land authorizations for access needs. 3. Responding to requests for land transfers. 4. Giving priority to land exchanges and/or sales on custodial grazing allotments while supporting other resource values.	No changes made.	No change (same as 2015)
MO LR:2.3: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available.	No changes made.	No change (same as 2015)
MD L&R-6002: Consider land use authorizations (permits, leases, etc.) on a project-specific basis consistent with other resource objectives.	No changes made.	No change (same as 2015)
MD L&R-6003: Consider withdrawals for surface and/or minerals on a project-specific basis.	No changes made.	No change (same as 2015)
MD L&R-6011: Acquire private or state land or interest in land from willing sellers consistent with other resource objectives, on a project-specific basis.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
**MD L&R-6012: Acquire and dispose of land based on all resource values, including but not limited to agricultural potential and water. Do not classify, open, or make available any BLM-administered public lands within the planning area for agricultural leasing or agricultural entry under either Desert Land Entry or Indian Allotment for one or more of the following reasons: rugged topography, presence of sensitive resources, lack of water or access, small parcel size, and/or unsuitable soils. Lands classified as PHMA and GHMA for Greater Sage-Grouse will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the Greater Sage-Grouse or (2) the agency can demonstrate that the disposal, including land exchanges, of the lands will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse. Exceptions would be considered where there is mixed ownership and land exchanges would allow for additional or more contiguous federal ownership patterns within PHMA. For PHMA with minority federal ownership, an additional, effective mitigation agreement would be included for any disposal of federal land. As a final preservation measure, consideration should be given to pursuing a permanent conservation easement. For lands in GHMA that are identified for disposal, the BLM will only dispose of such lands consistent with the goals and objectives of this plan, including, but not limited to, the land use plan goal to conserve, recover, and enhance Greater Sage-Grouse habitat on a landscape scale.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD L&R-6014: Prioritize acquiring land or interests in lands in areas adjacent to large blocks of BLM-administered land or other lands having significant resource or other values before other areas.	No changes made.	No change (same as 2015)
MG LR:4: Primary infrastructure corridors and subsidiary routes consistent with other resource values.	No changes made.	No change (same as 2015)
MO LR:4.1: Manage public lands to meet the needs of ROW customers while supporting other resource values.	No changes made.	Partially revised – add rangewide GRSG ROW language
MO LR:4.3: Identify infrastructure corridors consistent with other resource values.	No changes made.	No change (same as 2015)
MO LR:4.4: Make opportunities available for exploration and development of CO2 sequestration research and activities, while avoiding or mitigating impacts of these activities on other resource values.	No changes made.	No change (same as 2015)
MO LR:4.5: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available.	No changes made.	No change (same as 2015)
MD ROW-6001: Designate corridors for major ROW to minimize surface disturbance and impacts to other resources.	No changes made.	No change (same as 2015)
MD ROW-6004: The preferred location for new ROW will be in or adjacent to existing disturbed areas associated with existing ROW, constructed roads, or highways.	No changes made.	Partially revised – revised by adding rangewide GRSG ROW language
MD ROW-6005: Maintain a transportation management system in cooperation with appropriate state and local agencies to meet public and resource management needs.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD ROW-6006: Make lands available for ROW in accordance with management identified within the Approved RMP to conserve other resources. This results in: • 79,777 acres excluded from ROW. • 321,149 acres identified for ROW avoidance. PHMA would be managed as ROW avoidance areas for new ROW or SUA permits. Within PHMA where new ROWs/SUAs are necessary, new ROWs/SUAs would be located within designated RMP corridors or adjacent to existing ROWs/SUAs where technically feasible. Subject to valid existing rights including non-federal land inholdings, required new ROWs/SUAs would be located adjacent to existing ROWs/SUAs or where it best minimizes Greater Sage-Grouse impacts. Greater Sage-Grouse priority habitat (Core Population Areas and Core Population Connectivity Corridors) are designated as avoidance areas for ROWs. • 381,176 acres are open for ROW development.	No changes made.	Completely revised – revised by rangewide
MD ROW-6009: Designate the following corridors for major ROW transportation and utility use, in cooperation with the State of Wyoming: • Echeta Road • Sheridan to Gillette, largely following US 14/16 • Highway 59 north of Gillette • Interstate 25 • Interstate 90, Gillette to Montana State Line • Powder River • Powder River Breaks (Buffalo to Gillette) Corridor use is required. No above ground lines will be authorized in the Powder River or Powder River Breaks corridors. Corridor requirements within Greater Sage-Grouse habitat are identified in SS WL-4022.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD ROW-6010: Authorize and place above ground facilities (i.e., compressors, electric distribution powerlines) within ROW and other disturbance areas when resource objectives can be met.	No changes made.	No change (same as 2015)
MD ROW-6012: Evaluate CO2 sequestration proposals where in accordance with management identified within the Approved RMP.	No changes made.	No change (same as 2015)
MG LR:5: A safe transportation network that supports other resource values.	No changes made.	No change (same as 2015)
MO LR:5.1: Utilize a comprehensive travel management approach to sustain and enhance access, recreational experiences, and support other resource values.	No changes made.	No change (same as 2015)
MO LR:5.3: Designate all BLM-administered lands as Open, Limited, or Closed to OHV use, in consideration of other resource values.	No changes made.	No change (same as 2015)
MO LR:5.4: Provide for acceptable modes of legal public access that supports other resources, reduces conflicts, and provides for diverse recreation opportunities.	No changes made.	No change (same as 2015)
MD Trans-6002: Evaluate roads constructed under other initiatives (e.g., oil and gas exploration) for inclusion in the BLM transportation system. Roads that are no longer needed for their original purposes are assessed for addition to the BLM transportation system prior to reclamation.	No changes made.	No change (same as 2015)
MD Trans-6004: Design, construct, and maintain roads or trails based on the specific objectives for that trail or road in consideration of other resources. Design, construct, and maintain roads to minimize surface disturbance, changes to surface water runoff, and erosion.	No changes made.	No change (same as 2015)
MD Trans-6006: Base road or trail closures and abandonments on resource protection, demand for new roads, and accommodation of authorized uses.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD Trans-6007: Maintain transportation system roads under BLM jurisdiction in accordance with assigned maintenance levels and in consideration of other resource values. Maintain administrative roads on an as needed basis, dependent on time, funding, and access priorities.	No changes made.	No change (same as 2015)
MD Trans-6008: Within 5 years of the ROD, inventory all routes on public land and develop a travel management plan to classify and designate routes for continued use or decommissioning and reclamation. Include maintenance standards for routes to be retained for public use, as well as specific measures to accomplish road closure in the travel management plan. Inventory, designate, number, and sign all routes as appropriate. Posted signs will include allowed uses and activities. Restrictions to existing roads and trails remains in effect until travel management planning is completed and designated routes are identified. Appendix S (p. 667) provides additional information regarding the travel management planning process.	No changes made.	Partially revised – to update Appendix referenced
MD Trans-6013: Allow temporary closures to motorized vehicle use in areas that pose public health and safety risks, and/or where resource damage is imminent. In Greater Sage-Grouse priority habitat (Core Population Areas and Core Population Connectivity Corridors) and general habitat, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use). Temporary closure or restriction orders under these authorities are enacted at the discretion of the	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that OHVs are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence (43 CFR 8341.2). A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.		
MD Trans-6014: Limit OHV use to designated routes unless compelling reasons exist to classify parcels as Open or Closed, and is consistent with other resource values. Until individual routes are designated, areas subject to route designation will be classified as Limited to existing routes. Once route designation is completed, areas will no longer be classified as Limited to existing routes.	No changes made.	Completely revised – revised by rangewide
MD Trans-6019: Limit motorized vehicle use to designated routes within habitat of special status species consistent with travel management designations for that area. Routes will be designated to avoid occupied habitat during travel management planning.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD Trans-6020: Evaluate existing routes in the vicinity of any new system roads for closure and reclamation consistent with other resource values.	No changes made.	No change (same as 2015)
MO LR:7.2: Manage recreation to protect resources, maintain public health and safety, and to provide a diverse array of benefits to the public.	No changes made.	No change (same as 2015)
MG LR:8: Recreation facilities balance public demand with other resource values.	No changes made.	No change (same as 2015)
MO LR:8.1: Design and maintain recreation sites to meet acceptable health and safety standards while supporting other resource values.	No changes made.	No change (same as 2015)
MD Rec-6003: Open the planning area to dispersed recreation where consistent with other resource values.	No changes made.	No change (same as 2015)
MD Rec-6010: Avoid riparian habitat or develop and manage recreational sites, recreation facilities, and recreational access in a manner that minimizes impacts to riparian habitats.	No changes made.	No change (same as 2015)
MD Rec-6011: Prohibit dispersed camping and commercial camps within 200 feet of perennial surface water.	No changes made.	No change (same as 2015)
**MD Rec-6015: Allow additional recreation facilities in areas where they are supported by recreational use and are consistent with other resource values. Construction of recreation facilities within Greater Sage-Grouse PHMA (Core Population Areas and Core Population Connectivity Corridors) must conform with the avoidance and minimization measures of this plan. If it is determined that these conservation measures are inadequate for the conservation of Greater Sage-Grouse, the BLM will require and ensure compensatory mitigation that provides a net conservation gain to the species.	Allow additional recreation facilities in areas where they are supported by recreational use and are consistent with other resource values. Construction of recreation facilities within Greater Sage-Grouse PHMA (Core Population Areas and Core Population Connectivity Corridors) must conform to the avoidance and minimization measures of this plan. If it is determined that these conservation measures are inadequate for the conservation of Greater Sage-Grouse, the BLM will consider mitigation consistent with the applicable State Management Strategy (currently Governor's Executive Order 2015-4) (see also MD SS WL-4036).	Partially revised – revised to update mitigation reference

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD Rec-6018: Designate the following areas as SRMAs and delineate discrete recreation management zone boundaries: • Burnt Hollow (17,280 acres) • Dry Creek Petrified Tree (2,567 acres) • Hole-in-the-Wall (11,952 acres) • Middle Fork Powder River (10,083 acres) • Mosier Gulch (1,026 acres) • Welch Ranch (1,748 acres) • Weston Hills (9,504 acres) Strategically emphasize a variety of recreation opportunities along with the protection of natural and cultural resources. R&VS management will be recognized as the predominant land use focus in SRMAs. Manage SRMAs under site-specific management plans. Site-specific management plans will be consistent with and implement the provisions specified for SRMAs in Appendix T (p. 679).	No changes made.	No change (same as 2015)
MD Rec-6019: Do not lease minerals within the boundary of the following SRMAs: • Burnt Hollow (17,280 acres) • Dry Creek Petrified Tree (2,567 acres) • Hole-in-the-Wall (11,952 acres) • Middle Fork Powder River (10,083 acres) • Mosier Gulch (1,026 acres) • Welch Ranch (1,748 acres) Lease fluid minerals with a CSU stipulation to be consistent with SRMA management in the following SRMA: • Weston Hills (9,504 acres)	No changes made.	No change (same as 2015)
MD Rec-6021: Allow surface disturbance within designated SRMAs for administrative use only, where consistent with other resource values.	No changes made.	No change (same as 2015)
MD Rec-6022: Recommend withdrawals from mineral entry under the mining laws in designated SRMAs.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD Rec-6023: Allow salable mineral development within designated SRMAs for administrative use only.	No changes made.	No change (same as 2015)
MG LR:11: Public rangelands provide for a sustainable level of livestock grazing consistent with other resource values and sustained yield.	No changes made.	No change (same as 2015)
MO LR:11.2: Manage forage to maintain or improve ecological states and achieve and/or maintain Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming.	No changes made.	No change (same as 2015)
MO LR:11.3: Monitor and evaluate rangeland health and condition in coordination with cooperators, and lessees to determine if, and what additional management is needed to achieve desired ecological state.	No changes made.	No change (same as 2015)
MD Grazing-6001: Develop and implement appropriate livestock grazing management actions to achieve the Standards for Healthy Rangelands and Guidelines for Livestock Grazing Management for the Public Lands Administered by the BLM in the State of Wyoming, to provide watershed protection, to improve forage for livestock, forage and habitat for wildlife, and enhance rangeland health.	No changes made.	Partially revised – revised by adding rangewide GRSG livestock grazing language
MD Grazing-6004: Continue implementation of existing AMPs. Develop and implement new AMPs with grazing lessees and other stakeholders to achieve desired resource goals and objectives.	No changes made.	Partially revised – revised by adding rangewide GRSG livestock grazing language
MD Grazing-6005: Manage livestock grazing to sustain riparian, wetland, mountain mahogany, specials status species or other special habitats.	No changes made.	Partially revised – revised by adding rangewide GRSG livestock grazing language
MD Grazing-6009: Implement strategies that best protect rangeland resources during periods of drought. Cooperate with stakeholders for voluntary adjustments in livestock use and/or livestock management.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD Grazing-6015: Develop range improvements in accordance with resource needs and livestock management.	No changes made.	Partially revised – revised by adding rangewide GRSG livestock grazing language
MD Grazing-6016: Conduct baseline inventories. Develop, implement, and monitor AMPs. Base AMP goals/objectives in Category I and M allotments on resource protection and watershed health.	No changes made.	No change (same as 2015)
*MD Grazing- 6017: Allow livestock grazing on all public lands in the planning area except where an evaluation has determined it to be incompatible with other resource uses or values (campgrounds, entrances of caves, sites of cultural significance). • The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in Greater Sage-Grouse priority habitat (Core Population Areas and Core Population Connectivity Corridors) followed by general habitat. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. • The BLM will collaborate with appropriate federal agencies and the State of Wyoming, as contemplated under the Wyoming Governor's Executive Order 2013-3, to: (1) develop appropriate conservation objectives; (2) define a framework for evaluating situations where Greater Sage-Grouse conservation objectives are not being achieved on federal land, to determine if a significant causal	Allow livestock grazing on all public lands in the planning area except where an evaluation has determined it to be incompatible with other resource uses or values (campgrounds, entrances of caves, sites of cultural significance). • The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in Greater Sage-Grouse priority habitat (Core Population Areas and Core Population Connectivity Corridors) followed by general habitat. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. • Within PHMA, if monitoring data show the wildlife/special status species standard has not been met nor progress being made toward meeting that standard, there would be an evaluation and a determination made as to the cause. If it is determined that the current authorized livestock use is a significant causal factor in failing to achieve the wildlife/special status species standards, the BLM would address the achievement or	Partially revised – revised by adding or replacing applicable language with rangewide GRSG livestock grazing language

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and (3) identify appropriate site-based actions to achieve Greater Sage-Grouse conservation objectives within the framework. Absent substantial and compelling information that adjustments are necessary to the core population area strategy, these core population areas, connectivity areas, identified and mapped winter concentration areas, and protective stipulations shall not be altered for a minimum of 7 years. Any changes shall involve a transparent process that provides an opportunity for public input and proper consideration of any proposal consistent with the provisions contemplated under Wyoming's core population area strategy. • The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMAs will include specific management thresholds based on Greater Sage-Grouse Habitat Objectives Table and Land Health Standards (43 CFR 4180.2) and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. • Allotments within priority habitat (Core Population Areas and Core Population Connectivity Corridors), and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.	progress toward achieving the LHSs (43 CFR 4180.2) and, if needed, Greater Sage-Grouse habitat maintenance or improvement. The BLM will collaborate with appropriate federal agencies and the State of Wyoming, as contemplated under the Wyoming Governor's Executive Order 2013-3, to: (1) develop appropriate conservation objectives; (2) define a framework for evaluating situations where Greater Sage-Grouse conservation objectives are not being achieved on federal land, to determine if a significant causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and (3) identify appropriate site-based actions to achieve Greater Sage-Grouse conservation objectives within the framework. Absent substantial and compelling information that adjustments are necessary to the core population area strategy, these core population areas, connectivity areas, identified and mapped winter concentration areas, and protective stipulations shall not be altered for a minimum of 7 years. Any changes shall involve a transparent process that provides an opportunity for public input and proper consideration of any proposal consistent with the provisions contemplated under Wyoming's core population area strategy. • When NEPA analysis is required for a specific implementation action, one alternative would include mechanisms to make adjustments to meet or make progress toward meeting the wildlife/special status species standard. The analysis should also	

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
• At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fuel breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3. 9,992 acres are incompatible with and 772,110 acres are available for livestock grazing. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3.	identify the BLM-approved data collection methodologies used for monitoring conditions and determining when adjustments are necessary. If current grazing management meets land health standards and provides for Greater Sage-Grouse habitat, there would be no need to analyze an alternative for Greater Sage-Grouse. Within PHMA, seasonal habitat objectives for Greater Sage-Grouse apply only to those habitats delineated within an allotment during the specific season (e.g., breeding season objectives during breeding season). Data needed to inform the relationship between the authorized use and habitat condition would come from sample locations that appropriately reflect the impact of the authorized use on habitat conditions. Data points should fall within Greater Sage-Grouse seasonal habitat areas and be collected on ecological sites that have the potential to produce Greater Sage-Grouse habitat. Allotments within priority habitat (Core Population Areas and Core Population Connectivity Corridors), and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision. • Authorized uses in PHMA that incorporate habitat objectives for Greater Sage-Grouse must develop desired conditions based on Greater Sage-Grouse habitats present in the allotment and the ecological potential of sites that supports these habitats. Metrics used to monitor for objectives must be developed and inform	

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendment	Type of Change to Existing Management Direction in the Proposed RMP Amendment
	the wildlife/SSS portion of the Standards for Healthy Rangelands. • At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fuel breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3. 9,992 acres are incompatible with and 772,110 acres are available for livestock grazing. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3.	
MD Grazing-6019: Locate livestock salt or mineral supplements a minimum of 500 feet away from water sources, riparian areas, and aspen stands.	No changes made.	No change (same as 2015)
MD Grazing-6021: Provide rest/deferment from livestock grazing following wildfire, prescribed burns, and other vegetative treatments until resource objectives are met.	No changes made.	No change (same as 2015)

2.17.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 plans have management direction that would change by the Proposed RMP Amendment. Note that if 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The 2015 appendices can be found on the Buffalo RMP ePlanning website. The 2019 appendices can be found on the Wyoming GRSG ePlanning website.

ARMPA Appendix Name	Year	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Maps	2015	Completely Revised-revised by rangewide
A: Approved RMP Amendment with Management Goals, Objectives, and Decisions	2019	Partially Revised based on changes in Proposed RMP Amendment
B: Fluid Mineral Lease Notices; Lease Stipulations; and the Process for Exceptions, Modifications, and Waivers	2015	Partially Revised- Applies rangewide exceptions, modifications, and waivers
C: Best Management Practices and Required Design Features	2015, 2019	Partial change – no change (same as 2019) except the addition of livestock grazing BMPs
D: Greater Sage-Grouse Habitat Management Strategy	2015	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
C: Greater Sage-Grouse Habitat Management Strategy	2019	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
F: Mitigation Guidelines for Surface-Disturbing and Disruptive Activities, Wyoming Bureau of Land Management	2015	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
G: Federal Oil and Gas Operations on Split Estate Lands	2015	No change (same as 2015)
I: Wyoming Standards for Healthy Rangelands	2015	No change (same as 2015)
L: Buffalo Air Resources Management Plan	2015	No change (same as 2015)
M: Reclamation Policy for the Buffalo Field Office	2015	No change (same as 2015)
N: Buffalo Water Resources Management Plan	2015	No change (same as 2015)
O: Oil and Gas Operations	2015	No change (same as 2015)
P: Fire and Fuels Management	2015	No change (same as 2015)
Q: Biological Resources Support Document	2015	No change (same as 2015)
R: Lands Identified for Disposal Through Exchange or Sale	2015	No change (same as 2015)
S: Travel and Transportation Management	2015	No change (same as 2015)
T: Recreation Management Activities	2015	No change (same as 2015)
U: Livestock Grazing Allotments	2015	No change (same as 2015)
X: Implementation, Monitoring, and Evaluation	2015	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
No similar existing appendix		Addition of rangewide predator management as new appendix

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Appendix 2.18
Cody, Wyoming RMP Revisions

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2.18 CODY, WYOMING RMP REVISIONS

This appendix presents the approved RMP revision language from the record of decision for the Cody RMP that relate to GRSG management, and changes that were made in the 2019 GRSG amendment effort. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment (RMPA), either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMPA include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable RMP appendices that are listed in **Section 2.18.2** of this appendix. For the additional state-specific Wyoming management direction for the Proposed RMPA, see Chapter 2, Table 2-13.

2.18.1 Cody RMP (Wyoming)

Table 1. Comparison of Proposed RMP Amendment to Existing GRSG RMP Management Decisions in the Cody RMP (Wyoming)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment (no change, partial revision, complete revision, new direction)
Land Use Plan Revisions/Amendments to the Cody RMP		
MO MR:2.3: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority will be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 CFR 3162.3-1(h).	Leasing is allowed in PHMA. Where the BLM has a backlog of Expressions of Interest for leasing, the BLM will prioritize its work first in non-habitat management areas, followed by lower priority habitat management areas (e.g., GHMA) and then higher priority habitat management areas (i.e., PHMA). To the extent consistent with federal regulation, law, and policy, priority would be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority would be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 CFR 3162.3-1(h). Where a proposed fluid mineral	Completely revised – revised by rangewide

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment
	development project on an existing lease could adversely affect Greater Sage-Grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts on the extent compatible with lessees' rights to drill and produce fluid mineral resources. To incentivize development to locate outside of PHMA, the BLM would work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts on Greater Sage-Grouse or its habitat and will ensure that the best information about the Greater Sage-Grouse and its habitat informs and helps to guide development of such federal leases.	
*MO MR:2.4: Where a proposed fluid mineral development project on an existing lease could adversely affect Greater Sage-Grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts to Greater Sage-Grouse or its habitat and will ensure that the best information about the Greater Sage-Grouse and its habitat informs and helps to guide development of such federal leases.	Where a proposed fluid mineral development project on an existing lease could adversely affect Greater Sage-Grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts to Greater Sage-Grouse or its habitat and will ensure that the best information about the Greater Sage-Grouse and its habitat informs and helps to guide development of such federal leases (see MDs 4107, 4108, 4109, 4111, and 4157).	Completely revised – revised by rangewide
**MD 2006 MR:3.1: Consider interest in exploration for, or leasing of, federal coal (Map 3-5), if any on a case-by-case basis. Allow coal exploration licenses subject to the regulations of 43 CFR 3410, and subject to guidance mitigating for surface-disturbing activities in the Wyoming BLM Standard Oil	Consider interest in exploration for, or leasing of, federal coal (Map 3-5), if any on a case-by-case basis. Allow coal exploration licenses subject to the regulations of 43 CFR 3410, and subject to guidance mitigating for surface-disturbing activities in the Wyoming BLM Standard Oil and Gas Lease	Partially revised – revised by addition/replacement of applicable rangewide GRSG management

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and Gas- Lease Stipulations (Appendix B, Oil and Gas Lease Notices and Lease Stipulations, including Exception, Modification, and Waiver Criteria (p. 211)). Before issuing a coal exploration license, require the authorized officer to prepare an environmental assessment or environmental impact statement, if necessary, of the potential effects of the proposed exploration on the natural and socioeconomic environment of the affected area. If an application for a federal coal lease is received, conduct an appropriate land use and environmental analysis, including the coal screening process, to determine whether the area(s) proposed for leasing is (are) acceptable for coal development and leasing (as per 43 CFR 3425). If public lands are determined to be acceptable for further consideration for coal leasing, amend the land use plan as necessary. Only accept federal coal lease applications on those federal coal lands with development potential identified as suitable for further leasing consideration, after application of the coal screens and unsuitability criteria. At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining Greater Sage-Grouse for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1). The BLM will also consider that USFWS has found "the core area strategy…if implemented by all landowners via regulatory mechanisms, would provide adequate protection for sage-grouse and their habitats in the state" when considering leasing	Stipulations (2015 Cody RMP Appendix B, Oil and Gas Lease Notices and Lease Stipulations, including Exception, Modification, and Waiver Criteria (p. 211)). Before issuing a coal exploration license, require the authorized officer to prepare an environmental assessment or environmental impact statement, if necessary, of the potential effects of the proposed exploration on the natural and socioeconomic environment of the affected area. If an application for a federal coal lease is received, conduct an appropriate land use and environmental analysis, including the coal screening process, to determine whether the area(s) proposed for leasing is (are) acceptable for coal development and leasing (as per 43 CFR 3425). If public lands are determined to be acceptable for further consideration for coal leasing, amend the land use plan as necessary. Only accept federal coal lease applications on those federal coal lands with development potential identified as suitable for further leasing consideration, after application of the coal screens and unsuitability criteria. At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining Greater Sage-Grouse for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1). The BLM will also consider that USFWS has found "the core area strategy…if implemented by all landowners via regulatory mechanisms, would provide adequate protection for sage-grouse and their habitats in the state" when considering leasing	

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coal in PHMA under the criteria set for at 43 CFR 3461.5(o)(1) (USFWS 2010).	coal in PHMA under the criteria set for at 43 CFR 3461.5(o)(1) (USFWS 2010) (see also MDs 4107, 4108, 4109, 4111, and 4157).	
**MD 2013: Process oil and gas lease applications on a case-by-case basis. Ensure that leasing activities in PHMAs comply with Greater Sage-Grouse RMP decisions and remain in compliance with laws, regulations, and policy.	Process oil and gas lease applications on a case-by-case basis. Ensure that leasing activities in PHMAs comply with Greater Sage-Grouse RMP decisions and remain in compliance with laws, regulations, and policy (see also MDs 4107, 4108, 4109, 4111, and 4157).	Partially revised (2019) – add rangewide GRSG fluid mineral leasing objective language and update Management Direction referenced
MD 2023: Delineate **Oil and Gas Management Areas (Map 3-9) (108,174 acres of federal mineral estate) around existing intensively-developed fields, applying a 2-mile buffer from the outer boundary of the existing field (Map 3-10); adding enhanced oil recovery areas identified by the Governor's Office Enhanced Oil Recovery Institute and excluding Greater Sage-Grouse PHMAs. Manage these areas primarily for oil and gas exploration and development. Oil and gas development, including enhanced oil recovery operations, within Oil and Gas Management Areas is allowed to take place at the same level and density as the existing development in the field, except in the Oregon Basin Oil Field, where new development must result in no net gain of surface disturbance. Levels and densities beyond the existing field development may require additional reclamation or compensatory offsite mitigation. As oil and gas fields expand or exploration reaches beyond the Oil and Gas Management Areas depicted on Map 3-9, Oil and Gas Management Areas may be enlarged as appropriate. To enlarge Oil and Gas Management Areas, the expansion area would: i) have to be adjacent to the field and under valid oil and gas lease(s) with stipulations allowing surface	No changes made.	Partially revised – to update map and acres referenced

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occupancy and development; ii) have to have a surface density of, on average, at least four well pads per 640 acres; a determination that additional well density is required to efficiently and adequately produce the oil or gas resource; iii) have a project-specific environmental analysis prepared to analyze the impacts and determine operating methods, mitigation, and BMPs to be used in the efficient and comprehensive development of the field; iv) need surface resources to be satisfactorily mitigated; and v) need commitment to accelerate reclamation as required by the authorized officer.		
MO FM:1.5: Following wildland fires, conduct appropriate emergency stabilization and rehabilitation when and where needed. In priority Greater Sage-Grouse habitat areas, prioritize suppression immediately after life and property to conserve the habitat. In general Greater Sage-Grouse habitat, prioritize suppression where wildfires threaten priority Greater Sage-Grouse habitat.	No changes made.	No change (same as 2015)
MO FM:2.1: Consult and cooperate with adjacent landowners, state and local governments, and other stakeholders to plan and implement prescribed fire and other vegetation treatments across the landscape. In areas of general Greater Sage-Grouse habitat, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems.	No changes made.	No change (same as 2015)
MD 3008: Suppress fires threatening Greater Sage-Grouse habitats and crucial winter wildlife habitat within Wyoming big sagebrush communities. Where fire would be utilized to meet resource objectives, work closely with resource specialists to protect and improve Greater Sage-Grouse habitat. For	No changes made.	No change (same as 2015)

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fuels management, the BLM would consider multiple tools for fuels reduction and would analyze in NEPA compliance documentation before electing to implement prescribed fire in PHMAs. If prescribed fire is used in Greater Sage-Grouse habitat, the NEPA analysis for the Burn Plan will address: • why alternative techniques were not selected as a viable options; • how Greater Sage-Grouse goals and objectives would be met by its use; • how the COT Report objectives would be addressed and met; and • a risk assessment to address how potential threats to Greater Sage-Grouse habitat would be minimized. Prescribed fire as a vegetation or fuels treatment in Greater Sage-Grouse habitat shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect Greater Sage-Grouse habitat in PHMAs (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Prescribed fire in known crucial winter wildlife habitat shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in and/or around crucial winter wildlife habitat must be strategically-designed to reduce wildfire risk and protect winter range habitat quality.		

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MO BR:2.6: In PHMAs, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Technical Reference 1734-6 [BLM 2005c]).	No changes made.	No change (same as 2015)
MG BR:9: GREATER SAGE-GROUSE – Sustain the integrity of the sagebrush biome to provide the amount, continuity, and quality of habitat that is necessary to maintain sustainable populations of Greater Sage-Grouse and other species by achieving the objectives below.	No changes made.	Completely revised – revised by rangewide
MO BR:9.1: Maintain large patches of high quality sagebrush habitats, with emphasis on patches occupied by Greater Sage-Grouse.	No changes made.	No change (same as 2015)
MO BR:9.2: Maintain connections between sagebrush habitats, with emphasis on connections between habitats occupied by Greater Sage-Grouse.	No changes made.	No change (same as 2015)
MO BR:10.1: Reconnect large patches of sagebrush habitat with emphasis on reconnecting patches occupied by stronghold and isolated populations of Greater Sage-Grouse.	No changes made.	No change (same as 2015)

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**MD 4059: Maintain or improve important wildlife habitats through vegetative manipulations, habitat improvement projects, livestock grazing strategies and the application of The Wyoming Guidelines for Managing Sagebrush Communities with Emphasis on Fire Management (Wyoming Interagency Vegetation Committee 2002) and the Wyoming BLM Standard Mitigation Guidelines for Surface-Disturbing and Disruptive Activities (Appendix F, Wyoming Bureau of Land Management Mitigation Guidelines for Surface-Disturbing and Disruptive Activities (p. 351)), BMPs (Appendix C, Required Design Features and Best Management Practices (p. 251)), and similar guidance updated over time.	Maintain or improve important wildlife habitats through vegetative manipulations, habitat improvement projects, livestock grazing strategies and the application of The Wyoming Guidelines for Managing Sagebrush Communities with Emphasis on Fire Management (Wyoming Interagency Vegetation Committee 2002) and the Wyoming BLM Standard Mitigation Guidelines for Surface-Disturbing and Disruptive Activities (Appendix F, Wyoming Bureau of Land Management Mitigation Guidelines for Surface-Disturbing and Disruptive Activities (p. 351)), BMPs (2019 Wyoming GrSG ARMPA Appendix B, Required Design Features and Best Management Practices), and similar guidance updated over time.	Partially revised – to update Appendices referenced, as well as adding rangewide GRSG objectives
MD 4071: Conduct habitat enhancement vegetation treatments within sagebrush communities as opportunities and funding allow, consistent with EO 2015-4 (Wyoming Office of the Governor 2015).	No changes made.	Partially revised – to update EO referenced
MD 4072: Modify identified hazard fences, and analyze and construct new fences in accordance with wildlife needs, the BLM Fencing Handbook 1741-1, and WO IM 2010-022, Managing Structures for the Safety of Sage-grouse, Sharp-tailed grouse, and Lesser Prairie-chicken, and similar guidance and policy as updated over time.	No changes made.	Partially revised – revised by adding rangewide GRSG fence language
MD 4077: Allow water development projects in crucial elk winter range and in Greater Sage-Grouse nesting habitat with 10 inches or less annual precipitation only when adverse effects can be avoided, minimized and/or compensated based on site-specific analysis. Allow existing uses pending site-specific analysis on a priority basis.	No changes made.	Partially revised – revised by adding rangewide GRSG water development language

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD 4081: Avoid wind energy projects in big game crucial winter range and raptor concentration areas. Wind-energy development would be avoided in Greater Sage-Grouse PHMAs (Map 3-17), and not allowed unless it can be sufficiently demonstrated that the development activity would not result in declines of Greater Sage-Grouse PHMA populations. Sufficient demonstration of "no declines" should be coordinated with the WGFD and USFWS.	No changes made.	Partially revised– revised by addition of rangewide language for GRSG portion of MD
MD 4088: Discourage the use of broad-spectrum insecticides where insect control is required. Target pest control toward key problem areas and schedule applications to be effective in minimum doses in Greater Sage-Grouse brood-rearing areas. Field Offices may implement treatments within Greater Sage-Grouse habitat utilizing RAATS protocols	No changes made.	No change (same as 2015)
MD 4089: Avoid aerial pesticide spraying in favor of ground applications to minimize drift into non-target areas in Greater Sage-Grouse habitat unless benefits of treatments are likely to outweigh impacts.	No changes made.	No change (same as 2015)
MD 4090: Avoid applying pesticides to Greater Sage-Grouse breeding habitat during the nesting and early brood-rearing season (March 15 through June 30) to reduce the loss of food supply to chicks and avoid the chance of secondary poisoning unless benefits of treatments are likely to outweigh impacts.	No changes made.	No change (same as 2015)

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment
MD 4091: Maintain seeps, springs, wet meadows, and riparian vegetation in a functional and diverse condition for young Greater Sage-Grouse and other species that depend on forbs and insects associated with these areas. Consider management actions if desirable green vegetation associated with these wet areas is not available, accessible, or cannot be maintained with current livestock, wildlife, or wild horse use, and the impacts are outweighed by the improved habitat quality.	No changes made.	No change (same as 2015)
MD 4092: Restore Greater Sage-Grouse brood-rearing habitats in riparian/wetland areas.	No changes made.	No change (same as 2015)
MD 4093: Restore lost riparian functioning systems by repairing abnormally incised drainages to raise water tables and increase water storage and brood-rearing habitats within Greater Sage-Grouse habitat.	No changes made.	No change (same as 2015)
MD 4094: Manage vegetation composition diversity and structure, as determined by ESD, or other methods that reference site potential, and WGFD protocols to achieve Greater Sage-Grouse habitat management objectives, in cooperation with stakeholders. Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to Greater Sage-Grouse habitat to determine if they should be restored to sagebrush or habitat of higher quality for Greater Sage-Grouse. If these seedings provide value in conserving or enhancing Greater Sage-Grouse habitats, then no restoration would be necessary. Assess the compatibility of these seedings for Greater Sage-Grouse habitat during the land health assessments.	No changes made.	Partially revised– revised by addition of rangewide GRSG habitat objectives for GRSG portion of MD

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Burned areas within PHMAs would be restored to suitable habitat with consideration given to ESDs, reference sites, site potential and local variability. The BLM could bring in burned area rehabilitation and Burned Area Emergency Response teams who would work cooperatively with partners at the federal, state, and local levels to rehabilitate and restore Greater Sage-Grouse habitats in a manner consistent with the core habitat populations area strategy for conservation. DDCT reviews would be conducted in coordination with the WGFD Habitat Protection Program located in Cheyenne, Wyoming at the WGFD headquarters. Areas within PHMAs would be prioritized for restoration of Greater Sage-Grouse habitat beyond immediate response.		
MD 4095: Maintain sagebrush and understory diversity (relative to ecological site description) in crucial seasonal Greater Sage-Grouse habitats unless such removal is necessary to achieve Greater Sage-Grouse habitat management objectives. For example, thinning small patches of dense sagebrush may increase desirable forbs in early brood-rearing habitat.	No changes made.	No change (same as 2015)
MD 4096: Increase the composition and canopy cover of Wyoming big sagebrush, within existing nonnative grass seedings with less than 5 percent sagebrush canopy cover, to greater than or equal to neighboring sagebrush communities or historical levels. (See Shrubland-Salt Desert/Salt Bottom on Map 3-14; deeper soiled, and gentler sloped portions of the Shrubland-Salt Desert/Salt Bottom, colored in pink, would be those areas where sagebrush restoration efforts could be conducted.)	No changes made.	Partially revised – to update Map referenced

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MD 4097: Investigate opportunities to increase sagebrush in lower precipitation zones.	No changes made.	No change (same as 2015)
MD 4098: Plan and construct mining and mineral development activities, to the degree possible given state water rights, to minimize disturbances that would result in alterations to springs and riparian Greater Sage-Grouse habitat. Alternative water sources may be developed to replace natural sources that have been affected or destroyed during these development activities.	No changes made.	No change (same as 2015)
MD 4099: Treat constructed or non-natural water storage impoundments to control mosquito breeding (and the associated spread of West Nile virus), to prevent disease spread to Greater Sage-Grouse as necessary.	No changes made.	No change (same as 2015)
MD 4100: In cooperation with stakeholders, manage to promote the growth and persistence of native shrubs, grasses, and forbs needed by Greater Sage-Grouse for seasonal food and concealment	No changes made.	No change (same as 2015)
MD 4101: In cooperation with stakeholders, design and locate fences so as not to disturb PHMAs. Increase the visibility of fences in these areas which have been identified as hazardous to flying Greater Sage-Grouse.	No changes made.	Partially revised – revised by adding rangewide GRSG fence language
MD 4102: Conduct fire management activities to minimize overall wildfire size and frequency in sagebrush plant communities where Greater Sage-Grouse habitat objectives are at risk. General priorities for habitat protection: Priority # 1 – Protection of Greater Sage-Grouse PHMAs. Priority # 2 – Wyoming big sagebrush communities outside Greater Sage-Grouse PHMAs and habitats recovering from disturbance within or adjacent to Greater Sage-Grouse PHMAs.	No changes made.	No change (same as 2015)

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MD 4103: Annually maintain FMPs to incorporate updated sagebrush habitat information as well as fire suppression priorities in sagebrush habitats. Incorporate fire management objectives for the management of sagebrush ecosystems into FMPs. Provide fire management objectives for sagebrush ecosystems to initial attack personnel at the beginning of each fire season.	No changes made.	No change (same as 2015)
MD 4104: Establish fuels treatment projects at strategic locations to minimize size of wildfires and limit loss of Greater Sage-Grouse habitat.	No changes made.	No change (same as 2015)
MD 4105: Reintroduce appropriate fire regimes to limit conifer encroachment into the sagebrush plant communities. Take into account invasive herbaceous species and Fire Regime Group and FRCC (measure of departure from historic fire regime) with treatments. Where possible, achieve a balance between treating areas that have significantly departed from the historic fire regime (Condition Class 3) and areas that are functioning within an appropriate fire regime (Condition Class 1).	No changes made.	No change (same as 2015)
MD 4106: Remove conifers encroaching into sagebrush habitats in a manner that considers tribal and cultural values. Prioritize treatments closest to occupied Greater Sage-Grouse habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2 as defined in Miller et al. (2005). Refine the location of specific priority areas to be treated by utilizing site-specific analysis and principles like those included in the FIAT report (Chambers et. al. [2014]) and other ongoing modeling efforts to address conifer encroachment.	No changes made.	No change (same as 2015)

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MD 4107: **Inside PHMAs Prohibit surface occupancy and surface-disturbing activities on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks. The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse (Map 3-17). **Outside PHMAs** Prohibit surface-disturbing and disruptive activities and apply a NSO restriction within a ¼-mile radius of the perimeter of occupied Greater Sage-Grouse leks (Map 3-17). Outside Greater Sage-Grouse PHMAs, the BLM's goal is to sustain important habitats that support core populations and to maintain lek persistence over the long term in sufficient proportions of the Greater Sage-Grouse population to facilitate movement and genetic transfer between core populations, including those found in adjacent states.	**Inside PHMAs** Prohibit surface occupancy and surface-disturbing activities on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped). **Outside PHMAs** Prohibit surface-disturbing and disruptive activities and apply a NSO restriction within a ¼-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) (Map 3-17). Outside Greater Sage-Grouse PHMAs, the BLM's goal is to sustain important habitats that support core populations and to maintain lek persistence over the long term in sufficient proportions of the Greater Sage-Grouse population to facilitate movement and genetic transfer between core populations, including those found in adjacent states. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD 4157).	Partially revised (2019) – to update map referenced, update EO referenced, and reference Fluid Mineral Appendix (updated to reflect rangewide and state-specific changes, including fluid mineral waivers, exceptions, and modifications)
MD 4108: **Inside PHMAs Prohibit disruptive activities on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks from March 15 to June 30 (40,039 acres). **Outside PHMAs** Prohibit disruptive activities on or within a ¼-mile radius of the perimeter of occupied Greater Sage-Grouse leks from March 15 to June 30 (1,116 acres). **Inside PHMAs** Prohibit surface-disturbing and/or disruptive activities from March 15	**Inside PHMAs** Prohibit disruptive activities on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) from March 15 to June 30 (40,039 acres). **Outside PHMAs** Prohibit disruptive activities on or within a ¼-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) from March 15 to June 30 (1,116 acres). **Inside PHMAs**	Partially revised (2019) – to update acreage, update EO referenced, and reference Fluid Mineral Appendix (updated to reflect rangewide and state-specific changes, including fluid mineral waivers, exceptions, and modifications)

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to June 30 to protect Greater Sage-Grouse breeding, nesting, and early brood-rearing habitat (437,045 acres). Apply this timing limitation throughout the PHMAs. Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis. **Outside PHMAs** Prohibit surface-disturbing and/or disruptive activities in Greater Sage-Grouse nesting and early brood-rearing habitat within a 2-mile radius of the perimeter of occupied Greater Sage-Grouse leks from March 15 to June 30. Note: Where credible data support different timeframes for these seasonal restrictions, dates may be expanded by up to 14 days prior to or subsequent to the above dates.	Prohibit surface-disturbing and/or disruptive activities from March 15 to June 30 to protect Greater Sage-Grouse breeding, nesting, and early brood-rearing habitat (437,045 acres). Apply this timing limitation throughout the PHMAs. **Outside PHMAs** Prohibit surface-disturbing and/or disruptive activities in Greater Sage-Grouse nesting and early brood-rearing habitat within a 2-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) from March 15 to June 30. Note: Where credible data support different timeframes for these seasonal restrictions, dates may be expanded by up to 14 days prior to or subsequent to the above dates. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD 4157).	
MD 4109: **Greater Sage-Grouse winter concentration areas: Surface-disturbing and/or disruptive activities in sage-grouse winter concentration areas would be prohibited from December 1–March 14. Activities in unsuitable habitats within PHMAs would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis. Protection of additional mapped winter concentration areas in GHMAs would be implemented only where winter concentration areas are identified as supporting biologically significant numbers of sage-grouse nesting in PHMAs and/or attending leks within	**Greater Sage-Grouse winter concentration areas:** Surface-disturbing and/or disruptive actives in Greater Sage-Grouse winter concentration areas would be prohibited from December 1—March 14. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD 4157). Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas	Partially revised (2019) – to update EO referenced, include SHMA, and to reference Fluid Mineral Appendix (updated to reflect rangewide and state-specific changes, including fluid mineral waivers, exceptions, and modifications) for winter concentration areas in PHMA

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PHMAs. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Evaluate and allow activities in unsuitable habitats within PHMAs in accordance with exception and modification criteria on a case-by-case basis. Protection of additional mapped winter concentration areas in GHMAs would be implemented only where winter concentration areas are identified as supporting biologically significant numbers of Greater Sage-Grouse nesting in PHMAs and/or attending leks within PHMAs. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas.	are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated on consultation with the WGFD in all identified winter concentration areas.	
**MD 4110: Density of Disturbances: In Greater Sage-Grouse PHMAs, the density of disturbance of energy or mining facilities would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights (Appendix D, Greater Sage-Grouse Habitat Management Strategy (p. 273)). The one location and cumulative value of existing disturbances would not exceed 5 percent of habitat of the DDCT area. Inside PHMA, all suitable habitat disturbed (any program area) will not exceed 5 percent within the DDCT area using the DDCT process. Consolidate anthropogenic features from development and transmission on the landscape. Allow on a case-by-case basis high profile structures within Greater Sage-Grouse nesting habitat.	Density of Disturbances: In Greater Sage-Grouse PHMAs, the density of disturbance of energy or mining facilities would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights (2019 Wyoming GrSG ARMPA Appendix C, Greater Sage-Grouse Habitat Management Strategy). The one location and cumulative value of existing disturbances would not exceed 5 percent of habitat of the DDCT area. Inside PHMA, all suitable habitat disturbed (any program area) will not exceed 5 percent within the DDCT area using the DDCT process. Consolidate anthropogenic features from development and transmission on the landscape. Allow on a case-by-case basis high profile structures within Greater Sage-Grouse nesting habitat.	Completely revised – revised by rangewide and state-specific for surface disturbance cap Partially revised (2019) – to update Appendix referenced for density cap and to update WGFD Protocols for Treating Sagebrush to Benefit Sage-Grouse referenced.

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Sagebrush Treatment: For vegetation treatments in sagebrush within PHMAs, refer to WGFD Protocols for Treating Sagebrush to Benefit Sage-Grouse (WGFD 2011, as updated) and BLM WO IM 2013-128 (Sage-grouse Conservation Related to Wildland Fire and Fuels Management). These recommended protocols, subject to seasonal conditions of approval, would be used in determining whether proposed treatment constitutes a "disturbance" that would contribute toward the 5 percent threshold for habitat maintenance. Additionally, these protocols would be used to determine whether the proposed treatment configuration would be expected to have neutral or beneficial impacts for PHMA populations or if they represent additional habitat loss or fragmentation. Treatments to enhance sagebrush/grasslands habitat for Greater Sage-Grouse would be evaluated based upon habitat quality and the functionality/use of treated habitats post-treatment. The BLM would work collaboratively with partners at the state and local level to maintain and enhance Greater Sage-Grouse habitats. Seasonal restrictions would be applied, as needed, for implementing fuels management treatments according to the type of seasonal habitat present. Wildfire burns will be treated as disturbed if sagebrush is reduced below 5 percent unless there is an implementation plan outlining restoration efforts and 3 years of data showing a trend back to suitable habitat.	Sagebrush Treatment: For vegetation treatments in sagebrush within PHMAs, refer to WGFD Protocols for Treating Sagebrush to Benefit Sage-Grouse (WGFD 2015, as updated) and BLM WO IM 2013-128 (Sage-grouse Conservation Related to Wildland Fire and Fuels Management). These recommended protocols, subject to seasonal conditions of approval, would be used in determining whether proposed treatment constitutes a "disturbance" that would contribute toward the 5 percent threshold for habitat maintenance. Additionally, these protocols would be used to determine whether the proposed treatment configuration would be expected to have neutral or beneficial impacts for PHMA populations or if they represent additional habitat loss or fragmentation. Treatments to enhance sagebrush/grasslands habitat for Greater Sage-Grouse would be evaluated based upon habitat quality and the functionality/use of treated habitats post-treatment. The BLM would work collaboratively with partners at the state and local level to maintain and enhance Greater Sage-Grouse habitats. Seasonal restrictions would be applied, as needed, for implementing fuels management treatments according to the type of seasonal habitat present. Wildfire burns will be treated as disturbed if sagebrush is reduced below 5 percent unless there is an implementation plan outlining restoration efforts and 3 years of data showing a trend back to suitable habitat.	
*MD 4111: New project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of	Within PHMA (core only), new project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the	Partially revised (2019) – to update EO referenced

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the lek from 6:00 pm to 6:00 am during the breeding season (March 1 to May 15). Specific noise protocols for measurement and implementation will be developed as additional research and information emerges.	perimeter of the lek (or lek center if no perimeter is yet mapped) from 6:00 pm to 8:00 am during the breeding season (March 1–May 15). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD 4157). In coordination with the State of Wyoming, specific noise protocols for measurement and implementation will be developed as additional research and information emerges. These measures would be considered at the site-specific project level where and when appropriate.	
MD 4112: Allow motorized vehicle use in Greater Sage-Grouse PHMAs consistent with other resource objectives. Manage new road construction in and adjacent to Greater Sage-Grouse habitat consistent with applicable restrictions on surface-disturbing and disruptive activities. Avoid construction of new or local collector roads (as defined in BLM Manual 9113 [BLM 2011d]) within 1.9 miles of the perimeter of occupied Greater Sage-Grouse leks within PHMAs. Prohibit all new roads within 0.6 miles of the perimeter of occupied Greater Sage-Grouse leks within PHMAs. Construct roads to minimum design standards needed for production activities.	Allow motorized vehicle use in Greater Sage-Grouse PHMAs consistent with other resource objectives. Manage new road construction in and adjacent to Greater Sage-Grouse habitat consistent with applicable restrictions on surface-disturbing and disruptive activities. Avoid construction of new or local collector roads (as defined in BLM Manual 9113 [BLM 2011d]) within 1.9 miles of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) within PHMAs. Prohibit all new roads within 0.6 miles of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) within PHMAs. Construct roads to minimum design standards needed for production activities.	No change (same as 2019)

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MD 4113: In PHMAs, implement mitigation and minimization guidelines and required design features, including specific measures for Greater Sage-Grouse (refer to Appendix C, Required Design Features and Best Management Practices (p. 251)), as applicable and consistent with EO 2015-4 (Wyoming Office of the Governor 2015). Incorporate Greater Sage-Grouse specific measures into project proposals as required design features or mitigation for any authorized federal action, regardless of surface ownership.	In PHMAs, implement mitigation and minimization guidelines and required design features, including specific measures for Greater Sage-Grouse (refer to 2019 Wyoming GrSG ARMPA Appendix B, Required Design Features and Best Management Practices), as applicable and consistent with EO 2015-4 (Wyoming Office of the Governor 2015). Incorporate Greater Sage-Grouse specific measures into project proposals as required design features or mitigation for any authorized federal action, regardless of surface ownership.	Completely revised – revised by rangewide for mitigation Partially revised – to update Appendix referenced and update EO referenced for RDFs
MD 4114: In PHMAs, require the development of a wildlife resource monitoring and mitigation plan to address potential impacts from mineral development on wildlife populations and/or habitat on a case-by-case basis.	No changes made.	No change (same as 2015)
MD 4115: Use the following travel management criteria in PHMAs: • During subsequent travel management planning, all routes within PHMAs would undergo a route evaluation to determine its purpose and need and the potential resource and/or user conflicts from motorized travel. Where resource and/or user conflicts outweigh the purpose and need for the route, the route would be considered for closure or considered for relocation outside of sensitive Greater Sage-Grouse habitat. • During implementation-level travel planning, threats to Greater Sage-Grouse and their habitat would be considered when evaluating route designations and/or closures. • During subsequent travel management planning, routes within PHMAs that do not have a purpose or need would be considered for closure.	No changes made.	No change (same as 2015)

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• During subsequent travel management planning, routes within PHMAs that are duplicative parallel, or redundant would be considered for closure. • During subsequent travel management planning, OHV timing limitations would be considered in important seasonal habitats where OHV use is a threat. • During subsequent travel management planning, consider limiting snow machine travel to designated routes or consider seasonal closures in Greater Sage-Grouse wintering areas from November 1 through March 31. • During subsequent travel management planning, routes in PHMAs not required for public access or recreation with a current administrative/agency purpose or need would be evaluated for administrative access only. • During subsequent travel management planning, prioritize restoration of routes not designated in a Travel Management Plan within PHMAs. • During subsequent travel management planning, consider using seed mixes or transplant techniques that will maintain or enhance Greater Sage-Grouse habitat when rehabilitating linear disturbances. • During subsequent travel management planning, consider scheduling road maintenance to avoid disturbance during sensitive periods and times to the extent practicable. Use time of day limits (after 10:00 AM to 7:00 PM) to reduce impacts on Greater Sage-Grouse during breeding and nesting periods.		

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*MD 4116: The Greater Sage-Grouse adaptive management plan provides regulatory assurance that unintended negative impacts to Greater Sage-Grouse habitat will be addressed before consequences become severe or irreversible. Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives. With respect to Greater Sage-Grouse, all regulatory entities in Wyoming, including the BLM, use soft and hard triggers. Soft and hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts. See Appendix D, Greater Sage-Grouse Habitat Management Strategy (p. 273) for more information on soft and hard triggers. <u>Soft Triggers Response:</u> Soft triggers are indicators that management or specific activities may not be achieving the intended results of conservation action or that unanticipated changes to populations or habitats have occurred that have the potential to place habitats or populations at risk. The soft trigger is any deviation from normal trends in habitat or population in any given year. Metrics include, but are not limited to, annual lek counts, wing counts, aerial surveys, habitat monitoring, and DDCT evaluations. For population metrics, normal population trends are calculated as the 5-year running mean of annual population counts. BLM field offices, with the assistance of their respective land and RMP implementation groups, local WGFD offices, and local sage-grouse working groups will evaluate the metrics with the	The Greater Sage-Grouse adaptive management plan provides regulatory assurance that unintended negative impacts to Greater Sage-Grouse habitat will be addressed before consequences become severe or irreversible. Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives. With respect to Greater Sage-Grouse, all regulatory entities in Wyoming, including the BLM, use soft and hard triggers. Soft and hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts. See 2019 Wyoming GrSG ARMPA Appendix C, Greater Sage-Grouse Habitat Management Strategy for more information on soft and hard triggers. <u>Soft Triggers Response:</u> Soft triggers are indicators that management or specific activities may not be achieving the intended results of conservation action or that unanticipated changes to populations or habitats have occurred that have the potential to place habitats or populations at risk. The soft trigger is any deviation from normal trends in habitat or population in any given year. Metrics include, but are not limited to, annual lek counts, wing counts, aerial surveys, habitat monitoring, and DDCT evaluations. For population metrics, normal population trends are calculated as the 5-year running mean of annual population counts. BLM field offices, with the assistance of their respective land and RMP implementation groups, local WGFD offices, and local sage-grouse working groups will evaluate the metrics with the Adaptive	Completely revised – revised by rangewide

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Adaptive Management Working Group on an annual basis. The purpose of these strategies is to address localized greater sage-grouse population and habitat changes by providing the framework in which management will change if monitoring identifies negative population and habitat anomalies in order to avoid crossing a hard trigger threshold. Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short or long term, as allowed by law. The project level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal factor. The management agency (BLM) and the Adaptive Management Work Group will implement an appropriate response strategy to address causal factors not attributable to a specific project or to make adjustments at a larger regional or statewide level. <u>Hard Trigger Response:</u> Hard triggers are indicators that management is not achieving desired conservation results. Hard triggers would be considered a catastrophic indicator that the species is not responding to conservation actions, or that a larger-scale impact or set of impacts is having a negative effect. Within the range of normal population variables (5-year running mean of annual population counts), hard triggers shall be determined to take effect when two of the three metrics exceeds 60 percent of normal variability for the area under management in a single year, or when any of the three metrics exceeds 40 percent of normal variability for a 3 year time period within a 5-year range of analysis. A minimum of 3 consecutive years in a 5-year	Management Working Group on an annual basis. The purpose of these strategies is to address localized Greater Sage-Grouse population and habitat changes by providing the framework in which management will change if monitoring identifies negative population and habitat anomalies in order to avoid crossing a hard trigger threshold. Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short or long term, as allowed by law. The project level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal factor. The management agency (BLM) and the Adaptive Management Work Group will implement an appropriate response strategy to address causal factors not attributable to a specific project or to make adjustments at a larger regional or statewide level. <u>Hard Trigger Response:</u> Hard triggers are indicators that management is not achieving desired conservation results. Hard triggers would be considered a catastrophic indicator that the species is not responding to conservation actions, or that a larger-scale impact or set of impacts is having a negative effect. Within the range of normal population variables (5-year running mean of annual population counts), hard triggers shall be determined to take effect when two of the three metrics exceeds 60 percent of normal variability for the area under management in a single year, or when any of the three metrics exceeds 40 percent of normal variability for a 3 year time period within a 5-year range of analysis. A minimum of 3 consecutive years in a 5-year period is used to	

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period is used to determine trends (i.e., years 1-2-3, years 2-3-4, years 3-4-5). Upon determination that a hard trigger has been tripped, the BLM will immediately defer issuance of discretionary authorizations for new actions within the Biologically Significant Unit for a period of 90 days. In addition, within 14 days of a determination that a hard trigger has been tripped, the Adaptive Management Work Group will convene to develop an interim response strategy and initiate an assessment to determine the causal factor or factors (hereafter called the causal factor assessment). In making amendments to this plan, the BLM will coordinate with the USFWS as BLM continues to meet its objective of protecting, restoring, and enhancing Greater Sage-Grouse habitat by reducing, minimizing or eliminating threats to that habitat. The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter.	determine trends (i.e., years 1-2-3, years 2-3-4, years 3-4-5). Upon determination that a hard trigger has been tripped, the BLM will immediately defer issuance of discretionary authorizations for new actions within the Biologically Significant Unit for a period of 90 days. In addition, within 14 days of a determination that a hard trigger has been tripped, the Adaptive Management Work Group will convene to develop an interim response strategy and initiate an assessment to determine the causal factor or factors (hereafter called the causal factor assessment). The Adaptive Management Working Group would define a process to review and reverse adaptive management actions once the identified causal factor is resolved (e.g., returning to previous management once objectives of interim management strategy have been met). In making amendments to this plan, the BLM will coordinate with the USFWS as BLM continues to meet its objective of protecting, restoring, and enhancing Greater Sage-Grouse habitat by reducing, minimizing or eliminating threats to that habitat. The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter.	
MD 4145: Base future adjustments to the appropriate management level on monitoring information and multiple use considerations through development of and/or revisions to HMA Plans. Update HMA plans to include Greater Sage-Grouse objectives.	No changes made.	No change (same as 2015)

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*MD 4156: No similar action.	The BLM will update its Greater Sage-Grouse habitat management areas, including biologically significant units (BSUs), in conjunction with the State of Wyoming's core areas, upon issuance of any Wyoming Governor's Executive Order revising or amending the core area boundaries and upon completion of appropriate NEPA analysis and process. The BLM will complete the appropriate NEPA documentation (including appropriate public comment) prior to adopting any revised core area boundaries (e.g., maintenance action or plan amendment, environmental assessment, etc.).	Partially revised – to change reference from BSUs to HAF multi-scale areas
No similar action.	*MD 4157: Specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Adopt the State of Wyoming's Greater Sage-Grouse Compensatory Mitigation Framework to the extent consistent with federal law, regulations, and policy. In all Greater Sage-Grouse habitat, when authorizing third-party actions in designated Greater Sage-Grouse habitat, the BLM will seek to achieve the planning-level Greater Sage-Grouse management goals and objectives through implementation of mitigation and management actions, consistent with valid existing rights and applicable law. Under this Plan Amendment, management would be consistent with the Greater Sage-Grouse goals and objectives, and in conformance with BLM Manual 6840, Special Status Species Management. In accordance with BLM Manual 6840, the BLM will undertake planning decisions, actions and authorizations "to minimize or eliminate threats affecting the status of [Greater Sage-Grouse] or to improve the condition of [Greater Sage-	Completely revised – revised by rangewide

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	Grouse] habitat" across the planning area. Accordingly, before authorizing third-party actions that result in habitat loss and degradation, the BLM will complete the following steps, in alignment with the Governor of Wyoming's Executive Order 2015-4 (July 29, 2015): 1. Work jointly with the WGFD to evaluate projects and recommend mitigation in the form of avoidance and minimization. 2. The WGFD will determine if the State requires or recommends any additional mitigation – including compensatory mitigation – under State regulations, policies, or programs related to the conservation of Greater Sage-Grouse. 3. Incorporate state required or recommended mitigation into the BLM's NEPA decision-making process, if the WGFD determines that compensatory mitigation is required to address impacts to GRSG habitat as a part of State policy or authorization, or if a proponent voluntarily offers mitigation. 4. Analyze whether the compensatory mitigation (deferring to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action): • achieves measurable outcomes for Greater Sage-Grouse habitat function on a landscape scale as determined by WGFD that are at least equal to the lost or degraded values in accordance with the Governor of Wyoming's Executive Order 2015-4.	

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	• provides benefits that are in place for at least the duration of the impacts. • accounts for a level of risk that the mitigation action may fail or not persist for the full duration of the impact 5. Ensure mitigation outcomes are consistent with the State of Wyoming's mitigation strategy and principles outlined in 2018 Approved RMPA Appendix C, The Greater Sage-Grouse Habitat Management Strategy. The BLM has determined that compensatory mitigation must be voluntary unless required by other applicable law and in recognition that State authorities may also require compensatory mitigation (IM 2019-018, *Compensatory Mitigation*, December 6, 2018). Therefore, consistent with valid existing rights and applicable law, when authorizing third-party actions that result in habitat loss and degradation, the BLM will consider voluntary compensatory mitigation actions only as a component of compliance with a State mitigation plan, program, or authority, or when offered voluntarily by a project proponent. Project-specific analysis will be necessary to determine how a compensatory mitigation proposal addresses impacts from a proposed action. The BLM will cooperate with the State to determine appropriate project design and alignment with State policies and requirements, including those regarding compensatory mitigation. When the BLM is considering compensatory mitigation as a component of the project proponent's submission or based on a mitigation requirement from the State, the BLM's NEPA analysis would evaluate the need to avoid or minimize impacts of the proposed project and achieve the	

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	goals and objectives of this RMPA. The BLM will defer to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action.	
MO LR:1.5: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available.	No changes made.	No change (same as 2015)
**MD 6016: Retain approximately 1,072,653 acres of BLM-administered land. 14,283 acres of BLM-administered land are available for disposal by sale, exchange or other means (Map 3-21) (Appendix I, Land Disposal and Acquisition (p. 381)). Disposal can include none, some, or all of the mineral estate as allowed by 43 CFR 2720 and FLPMA Section 209(b)(1). A mineral potential report would determine if a surface estate disposal includes none, some, or all of the mineral estate. Lands classified as PHMAs and GHMAs for Greater Sage-Grouse will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the Greater Sage-Grouse or (2) the agency can demonstrate that the disposal of the lands, including land exchanges, will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse. Consider exceptions where there is mixed ownership. Allow land exchanges for additional or more contiguous federal ownership patterns within PHMAs. For PHMAs with minority federal ownership, include an additional, effective mitigation agreement for any disposal of federal land.	No changes made.	Partially revised – to update Map referenced, to update Appendix referenced, and to add SHMA

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Consider pursuing a permanent conservation easement as a final preservation measure. For lands in GHMAs that are identified for disposal, the BLM will only dispose of such lands consistent with the goals and objectives of this plan, including, but not limited to, the land use plan objective to maintain or increase Greater Sage-Grouse abundance and distribution. Note: All land actions to acquire or dispose of lands would require a site specific analysis under NEPA.		
MD 6032: Designate ROW corridors as shown on Map 3-24. PHMAs are designated as avoidance areas for high voltage transmission line and pipeline ROWs. All authorizations in these areas must comply with the conservation measures outlined in this Approved RMP, including the RDFs and avoidance criteria presented in Appendix C, Required Design Features and Best Management Practices (p. 251). Within PHMAs, specific to management for Greater Sage-Grouse, all RMPs are amended as follows: **New Transmission Lines (greater than 115 kV): New transmission lines greater than 115 kV in PHMA would be allowed only (1) when located within 0.5 miles or less of 115 kV or greater transmission lines constructed prior to 2008; or (2) in designated RMP corridors authorized for aboveground transmission lines. Transmission lines routed using one or more of the two criteria listed above will not be counted against the DDCT 5 percent disturbance cap. New transmission lines greater than 115 kV proposed outside of these areas would be considered where it can be demonstrated that declines in Greater Sage-Grouse populations could be avoided	No changes made.	Partially revised – revised by adding rangewide GRSG major ROW language

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through project design and/or mitigation. These projects will be subject to the density and disturbance restrictions for PHMA. Review of transmission line proposals would incorporate the Framework for Sage-grouse Impact Analysis for Interstate Transmission Lines (BLM 2012b) and other appropriate documents consistent with the three routing criteria described above. New projects within PHMAs that may require future utility lines, including distribution and transmission lines or pipelines, would include the proposed utility lines in their DDCT as part of the proposed disturbance. Lines permitted, but not located in the above mentioned routes or a designated corridor will be counted toward the 5 percent disturbance calculation (line distance is equal to the anticipated construction footprint or construction ROW width multiplied by length and includes all access roads, staging area, and other surface disturbance associated with construction outside of the construction ROW). **New Electric Distribution Lines (less than 115 kV):** Require burial of new electric distribution lines where economically feasible. If not economically feasible, distribution lines may be authorized when effectively designed/mitigated to protect Greater Sage-Grouse and when the authorized officer determines that overhead installation is the action alternative with the fewest adverse impacts while still meeting the project need. Consider agricultural and residential distribution lines to be adequately mitigated for Greater Sage-Grouse if constructed at least 0.6 mile from the lek perimeter with appropriate timing constraints and constructed to the latest		

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APLIC standards. These ROW authorizations will be subject to approval by the State Director. **Pipelines:** Allow new pipelines through PHMAs: (1) within an RMP corridor currently authorized for that use or designated through future RMP amendments; or (2) constructed in or adjacent to existing utilities (buried and aboveground) or roads. Pipelines constructed in RMP corridors or adjacent to existing utilities or roads will require completion of a DDCT analysis for baseline data collection, but the project is not required to meet the threshold of 5 percent. However, within 6 months of the completion of construction, the project proponent will provide the authorized officer with as-built drawings so that the total disturbance within PHMAs can be calculated annually.		
MD 6033: Manage 637,154 acres as ROW avoidance areas (Map 3-24). Manage PHMAs as ROW avoidance areas for new ROW or SUA permits (317,307 acres). Within PHMAs where new ROWs/SUAs are necessary, locate new ROWs/SUAs within designated RMP corridors or adjacent to existing ROWs/SUAs where technically feasible. Subject to valid existing rights, including non-federal land inholdings, locate new, required ROWs/SUAs adjacent to existing ROWs/SUAs or where impacts to Greater Sage-Grouse are minimized. Work with proponents to design ROW applications to protect Greater Sage-Grouse.	No changes made.	Partially revised – revised by adding rangewide GRSG ROW language
MD 6046: Allow temporary closures to motorized vehicle use in areas that pose public health and safety risks, and/or where resource damage is imminent. In PHMAs and GHMAs, temporary closures will	No changes made.	Partially revised – to include SHMA

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be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use). Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR 8341.2) A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.		

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*MD 6059: Design recreational sites, recreation facility development, and recreational access to avoid riparian habitat areas or develop and manage them in a manner that minimizes effects on riparian habitats. Construction of recreation facilities within PHMA must conform with the avoidance and minimization measures of this plan. If it is determined that these conservation measures are inadequate for the conservation of Greater sage-grouse, the BLM will require and ensure compensatory mitigation that provides a net conservation gain to the species.	Design recreational sites, recreation facility development, and recreational access to avoid riparian habitat areas or develop and manage them in a manner that minimizes effects on riparian habitats. Construction of recreation facilities within PHMA must conform to the avoidance and minimization measures of this plan. If it is determined that these conservation measures are inadequate for the conservation of Greater Sage-Grouse, the BLM will consider mitigation is consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4 (see also MD 4157).	Partially revised – to update mitigation reference
**MD 6126: In cooperation, consultation, and coordination with permittees/lessees, cooperators, and interested public, develop and implement appropriate livestock grazing management actions to enhance land health, improve forage for livestock, and meet other multiple use objectives by using the *Wyoming Guidelines for Livestock Grazing Management*, other appropriate BMPs (see Appendix C, *Required Design Features and Best Management Practices* (p. 251)), and development of appropriate range improvements. The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMAs. In setting workload priorities, precedence will be given to existing permits/leases in areas not meeting Land Health Standards, with focus on allotments containing riparian areas or wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., wildfire) and legal obligations.	In cooperation, consultation, and coordination with permittees/lessees, cooperators, and interested public, develop and implement appropriate livestock grazing management actions to enhance land health, improve forage for livestock, and meet other multiple use objectives by using the Wyoming Guidelines for Livestock Grazing Management, other appropriate BMPs (see 2019 Wyoming GrSG ARMPA Appendix B, Required Design Features and Best Management Practices), and development of appropriate range improvements. The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMAs. In setting workload priorities, precedence will be given to existing permits/leases in areas not meeting Land Health Standards, with focus on allotments containing riparian areas or wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., wildfire) and legal obligations.	Completely revised – revised by rangewide

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The BLM will collaborate with appropriate federal agencies, and the State of Wyoming as contemplated under EO 2013–3 (Wyoming Office of the Governor 2013), to 1) develop appropriate conservation objectives; (2) defined a framework for evaluating situations where Greater Sage-Grouse conservation objectives are not being achieved on federal land, to determine if a causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and 3) identify appropriate site-specific actions to achieve Greater Sage-Grouse conservation objectives within the framework.	The BLM will collaborate with appropriate federal agencies, and the State of Wyoming as contemplated under EO 2013–3 (Wyoming Office of the Governor 2013), to 1) develop appropriate conservation objectives; (2) defined a framework for evaluating situations where Greater Sage-Grouse conservation objectives are not being achieved on federal land, to determine if a causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and 3) identify appropriate site-specific actions to achieve Greater Sage-Grouse conservation objectives within the framework.	
*MD 6130: Utilize a rangeland health assessment, resource monitoring, or analysis to determine if livestock grazing adjustments in amounts, kinds, or season are necessary. The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMAs will include specific management thresholds based on Greater Sage-Grouse Habitat Objectives Table (Table 2.7, "Greater Sage-Grouse Seasonal Habitat Objectives" (p. 21)) and Land Health Standards (43 CFR 4180.2) and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. Greater Sage-Grouse Habitat Objectives Habitat Objectives Table (Table 2.7, "Greater Sage-Grouse Seasonal Habitat Objectives" (p. 21)), Land Health Standards (43 CFR 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to	Utilize a rangeland health assessment, resource monitoring, or analysis to determine if livestock grazing adjustments in amounts, kinds, or season are necessary. Within PHMA, if monitoring data show the wildlife/special status species standard has not been met nor progress being made toward meeting that standard, there would be an evaluation and a determination made as to the cause. If it is determined that the current authorized livestock use is a significant causal factor in failing to achieve the wildlife/special status species standard~~s,~~ the BLM would address the achievement or progress toward achieving the LHSs (43 CFR 4180.2) and, if needed, Greater Sage-Grouse habitat maintenance or improvement. When NEPA analysis is required for a specific implementation action, one alternative would include mechanisms to make adjustments to meet or make progress toward meeting the wildlife/special status species standard. The analysis should also	Completely revised – revised by rangewide

2015 Approved RMP	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment
livestock grazing that have already been subjected to NEPA analysis.	identify the BLM-approved data collection methodologies used for monitoring conditions and determining when adjustments are necessary. If current grazing management meets land health standards and provides for Greater Sage-Grouse habitat, there would be no need to analyze an alternative for Greater Sage-Grouse. Authorized uses in PHMA that incorporate habitat objectives for Greater Sage-Grouse must develop desired conditions based on Greater Sage-Grouse habitats present in the allotment and the ecological potential of sites that supports these habitats. Metrics used to monitor for objectives must be developed and inform the wildlife/SSS portion of the Standards for Healthy Rangelands. Within PHMA, seasonal habitat objectives for Greater Sage-Grouse apply only to those habitats delineated within an allotment during the specific season (e.g., breeding season objectives during breeding season). Data needed to inform the relationship between the authorized use and habitat condition would come from sample locations that appropriately reflect the impact of the authorized use on habitat conditions. Data points should fall within Greater Sage-Grouse seasonal habitat areas and be collected on ecological sites that have the potential to produce Greater Sage-Grouse habitat.	
MD 6142: Allotments within PHMAs, focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.	No changes made.	No change (same as 2015)

2.18.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 plans have management direction that would change by the Proposed RMP Amendment. If 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The 2015 Appendices can be found on the Bighorn Basin RMP ePlanning website. The 2019 Appendices can be found on the Wyoming GRSG ePlanning website.

ARMPA Appendix Name	Year	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Maps	2015	Completely Revised-revised by rangewide
A: Approved RMP Amendment with Management Goals, Objectives, and Decisions	2019	Partially Revised based on changes in Proposed RMP Amendment
B: Oil and Gas Lease Notices and Lease Stipulations; including Exception, Modification, and Waiver Criteria	2015	Partially Revised- Applies rangewide exceptions, modifications, and waivers
C: Required Design Features and Best Management Practices	2015, 2019	Partial change – no change (same as 2019) except the addition of livestock grazing BMPs
D: Greater Sage-Grouse Habitat Management Strategy	2015	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
C: Greater Sage-Grouse Habitat Management Strategy	2019	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
F: Wyoming Bureau of Land Management Mitigation Guidelines for Surface-Disturbing and Disruptive Activities	2015	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
G: Federal Oil and Gas Operations on Split-Estate Lands	2015	No change (same as 2015)
H: Monitoring and Evaluation	2015	Partially revised – revised by adding rangewide GRSG monitoring language
I: Land Disposal and Acquisition	2015	No change (same as 2015)
J: Recreation Management	2015	No change (same as 2015)
L: Implementation	2015	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
M: Bighorn Basin Air Resource Management Plan	2015	No change (same as 2015)
N: Seasonal Raptor Stipulations for All Surface-Disturbing and Disruptive Activities	2015	No change (same as 2015)
O: Livestock Grazing	2015	No change (same as 2015)
No similar existing appendix		Addition of rangewide predator management as new appendix

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Appendix 2.19
Lander, Wyoming RMP Revisions

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2.19 LANDER, WYOMING RMP REVISIONS

This appendix presents the approved RMP revision language from the record of decision for the Lander RMP that relate to GRSG management, and changes that were made in the 2019 GRSG amendment effort. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment (RMPA), either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMPA include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable RMP appendices that are listed in **Section 2.19.2** of this appendix. For the additional state-specific Wyoming management direction for the Proposed RMPA, see Chapter 2, Table 2-13.

2.19.1 Lander RMP (Wyoming)

Table 1. Summary of Goals, Objectives, and Management Actions to the Lander RMP

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan (no change, partial revision, complete revision, new direction)
Land Use Plan Revisions/Amendments to the Lander RMP		
**MD 1015: Implement BLM National and Wyoming Reclamation Policies requiring the development of reclamation plans for all federal actions authorized, conducted, or funded by the BLM that disturb vegetation and/or the mineral/soil resources. Require that site-specific interim and final reclamation practices be developed and implemented that will meet the reclamation standards as identified in Appendix B (p. 185). The type and detail of the reclamation plan will be commensurate with the extent and duration of soil disturbance. For extensive disturbance such as a full-field oil and gas development, a detailed, multi-phase plan such as the Continental Divide Creston oil and gas project reclamation plan (attached as Appendix G to the Proposed RMP and Final EIS as an example) will be required.	No changes made.	Partially revised – to update Appendices referenced

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
**MD 1016: Require a full reclamation bond specific to the site for all new disturbances in accordance with 43 CFR 3104.2, 3104.3, and 3104.5 or current policy. Ensure bonds are sufficient for costs relative to reclamation (Connelly et al. 2000; Hagen et al. 2007) that would result in restoration of disturbed lands in accordance with the final reclamation standards and objectives identified in Appendix B (p. 185). Base the reclamation costs on the assumption that contractors for the BLM will perform the work.	No changes made.	Partially revised – to update Appendix referenced
MD 1017: Require that surface-disturbing activities minimize the surface disturbance footprint to the maximum extent possible to limit the areas requiring reclamation. Limit disturbance of desirable vegetative communities established during interim reclamation when implementing final reclamation.	No changes made.	No change (same as 2014)
MD 1018: Require that all reclamation plans identify the desired plant community for final reclamation.	No changes made.	No change (same as 2014)
MD 1019: Consider wildlife habitat objectives in all final reclamation objectives. In Core Area, final reclamation objectives will be to restore greater sage-grouse habitat. Include metrics to ensure that restoration goals are met.	No changes made.	No change (same as 2014)
MD 1020: Require site stabilization and sediment control in compliance with Wyoming Stormwater Discharge requirements and BLM reclamation policies.	No changes made.	No change (same as 2014)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
**MD 1021: Require that during and following reclamation activities, the land user is responsible for monitoring to help ensure interim and final reclamation success as defined in reclamation policies and with the standards identified in Appendix B (p. 185) is achieved. Require follow-up seeding and/or other corrective or remedial erosion-control measures on areas of surface disturbance, as appropriate and, if necessary, protecting the reclaimed landscape until reclamation standards have been achieved. Monitoring and follow-up reclamation practices will continue on interim and final reclaimed areas until the standards identified in Appendix B (p. 185) have been successfully achieved.	No changes made.	Partially revised – to update Appendix referenced
MD 1022: Identify areas with soil disturbance that were not successfully reclaimed. Priorities for reclamation of these areas are determined on a case-by-case basis with an emphasis on greater sage-grouse Core Area and other important wildlife habitat. Develop partnerships and funding sources to implement reclamation where no responsible party has the reclamation obligation.	No changes made.	No change (same as 2014)
**MD 1023: Adapt reclamation methods to specific requirements based on plant communities within ecological sites and site-specific objectives. Incorporate reclamation objectives and require reclamation plans, including reclamation standards as identified in Appendix B (p. 185) on a site-specific basis.	No changes made.	Partially revised – to update Appendix referenced
MD 1024: Utilize management practices, including phased development and BMPs, to achieve reclamation success. Require Reclamation Objectives and Standards as identified in all reclamation plans.	No changes made.	No change (same as 2014)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
**MD 1025: Reclamation management practices will select native plant species based on site characteristics and ecological site descriptions. Reclamation success will be determined based on the criteria and standards identified in Appendix B (p. 185).	No changes made.	Partially revised – to update Appendix referenced
MD 2001: Do not lease coal or oil shale-tar sands.	No changes made.	No change (same as 2014)
MD 2002: Incorporate proponent committed or BLM Required Design Features or mitigation such as BMPs as Conditions of Approval for any authorized mineral activity for federal minerals, regardless of surface ownership.	No changes made.	No change (same as 2014)
2003 (MR: 1.3): In project-level EISs and EAs, require, on a case-by-case basis, the development of a wildlife resource monitoring and mitigation plan to address potential impacts from mineral development on wildlife populations and/or habitat.	Action was removed in 2019.	Completely revised-revised by addition of rangewide GRSG monitoring and mitigation language.
MD 2004: Recommend for withdrawal from locatable mineral entry (Map 9) approximately 467,065 acres. (In addition, approximately 8,634 acres are withdrawn in pre-FLPMA actions that do not expire.) See decisions under resource programs such as wildlife, cultural, and recreation for specific details of acres recommended for withdrawals. A total of approximately 2,333,402 acres are open to locatable mineral entry (Map 9).	No changes made.	Partially revised – to update Map referenced
2005 (MR:1.3): 1,411,095 acres of federal mineral estate are open to geothermal leasing with moderate constraints (Map 10). 603,633 acres of federal mineral estate are open to geothermal leasing with major constraints (Map 10). 714,545 acres of federal mineral estate are closed to geothermal leasing (Map 10).	Action was removed in 2019.	No change (same as 2019)
2006 (MR:1.3): Constraints applied for oil and gas leasing also apply to geothermal leasing.	Action was removed in 2019.	No change (same as 2019)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 2008: Approximately 67,511 acres of federal mineral estate are open to oil and gas leasing subject only to standard lease stipulations (Map 11). Approximately 1,423,264 acres of federal mineral estate are open to oil and gas leasing subject to controlled surface use and/or timing limitation stipulations (Map 11 and Appendix I (p. 255)). Approximately 1,146,630 acres of federal mineral estate are open to oil and gas leasing subject to NSO stipulations (Map 11 and Appendix I (p. 255)). Approximately 172,071 acres of federal mineral estate are closed to oil and gas leasing (Map 11).	Approximately 80,198 acres of federal mineral estate are open to oil and gas leasing subject only to standard lease stipulations (Map 11). Approximately 1,419,568 acres of federal mineral estate are open to oil and gas leasing subject to controlled surface use and/or timing limitation stipulations (Map 11 and Appendix I (p. 255)). Approximately 1,137,666 acres of federal mineral estate are open to oil and gas leasing subject to NSO stipulations (Map 11 and Appendix I (p. 255)). Approximately 171,669 acres of federal mineral estate are closed to oil and gas leasing (Map 11).	Completely revised – revised by rangewide and state-specific
MD 2009: All oil and gas and other mineral leases are subject to standard lease stipulations. Additional stipulations may apply as otherwise specified in this RMP. In areas that are closed to mineral leasing, do not re-offer existing leases when they expire. If drainage occurs in an area closed to oil and gas leasing, authorize leasing on a case-by-case basis with an NSO stipulation.	No changes made.	No change (same as 2014)
MD 2010: For proposed actions in greater sage-grouse Core Area, determine whether a categorical exclusion is applicable and if so, closely examine the extraordinary circumstances, if applicable, to determine whether one or more exists that would require preparation of a NEPA analysis. If a categorical exclusion applies, and no extraordinary circumstances exist, determine whether preparing a NEPA analysis would help inform decision making.	No changes made.	No change (same as 2014)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 2011: Require unitization when deemed necessary for proper development and operation of an area or to facilitate more orderly (e.g., phased and/or clustered) development as a means of minimizing adverse impacts to resources, including greater sage-grouse, so long as the unitization plan adequately protects the rights of all parties, including the United States.	No changes made.	No change (same as 2014)
MD 2012: Disposal of produced water is authorized in accordance with Onshore Oil and Gas Order #7, Disposal of Produced Water, and in compliance with state regulations. If there is Wyoming Pollutant Discharge Elimination System permitted discharge, consider soil erosion, degradation of soil quality, sedimentation, and other factors in coordination with the State of Wyoming.	No changes made.	No change (same as 2014)
MD 2013: The planning area is open to geophysical exploration except for lands identified as closed to mineral leasing or NSO to oil and gas leasing or as otherwise provided in other decisions. Geophysical exploration is subject to motorized travel limitations and restrictions on surface-disturbing and disruptive activities.	No changes made.	No change (same as 2014)
MD 2017: Approximately 1,955,798 acres are open for mineral material disposal on a demand basis (Map 12) subject to resource protections. 853,303 acres are closed to mineral material disposal (Map 12).	Action was removed in 2019.	Completely revised – revised by rangewide and state-specific GRSG additions

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 2018: Identify areas disturbed by expired mineral material sales, including free-use permits and community use pits. Prioritize reclamation of these sites, starting with those in greater sage-grouse Core Area where restoration as long-term greater sage-grouse habitat is possible. Next in priority are those in riparian-wetland areas, ACECs, the National Trails Management Corridor, VRM Class II areas, non-Core Area greater sage-grouse habitat, and wildlife migration corridors. Seek partnerships with others to complete restoration, including applicants seeking suitable offsite mitigation opportunities.	Action was removed in 2019.	No change (same as 2019)
FM: 2: Manage fire and fuels to restore or maintain natural ecosystem functions, restore fire-adapted ecosystems, reduce losses from landscape-level wildland fire, and protect multiple-use values.	Action was removed in 2019.	No change (same as 2019)
FM 2.6: Utilize fuels and vegetation treatments to maintain and enhance greater sage-grouse habitat where applicable.	Action was removed in 2019.	No change (same as 2019)
MD 3004: In greater sage-grouse Core Area, prioritize suppression to conserve the habitat. Where applicable and technically feasible, apply greater sage-grouse BMPs such as those identified in Appendix E (p. 215).	No changes made.	Partially revised – to update Appendix referenced
MD 3007: Use chemical, biological, and mechanical treatments to reduce the risk of landscape-level wildfire within priority areas. Alter fuel loading and improve ecological condition of vegetation communities. Consider the presence and potential for noxious and nonnative plant species when designing wildland fire response and fuels treatments.	No changes made.	No change (same as 2014)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 3008: Use personal use and commercial vegetation sale permits, where not otherwise constrained or prohibited (as identified in Records 4012, 6139, and 7045), for removal of firewood, post and pole, Christmas trees, sawlogs, and wildlings, for hazardous fuels management.	Use personal use and commercial vegetation sale permits, where not otherwise constrained or prohibited, for removal of firewood, post and pole, Christmas trees, sawlogs, and wildlings, for hazardous fuels management.	No change (same as 2019)
MD 3009: Monitor fuels treatment and wildfire burn areas for sufficient time after treatment or fire event in order to determine short-term and long-term project success, detect weed infestations and accelerated soil erosion, and assess overall vegetation recovery. Utilize all available rehabilitation tools to control weed infestation and accelerated soil erosion. Implement post-treatment rest of treated areas from livestock grazing for two full growing seasons on all prescribed or wildland fire burn areas unless vegetation recovery dictates otherwise.	No changes made.	No change (same as 2014)
MD 3010: Partner with the University of Wyoming and other research entities to develop a greater understanding of the ecology and disturbance regime of sagebrush steppe, woodland, and forested vegetation communities found within the planning area. Use this information to develop a regionally specific scientific foundation for vegetation management activities.	No changes made.	No change (same as 2014)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 3011: Inventory the Fire Regime Condition Class (Map 14) of the vegetative communities found within the fire management units (Map 15). In coordination with stakeholders and in consideration of greater sage-grouse Core Area objectives, prioritize areas requiring treatment and utilize appropriate vegetation treatment techniques to improve the condition class across a landscape. Prioritize those projects in areas with the greatest benefits to wildlife and the highest likelihood of landscape-level wildfire.	No changes made.	Partially revised – to update Maps referenced
MD 3012: Allow vegetation treatments in greater sage-grouse Core Area that conserve, enhance, or restore greater sage-grouse habitat excluding the use of prescribed fire unless specifically for the purpose of greater sage-grouse habitat improvement (this includes treatments that benefit livestock as part of an allotment management plan/conservation plan to improve greater sage-grouse habitat). In suitable habitat within greater sage-grouse Core Area, incorporate specific greater sage-grouse habitat objectives and apply appropriate seasonal restrictions for implementing vegetation management treatments. In identified greater sage-grouse winter concentration areas, vegetation treatments should emphasize strategically reducing wildfire risk around or in the winter concentration areas and maintaining winter concentration habitat quality. Prioritize restoration treatments in areas that are thought to limit greater sage-grouse distribution and/or abundance. Focus vegetation treatments outward from existing, intact greater sage-grouse habitat. Utilize BMPs, such as those in Appendix E (p. 215) and other current habitat management guidelines, when designing and implementing the project.	No changes made.	Partially revised – to update Appendix referenced

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 3013: In suitable greater sage-grouse Core Area, do not reduce sagebrush canopy cover to less than 15 percent within a defined treatment polygon unless a vegetation management objective requires additional reduction in sagebrush cover to protect or to conserve habitat quality for greater sage-grouse or other sagebrush steppe obligate species. Maintain sagebrush and understory diversity (relative to ecological site description) unless such removal is necessary to achieve greater sage-grouse habitat management objectives. Remove conifers or reduce the density of conifers that have encroached into sagebrush plant communities.	No changes made.	No change (same as 2014)
MD 3014: Outside of greater sage-grouse Core Area, emphasize the reintroduction of fire into its natural role in the ecosystem in consideration of Decision Record 3016. Where possible, use wildland fire and prescribed fire to achieve management objectives, including reducing hazardous fuel loading, restoring vegetation communities, improving and/or protecting wildlife habitat, enhancing forage production, and addressing forest and woodland health issues such as pine beetle outbreaks.	Action was removed in 2019.	No change (same as 2019)
MD 3015: Cooperate with stakeholders to conduct landscape level treatments resulting in enhanced fuels management and/or restoration of fire-adapted ecosystems. In cooperation with stakeholders, manage to promote the growth and persistence of native shrubs, grasses, and forbs.	No changes made.	No change (same as 2014)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 3016: Limit the use of fire to treat areas receiving less than 12 inches of annual precipitation. Prescribed fire to reduce hazardous fuels or enhance land health in areas receiving less than 12 inches of annual precipitation could be utilized after exploring other potential treatment methods and in areas where the relative resistance and relative recovery rate of the site allows for the successful post-fire reestablishment of desired native vegetation.	No changes made.	No change (same as 2014)
MD 3017: Utilizing Required Design Features and BMPs applied as Conditions of Approval, establish fuels treatment projects at strategic locations to minimize the size of wildfires. Restore native or desirable plants and create landscape patterns to benefit wildlife. Power wash all fire vehicles including engines, water tenders, personnel vehicles, and OHVs after they have been in the field to help prevent the establishment or spread of invasive weeds.	No changes made.	No change (same as 2014)
MD 4015: Identify unique plant communities and manage to protect, preserve, or enhance these communities.	No changes made.	No change (same as 2014)
MD 4016: Manage vegetation communities for vegetative attributes described in NRCS Ecological Site Guides and to meet identified vegetative goals. When existing Ecological Site Descriptions have not been developed, are too general, or are not correct to serve adequately as benchmarks, identify and document local areas of similar potential within each specific ecological site that exemplify achievement of appropriate habitat objectives, and use these sites for the development of new reference sheets to be used as the benchmark reference.	No changes made.	No change (same as 2014)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 4017: Use vegetation treatments to change plant community composition in a manner that achieves wildlife objectives, rangeland health objectives, and facilitates grazing management. Ensure that projects conform to resource objectives for the site.	No changes made.	No change (same as 2014)
MG BR:3: Manage for healthy native plant communities by reducing, preventing expansion of, or eliminating the occurrence of invasive nonnative species, undesirable vegetation, or noxious weeds, and predatory plant pests or disease by implementing decisions consistent with goals included in Partners Against Weeds and consistent with state and local weed management plans.	No changes made.	No change (same as 2014)
MO BR:3.1: Maintain adequate baseline information, and inventory and monitoring data, regarding the extent and control of invasive species. Evaluate effectiveness of decisions, and assess progress toward goals to improve invasive species management. Develop a prevention and early detection program.	No changes made.	No change (same as 2014)
MO BR:3.2: Coordinate with adjoining jurisdictions in management and control of invasive nonnative species across jurisdictional and political boundaries.	No changes made.	No change (same as 2014)
MO BR:3.3: Include provisions for invasive nonnative species management in all BLM-funded or authorized actions.	No changes made.	No change (same as 2014)
MG BR:4: Support internal and external education and awareness of noxious weeds.	No changes made.	No change (same as 2014)
MO BR:4.1: Develop and deploy educational and public awareness programs and materials in cooperation with other agencies and organizations.	No changes made.	No change (same as 2014)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MG BR:5: In all parts of the planning area, manage for the reduction, prevention, and halting the expansion of cheatgrass. Emphasize the prevention of invasive annual grass and woody plants in greater sage-grouse Core Area.	No changes made.	No change (same as 2014)
MD 4020: Manage weed treatments to maintain and improve greater sage-grouse habitat. Apply Required Design Features and BMPs as Conditions of Approval, such as those in Appendix E (p. 215).	No changes made.	Partially revised – to update Appendix referenced
MD 4021: Require the use of certified noxious-weed free forage, mulch, and other land-applied products for BLM-authorized activities on BLM-administered lands.	No changes made.	No change (same as 2014)
MD 4022: Should invasive nonnative species become established in a location, develop and implement site-specific plans to eradicate/control invasive weeds for all surface-disturbing activities in the immediate vicinity. Priority for control will be: (1) Wyoming Declared Weed and Pest Species, (2) those weeds on the Western States Combined Declared Noxious Weed List, (3) those annual/biennial invasive weeds interfering with reclamation efforts, and (4) those invasive nonnative species interfering with a management objective.	No changes made.	No change (same as 2014)
MD 4023: Require that equipment and vehicles used for BLM-authorized activities be cleaned for seeds of noxious weeds and invasive nonnative species before moving onto BLM-administered lands. Prohibit project vehicles accessing BLM-administered lands via cross-county travel from driving through infestations during access to the site. If the area on which BLM-authorized activities take place is identified as being a high risk for invasive and/or noxious weeds, require that vehicles be cleaned before leaving the worksite and include prescriptions for the disposal of wash water.	No changes made.	No change (same as 2014)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 4024: Develop a plan to manage cheatgrass in coordination with other agencies and individuals, with the local County Weed & Pest Control Districts acting as the point of contact among all parties.	No changes made.	No change (same as 2014)
MD 4025: If the Authorized Officer determines that BLM-authorized activities are contributing to the spread of noxious or invasive species, adjust the terms of the authorized activity to aid in the control of the species.	No changes made.	No change (same as 2014)
MD 4026: If the Authorized Officer determines that livestock are likely carrying ingested seeds of invasive nonnative species, the Authorized Officer may require that livestock be flushed for weeds for a period of 72 hours before allowing livestock to move onto BLM-administered lands.	No changes made.	No change (same as 2014)
MD 4027: Develop and implement a program promoting public awareness of Wyoming Declared Noxious Weeds and Pests as well as invasive nonnative species.	No changes made.	No change (same as 2014)
MD 4028: Identify riparian-wetland management actions to promote biodiversity and develop an implementation plan to incorporate actions into BLM-authorized activities. Manage riparian-wetland areas and wet meadows to achieve or maintain diverse species richness that includes a component of perennial forbs in conjunction with desirable riparian sedges, rushes, bulrushes, and grasses, as appropriate.	No changes made.	No change (same as 2014)
MD 4029: Implement management actions to have riparian-wetland areas meet or exceed proper functioning conditions and Standard 2 of the Wyoming Standards for Healthy Rangelands.	No changes made.	No change (same as 2014)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 4035: Use an integrated management approach (mechanical, chemical, or biological treatments, prescribed fire, and grazing management techniques) to manipulate vegetative communities to achieve fish, wildlife, and watershed objectives. See the *Special Status Species* section for limitations on the use of prescribed fire in greater sage-grouse habitat.	Action was removed in 2019.	No change (same as 2019)
MD 4041: The Dubois, Red Canyon, Lander Slope, and Green Mountain ACECs, greater sage-grouse Core Area, and the Sweetwater River watershed are priorities for management of fish and wildlife and their habitat. See the *Areas of Critical Environmental Concern* section for ACEC decisions. See the *Special Status Species – Wildlife* section for greater sage-grouse management.	Action was removed in 2019.	No change (same as 2019)
MD 4051: Avoid the movement of water from one 4th level hydrologic unit code drainage to another 4th level hydrologic unit code drainage to prevent aquatic invasive species and disease transfer.	No changes made.	No change (same as 2014)
**MD 4056: Outside of DDAs, wildlife seasonal protections for surface-disturbing and disruptive activities apply to maintenance and operations actions when the activity is determined to be detrimental to wildlife (see Appendix F (p. 229)). Reclamation of surface disturbance will be in accordance with Appendix B (p. 185) for non-DDAs.	No changes made.	Partially revised – to update Appendices referenced
MD 4059: On a case-by-case basis, close and reclaim redundant roads to reduce road density and habitat fragmentation in coordination with adjacent landowners and/or state and county governments.	No changes made.	No change (same as 2014)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 4060: Manage wind-energy development on a case-by-case basis and in consideration of the resource values in big game crucial winter range, migration corridors, and parturition areas, raptor concentration areas, and other areas with wildlife values. Wind-energy management in greater sage-grouse Core Area is found in the *Special Status Species – Wildlife* section.	Action was removed in 2019.	No change (same as 2019), except Wind-energy management in GRSG habitat is completely revised through addition of rangewide and state-specific GRSG language.
MD 4067: On a case-by-case basis, manage vegetation in identified crucial winter range and parturition areas to benefit the identified species (Maps 18-22).	No changes made.	Partially revised – to update Maps referenced
MD 4069: Avoid authorizing road development in big game crucial winter range and parturition areas.	No changes made.	No change (same as 2014)
MG BR:13: Maintain and/or increase greater sage-grouse abundance and distribution by conserving, enhancing, or restoring the sagebrush ecosystem upon which populations depend, in cooperation with other conservation partners. Sustain the integrity of the sagebrush biome to provide the amount, continuity, and quality of habitat that is necessary to maintain sustainable populations of greater sage-grouse and other species by achieving the objectives below.	No changes made.	Completely revised – revised by rangewide
MO BR:13.1: Maintain large patches of high-quality sagebrush habitats with emphasis on patches occupied by greater sage-grouse.	No changes made.	No change (same as 2014), except addition of rangewide GRSG habitat objectives
MO BR:13.2: Maintain connections between sagebrush habitats, with emphasis on connections between habitats occupied by greater sage-grouse.	No changes made.	No change (same as 2014)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 4072: Develop and implement protective measures for federally listed species in coordination with the USFWS. For proposed actions in greater sage-grouse Core Areas, determine whether a categorical exclusion is applicable and if so, closely examine the extraordinary circumstances, if applicable, to determine whether one or more exists that would require preparation of a NEPA analysis. If a categorical exclusion applies, and no extraordinary circumstances exist, determine whether preparing a NEPA analysis would help inform decision making. Continue to take action in cooperation with the USFWS to facilitate the recovery of threatened and endangered plant species that occur on BLM-administered land.	Action was removed in 2019.	No change (same as 2019)
MD 4074: Coordinate with agencies, including state and local governments, in the restoration, reintroduction, augmentation, or reestablishment of threatened, endangered, and other special status species populations and/or habitats.	No changes made.	No change (same as 2014)
MD 4076: Develop site-specific measures for BLM-authorized activities to protect threatened, endangered, and sensitive species. Reduce the footprint of development and facilities to the smallest practical to protect special status species and their habitat. Incorporate Required Design Features and BMPs such as those identified in Appendix E (p. 215) as Conditions of Approval as appropriate for authorized activities to address adverse impacts to special status species.	Develop site-specific measures for BLM-authorized activities to protect threatened, endangered, and sensitive species. Reduce the footprint of development and facilities to the smallest practical to protect special status species and their habitat. Incorporate Required Design Features and BMPs such as those identified in Appendix E (p. 215) as conditions of approval as appropriate for authorized activities to address adverse impacts to special status species. Conditions of approval are called stipulations or terms and conditions in some programs.	Partially revised – to update Appendix referenced
MD 4079: On a case-by-case basis, require surveys for BLM sensitive species as part of authorizing actions. Require protective actions when appropriate.	No changes made.	No change (same as 2014)

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MD 4080: Establish limits of acceptable cumulative habitat loss, including habitat modification, fragmentation, and loss of function, for special status species on a case-by-case basis. Limits of habitat loss and fragmentation for greater sage-grouse in Core Area are addressed in Decision Record 4109.	No changes made.	Partially revised – to update reference to GRSG habitat loss thresholds (surface disturbance caps; adaptive management)
MD 4096: Manage travel corridors for threatened and endangered species and BLM sensitive species on a case-by-case basis (Map 25). (Note: Only Canada lynx analysis units have been identified to date.) Manage permitted activities within travel corridors to avoid adverse impacts to sensitive species.	No changes made.	Partially revised – to update Map referenced
MD 4097: To protect the concentration of special status species and their habitats, mineral and ROW actions in the Dubois area not within a WSA or an ACEC are managed as follows: • Closed to oil and gas leasing • Closed to geophysical exploration • Closed to phosphate leasing • Open to locatable minerals • Closed to mineral material disposals unless entirely contained within the 120 acres located in T41N, R107W, Sec. 1 N½SE¼ • Excluded to major ROWs • Avoided for minor ROWs	No changes made.	No change (same as 2014)
**MD 4098: Maintain sagebrush and understory diversity (relative to ecological site description) in seasonal greater sage-grouse and other sagebrush-obligate species habitats unless plant removal is necessary to achieve habitat management objectives. Vegetation treatments for greater sage-grouse would follow the "Wyoming Game and Fish Department Protocols for Treating Sagebrush to be Consistent with Wyoming Executive Order 2011-5; Greater Sage-Grouse Core Area Protection" (WGFD 2011) or the most current version or science available.	Maintain sagebrush and understory diversity (relative to ecological site description) in seasonal Greater Sage-Grouse and other sagebrush-obligate species habitats unless plant removal is necessary to achieve habitat management objectives. Vegetation treatments for Greater Sage-Grouse would follow the "Wyoming Game and Fish Department Protocols for Treating Sagebrush to be Consistent with Wyoming Executive Order 2015-4; Greater Sage-Grouse Core Area Protection" (WGFD 2015) or the most current version or science available.	Partially revised – to update EO referenced and update version of WGFD Protocols for Treating Sagebrush document referenced and addition of rangewide GRSG habitat objective language and appendix

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MD 4099: To minimize adverse impacts to greater sage-grouse from allowable uses, utilize recommendations and guidance from the following sources: • Grazing Influence, Management, and Objective Development in Wyoming's Greater Sage-Grouse Habitat-With Emphasis on Nesting and Early Brood Rearing • Sage-Grouse Habitat Management Guidelines for Wyoming • Studies in Avian Biology article "Ecology and Conservation of Greater Sage-Grouse: A Landscape Species and Its Habitats" • Western Association of Fish and Wildlife Agencies Greater Sage-Grouse Conservation Strategy • Conservation Objectives Team Report • National Technical Team Report Utilize additional information as it becomes available.	No changes made.	Partially revised – revised to add rangewide GRSG habitat objectives, disturbance cap language, allocations for PHMA and GHMA, mitigation, and adaptive management language.
MD 4100: Maintain seeps, springs, wet meadows, and riparian vegetation in a functional and diverse condition for young greater sage-grouse and other species that depend on forbs and insects associated with these areas. Restore non-functioning riparian systems by repairing abnormally incised drainages to raise water tables and increase water storage and brood-rearing habitats within greater sage-grouse habitat.	No changes made.	No change (same as 2014)
MD 4101: Discourage the use of broad-spectrum insecticides where insect control is required. Target pest control toward key problem areas and schedule applications to be the smallest amount effective in greater sage-grouse brood-rearing areas.	No changes made.	No change (same as 2014)
MD 4102: Establish forage utilization levels in greater sage-grouse nesting habitat to ensure adequate cover remains.	No changes made.	Completely revised – revised by rangewide and state-specific

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 4103: Except as otherwise provided in this RMP, greater sage-grouse Core Area is open to oil and gas and geothermal leasing, subject to standard stipulations for the protection of greater sage-grouse and other resources as described elsewhere in this RMP.	No changes made.	Completely revised – revised by rangewide and state-specific
**MD 4104: Prohibit surface-disturbing or surface occupancy on or within a 0.6-mile radius of the perimeter of occupied greater sage-grouse leks in Core Area and on or within a 0.25-mile radius of the perimeter of occupied greater sage-grouse leks outside Core Area (Map 24). In Core Area, keep any new roads or road upgrades 1.9 miles from the perimeter of the lek.	Prohibit surface-disturbing **activities** or surface occupancy on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) in Core Area and on or within a 0.25-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) outside Core Area (Map 24). In Core Area, keep any new roads or road upgrades 1.9 miles from the perimeter of the lek (or lek center if no perimeter is yet mapped). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see also MD 4134).	Partially revised (2019) – to update map referenced, update EO referenced, and reference Fluid Mineral Appendix (updated to reflect rangewide and state-specific changes in waivers, exceptions, and modifications)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
**MD 4105: Prohibit surface-disturbing activities and/or disruptive activities from March 15 to June 30 in Core Area. Outside of Core Area, prohibit surface-disturbing and/or disruptive activities from March 15 to June 30 within 2 miles of the perimeter of occupied leks (Map 24). Where credible data support different timeframes for these seasonal restrictions, dates may be expanded 14 days prior to or subsequent to the above dates.	Prohibit surface-disturbing and/or disruptive activities from March 15 to June 30 in Core Area. Outside of Core Area, prohibit surface-disturbing and/or disruptive activities from March 15 to June 30 within 2 miles of the perimeter of occupied leks (or lek center if no perimeter is yet mapped) (Map 24). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site- specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see also MD 4134). Where credible data support different timeframes for these seasonal restrictions, dates may be expanded 14 days prior to or subsequent to the above dates.	Partially revised (2019) – to update map referenced, update EO referenced, and reference Fluid Mineral Appendix (updated to reflect rangewide and state-specific changes in waivers, exceptions, and modifications)
**MD 4106: Consistent with the BLM's regulatory authority over locatable mineral exploration and development, prohibit surface disturbance or disruptive activities from notice-level activity under 43 CFR 3809.320 in Core Area during the period March 15 to June 30.	Consistent with the BLM's regulatory authority over locatable mineral exploration and development, prohibit surface disturbance or disruptive activities from notice-level activity under 43 CFR 3809.320 in Core Area during the period March 15 to June 30. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see also MD 4134).	Partially revised (2019) – to update EO referenced

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**MD 4107: Prohibit disruptive activities between 6 p.m. and 8 a.m. from March 1 to May 15 on or within a 0.6-mile radius of the perimeter of occupied greater sage-grouse leks in Core Area (Map 24).	Prohibit disruptive activities between 6 p.m. and 8 a.m. from March 1 to May 15 on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) in Core Area (Map 24). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see also MD 4134).	Partially revised (2019) – to update map referenced, update EO referenced, and reference Fluid Mineral Appendix (updated to reflect rangewide and state-specific changes in waivers, exceptions, and modifications)
**MD 4108: Prohibit surface-disturbing and disruptive activities in greater sage-grouse winter concentration areas, as they are identified, from December 1 to March 14 unless data indicate a date modification is necessary to better protect wintering greater sage-grouse.	Prohibit surface-disturbing and disruptive activities in Greater Sage-Grouse winter concentration areas, as they are identified, from December 1 to March 14 unless data indicate a date modification is necessary to better protect wintering Greater Sage-Grouse. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see also MD 4134). Protection of additional mapped winter concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas.	Partially revised (2019) – to update EO referenced, include SHMA, and to reference Fluid Mineral Appendix (updated to reflect rangewide and state-specific changes in waivers, exceptions, and modifications) for winter concentration areas in PHMA

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MD 4109: In greater sage-grouse Core Area, limit the density of disturbance of an activity (oil and gas or mining) to an average of one site per square mile (640 acres) within the DDCT. The one location and cumulative value of existing disturbances will not exceed 5 percent of suitable habitat of the DDCT area. Utilize the most current greater sage-grouse density disturbance process or other state and/or federal agreed-upon process for compliance evaluations.	No changes made.	Partially revised – density of disturbance (i.e., 1 per 640) revised to update Appendix referenced; Completely revised – surface disturbance (5%) revised by rangewide and state-specific
MD 4110: If in order to accommodate valid existing rights, the new disturbance for a ROW in greater sage-grouse Core Area coupled with existing disturbance would exceed 5 percent of suitable habitat within the DDCT area (see current guidance with respect to disturbance calculations), then additional effective mitigation is necessary to offset the resulting loss of greater sage-grouse habitat. Interim reclamation following construction of the ROW and final reclamation following the relinquishment of the ROW will ensure reestablishment of the predisturbance greater sage-grouse habitat, with the reclamation bond amount set in consideration of this reclamation obligation. These ROW authorizations will be subject to approval by the State Director.	No changes made.	Partially revised – to update surface disturbance threshold (HAF fine scale)

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MD 4111: In Core Area, major overhead powerlines will not be authorized unless co-located with an existing 115 kilovolt or greater powerline, as close as technically feasible, not to exceed 0.5 miles or within a designated corridor authorized for overhead powerlines. Distribution lines may be authorized when effectively mitigated to protect greater sage-grouse and the Authorized Officer determines that overhead installation is the action alternative with the fewest adverse impacts. Agricultural and residential lines will be considered to be adequately mitigated for greater sage-grouse if constructed at least 0.6 mile from the lek perimeter with appropriate timing constraints and installation of raptor deterrents. These ROW authorizations will be subject to approval by the State Director.	In Core Area, major overhead powerlines will not be authorized unless co-located with an existing 115 kilovolt or greater powerline, as close as technically feasible not to exceed 0.5 miles or within a designated corridor authorized for overhead powerlines. Distribution lines may be authorized when effectively mitigated to protect Greater Sage-Grouse and the Authorized Officer determines that overhead installation is the action alternative with the fewest adverse impacts. Agricultural and residential lines will be considered to be adequately mitigated for Greater Sage-Grouse if constructed at least 0.6 mile from the lek perimeter (or lek center if no perimeter is yet mapped) with appropriate timing constraints and installation of raptor deterrents. These ROW authorizations will be subject to approval by the State Director.	Completely revised – revised by rangewide
MD 4112: Until research on impacts of wind energy to greater sage-grouse is completed and adequate mitigation can be developed, exclude wind-energy development in Core Area.	No changes made.	Completely revised – revised by rangewide
MD 4113: Allow livestock water development projects in greater sage-grouse nesting habitat. Consistent with the intent of greater sage-grouse Core Area management, such projects will only be allowed if they will contribute to improved greater sage-grouse habitat, developments can be designed to be compatible with greater sage-grouse, and they are part of a comprehensive grazing strategy.	No changes made.	Completely revised – revised by rangewide

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MD 4114: The BLM will collaborate with appropriate federal agencies and the State of Wyoming, as contemplated under the Wyoming Governor's Executive Order 2013-3, to: 1) develop appropriate conservation objectives; 2) define a framework for evaluating situations where greater sage-grouse conservation objectives are not being achieved on federal land, to determine if a significant causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and greater sage-grouse conservation objectives; and 3) identify appropriate site-based actions to achieve greater sage-grouse conservation objectives within the framework.	No changes made.	Completely revised – revised by rangewide
MD 4115: In cooperation with stakeholders, design and locate fences, so as not to disturb important greater sage-grouse habitat areas. When fences are authorized, require a design that has the fewest adverse impacts to greater sage-grouse, including features to reduce greater sage-grouse strikes and mortality. Require the installation of fence markers on wire fences constructed in greater sage-grouse habitat to increase fence visibility and reduce collision potential. Remove, modify, or mark fences with high-risk for collision.	No changes made.	Completely revised – revised by rangewide
MD 4116: New permanent, high-profile structures within greater sage-grouse nesting habitat will be allowed on a case-by-case basis. Require the installation of anti-perching devices on appropriate structures to reduce predation opportunities.	No changes made.	No change (same as 2014)

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*MD 4117: Limit noise sources to 10 decibels above ambient noise measured at the perimeter of occupied greater sage-grouse leks from March 1 to May 15, unless scientific findings indicate a different noise level is appropriate. In addition, limit noise sources in other important greater sage-grouse habitats if research and/or policy indicate the need.	Within PHMA (core only), new project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek (or lek center if no perimeter is yet mapped) from 6:00 pm to 8:00 am during the breeding season (March 1–May 15). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD 4134). In coordination with the State of Wyoming, specific noise protocols for measurement and implementation will be developed as additional research and information emerges. These measures would be considered at the site-specific project level where and when appropriate.	Partially revised (2019) – to update EO referenced
MD 4118: To minimize raptor use, require anti-perching devices on new overhead powerlines in greater sage-grouse Core Area. Require anti-perching devices on new overhead powerlines and wind energy meteorological towers in prairie dog, mountain plover, and pygmy rabbit habitats on a case-by-case basis. Work with ROW holders to install anti-perching devices on existing powerlines in these habitats.	No changes made.	No change (same as 2014) for non-GRSG species. For GRSG, add rangewide GRSG predation language
MD 4119: Allow above ground low voltage utility lines or require burying lines in greater sage-grouse, prairie dog, mountain plover, and pygmy rabbit habitats on a case-by-case basis. Evaluate and take advantage of opportunities such as the renewal of existing ROWs to remove or modify existing powerlines, prioritizing greater sage-grouse Core Area.	No changes made.	Completely revised – revised by rangewide for ROWs in PHMA No change (same as 2014) for ROWs in SHMA and GHMA, and for resources other than GRSG

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MD 4120: In order to avoid surface-disturbing activities in Core Areas, priority will be given to development of oil and gas and other mineral resources outside of Core Areas, subject to applicable stipulations. When authorizing development of oil and gas and other mineral resources in core habitat, subject to applicable stipulations for the conservation of greater sage-grouse, priority will be given to development in non-habitat areas first and then in the least suitable habitat for greater sage-grouse.	No changes made.	Completely revised – revised by rangewide and state-specific
MD 4129: Update the Herd Area Management Plan as needed to meet herd health objectives, including Appropriate Management Levels, and to address impacts to other resources. Consider forage competition and evaluate overall utilization levels by all grazing animals, and incorporate greater sage-grouse habitat management objectives.	No changes made.	Completely revised – revised by rangewide (WHB)
No similar action.	*MD 4133: The BLM will update its Greater Sage-Grouse habitat management areas, including biologically significant units (BSUs), in conjunction with the State of Wyoming's core areas, upon issuance of any Wyoming Governor's Executive Order revising or amending the core area boundaries and upon completion of appropriate NEPA analysis and process. The BLM will complete the appropriate NEPA documentation (including appropriate public comment) prior to adopting any revised core area boundaries (e.g., maintenance action or plan amendment, environmental assessment, etc.).	Partially revised – to change reference from BSUs to HAF multi-scale areas.
No similar action.	*MD 4134: Specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Adopt the State of Wyoming's Greater Sage-Grouse Compensatory Mitigation Framework to the extent	Completely revised – revised by rangewide

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	consistent with federal law, regulations, and policy. In all Greater Sage-Grouse habitat, when authorizing third-party actions in designated Greater Sage-Grouse habitat, the BLM will seek to achieve the planning-level Greater Sage-Grouse management goals and objectives through implementation of mitigation and management actions, consistent with valid existing rights and applicable law. Under this Plan Amendment, management would be consistent with the Greater Sage-Grouse goals and objectives, and in conformance with BLM Manual 6840, Special Status Species Management. In accordance with BLM Manual 6840, the BLM will undertake planning decisions, actions and authorizations "to minimize or eliminate threats affecting the status of [Greater Sage-Grouse] or to improve the condition of [Greater Sage-Grouse] habitat" across the planning area. Accordingly, before authorizing third-party actions that result in habitat loss and degradation, the BLM will complete the following steps, in alignment with the Governor of Wyoming's Executive Order 2015-4 (July 29, 2015): 1. Work jointly with the WGFD to evaluate projects and recommend mitigation in the form of avoidance and minimization. 2. The WGFD will determine if the State requires or recommends any additional mitigation – including compensatory mitigation – under State regulations, policies, or programs related to the conservation of Greater Sage-Grouse. 3. Incorporate state required or recommended mitigation into the BLM's NEPA decision-making process, if the WGFD determines that compensatory mitigation is required to address impacts to	

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	GRSG habitat as a part of State policy or authorization, or if a proponent voluntarily offers mitigation. 4. Analyze whether the compensatory mitigation (deferring to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action): • achieves measurable outcomes for Greater Sage-Grouse habitat function on a landscape scale as determined by WGFD that are at least equal to the lost or degraded values in accordance with the Governor of Wyoming's Executive Order 2015-4. • provides benefits that are in place for at least the duration of the impacts. • accounts for a level of risk that the mitigation action may fail or not persist for the full duration of the impact. 5. Ensure mitigation outcomes are consistent with the State of Wyoming's mitigation strategy and principles outlined in 2019 Wyoming GrSG ARMPA Appendix C, The Greater Sage-Grouse Habitat Management Strategy. The BLM has determined that compensatory mitigation must be voluntary unless required by other applicable law and in recognition that State authorities may also require compensatory mitigation (IM 2019-018, *Compensatory Mitigation*, December 6, 2018). Therefore, consistent with valid existing rights and applicable law, when authorizing third-party actions that result in habitat loss and degradation, the BLM will consider voluntary compensatory mitigation actions only as a component of compliance	

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	with a State mitigation plan, program, or authority, or when offered voluntarily by a project proponent. Project-specific analysis will be necessary to determine how a compensatory mitigation proposal addresses impacts from a proposed action. The BLM will cooperate with the State to determine appropriate project design and alignment with State policies and requirements, including those regarding compensatory mitigation. When the BLM is considering compensatory mitigation as a component of the project proponent's submission or based on a mitigation requirement from the State, the BLM's NEPA analysis would evaluate the need to avoid or minimize impacts of the proposed project and achieve the goals and objectives of this RMPA. The BLM will defer to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action.	
MD 6001: Respond to specific proposals for land use authorizations on a case-by-case basis. Do not classify, open, or make available any BLM-administered lands for agricultural leasing or agricultural entry under either Desert Land Entry or Indian Allotment for one or more of the following reasons: unsuitable topography, presence of sensitive resources or resource conflicts, lack of water or access, small parcel size, or unsuitable soils.	No changes made.	No change (same as 2014)

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MD 6002: Identify lands for acquisition through exchange and/or purchase with a priority on meeting special management objectives such as greater sage-grouse Core Area, ACECs, and National Landscape Conservation System lands. Prioritize lands for acquisition that do not have split-estate unless in Core Area where greater sage-grouse management objectives would benefit greater sage-grouse conservation. Lands and/or interests in lands acquired, and former withdrawn lands relinquished would be managed in a manner consistent with adjacent or nearby BLM-administered land including surface and mineral estate management and pursuing withdrawals as appropriate, unless otherwise addressed through further land use planning actions. Subject to further NEPA analysis.	Action was removed in 2019.	No change (same as 2019)
MD 6003: Continue to administer lands leased under the Recreation and Public Purposes Act. Respond to requests for additional Recreation and Public Purposes Act leases.	No changes made.	No change (same as 2014)
MD 6005: No parcels within a National Landscape Conservation System unit, including the National Trails Management Corridor or an ACEC, or in greater sage-grouse Core Area, are identified for disposal unless the disposal would benefit the goals and objectives of the area's priority values or other important resource values. Acquire lands in areas with mixed ownership and where land exchanges would result in additional or more contiguous federal ownership patterns or would improve management for the benefit of priority resources as identified in other decisions such as ACECs.	No changes made.	No change (same as 2014)

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MD 6011: Management prescriptions for wind-energy development in important wildlife habitat, areas managed as VRM Classes I and II, RMZs, areas with cultural resources, and special designations are found in those respective sections.	No changes made.	No change (same as 2014)
MD 6012: Implement the programmatic policies and BMPs for wind-energy development as identified in the ROD for Wind-Energy Development on Bureau of Land Management-Administered Land in the Western States (BLM 2005b) and Instruction Memorandum 2009-043 or subsequent guidance as part of any wind-energy authorization.	No changes made.	No change (same as 2014) for all resources except GRSG. For GRSR, completely revised – revised by rangewide and state-specific
MD 6015: Programmatic policies, BMPs, leasing procedures, and stipulations identified in the ROD for the Programmatic EIS for Geothermal Leasing in the Western United States (BLM and Forest Service 2008) are analyzed in the *Minerals* section.	No changes made.	No change (same as 2014)
**MD 6016: Manage 1,279,633 acres as ROW avoidance areas (Map 33). See Appendix C (p. 191) for avoidance criteria. Manage 576,458 acres as ROW exclusion areas (Map 33). Manage 538,110 acres as open to ROW (Map 33).	Manage 1,282,773 acres as ROW avoidance areas (Map 33). See 2014 Lander RMP Appendix C (p. 191) for avoidance criteria. Manage 567,476 acres as ROW exclusion areas (Map 33). Manage 543,961 acres as open to ROW (Map 33).	Completely revised – revised by rangewide and state-specific
MD 6017: The Beef Gap section of the Sweetwater Rocks Complex (the gap between the Split Rock and the Miller Springs WSAs [Map 44]) is closed to any new ROWs even if co-located with existing ROWs.	No changes made.	Partially revised – to update Map referenced
MD 6018: Energy Corridor 79-216 is a designated corridor (Map 34).	No changes made.	Partially revised – to update Map referenced
MD 6019: The following are designated corridors for major ROW development (Map 34) open for above and/or below ground ROWs as indicated. The location of the designated corridors as represented on the map is approximate and subject to verification based on existing	No changes made.	Partially revised – to update (per rangewide) designated corridor avoidance criteria in PHMA

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disturbance, particularly in the Sand Draw to Casper corridor through the Gas Hills mining district and the Lost Creek corridor north and south of Jeffrey City. The corridor widths displayed on Map 34 are overstated to improve clarity. The specific location of the designated corridors is based on the existing ROW. The Lost Creek Corridor, for example, is the area adjacent to the Lost Creek pipeline. These locations are subject to on-the-ground verification which will be reflected on updated iterations of Map 34. • Jim Bridger (containing the Spence-Mustang-Jim Bridger existing 230 kV powerline) from where it enters the Lander planning area in Township 25 North, Range 94 West to where it intersects with the Lost Creek pipeline: above and below ground • Lost Creek: variously below ground only and above and below ground as follows: o Lost Creek 1: from where the pipeline enters the Lander planning area in the south in Township 25 North, Range 93 West to where the pipeline meets the existing 230 kV powerline in the Jim Bridger corridor: below ground only o Lost Creek 2: from the Jim Bridger meeting point northward until the Lost Creek pipeline meets the Sand Draw to Casper designated corridor: above and below ground. The section of the corridor through the Jeffrey City area that is not within the National Trails Management Corridor is open to oil and gas leasing subject to CSU stipulations o Lost Creek 3: from the Sand Draw to Casper meeting point north to Highway 20/26: below ground only		

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
○ Lost Creek 4: from north of Highway 20/26 to the Westwide Corridor: above and below ground • Pathfinder: below ground only. (The Pathfinder corridor is only in the Lander planning area in Township 30 North, Range 85 West.) • Sand Draw to Casper: above and below ground • Highway 20/26: above and below ground • Beaver Creek (formerly called Beaver Creek North and Lost Creek Spur): below ground only • Shoshoni/Badwater: below ground • Bairoil: below ground only • Sand Draw: below ground only • Bison Basin: below ground only • Frontier going southwest from the Bairoil corridor to where it leaves the Lander planning area: below ground only • Rattlesnake Hills (formerly called Frontier-Anadarko) north of Black Rock: below ground • Black Rock (formerly called Pacificorp): above and below ground • Pacificorp (going east-west in Township 35): above and below ground Widths for these corridors are 0.5 mile unless there are resource conflicts, then the construction ROW width will be adjusted accordingly. Within these corridors, new facilities will be constructed adjacent to existing linear facilities and overlapping existing ROWs where feasible, recognizing the need for adequate separation for operating system integrity, safety (construction and operation), appropriate local, state, and federal policies, regulations and laws, and land-use constraints. Designated corridors are subject to the prescriptions for resource		

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
protections except that they are open for ROWs even if the surrounding areas are excluded or avoided. Management prescriptions for ROWs are found in other resource areas such as Special Designations.		
MD 6020: The preferred location for new ROWs and access route authorizations is in areas already disturbed by existing ROWs. See Appendix E (p. 215) for design constraints to limit surface disturbance associated with new ROWs. Identify opportunities to reclaim duplicative ROWs or those no longer in use.	No changes made.	Partially revised – revised by rangewide for major ROWs in PHMA Partially revised – to update Appendix referenced for outside of PHMA
MD 6021: Utilize the most current greater sage-grouse density disturbance process or other state/federal agreed-upon process for compliance evaluations.	No changes made.	Completely revised for disturbance cap – revised by rangewide and state-specific
MD 6022: Locate linear ROWs such as fiber optic and low-voltage powerline corridors along currently established road systems (for example, state highways and county roads).	No changes made.	No change (same as 2014)
MD 6024: Lands that are available to oil and gas leasing are available to carbon dioxide sequestration and research subject to the same surface limitations as would be applied to oil and gas operations. Lands that are closed to oil and gas leasing are excluded for carbon dioxide sequestration and research.	No changes made.	No change (same as 2014)
MD 6029: Grant administrative use authorizations on a case-by-case basis with approval from the Authorized Officer. All access agreements will specify the following: what type of use is allowed and for what purpose, times, dates or seasons of access, where the use will occur, and additional stipulations required to provide for adequate resource protection and to meet pertinent planning decisions.	No changes made.	No change (same as 2014)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 6050: Livestock grazing in the planning area (Map 38) is managed as follows: • 2,323,152 acres are open to grazing • 7,665 acres are closed to grazing • 63,393 acres are unavailable to grazing	No changes made.	Partially revised – to update Map referenced and addition of rangewide GRSG livestock grazing language
MD 6052: In cooperation, consultation, and coordination with permittees/lessees, cooperators, and stakeholders including interested parties, develop and implement appropriate livestock grazing management actions to achieve the Wyoming Standards for Healthy Rangelands, improve forage for livestock, and enhance rangeland health. Within greater sage-grouse Core Area, incorporate greater sage-grouse habitat objectives and management considerations into all BLM grazing allotments containing greater sage-grouse habitat through Allotment Management Plans or permit renewals. Consider the application of BMPs for the protection of greater sage-grouse as terms and conditions of grazing permit/lease renewals. In areas where Wyoming Standards for Healthy Rangelands are not being met or are not making progress toward meeting standards, because of current livestock grazing, modify existing permits or condition the issuance of new permits on the implementation of new grazing strategies to meet standards in accordance with grazing regulations. Apply appropriate BMPs as terms and conditions of the permit.	Action was removed in 2019.	Completely revised – revised by rangewide GRSG livestock grazing language
MD 6054: Conduct grazing program monitoring (see Glossary) of allotments by focusing on Category I allotments in order of priority starting with those allotments that have degraded riparian-wetland areas or are in whole or in part in greater sage-grouse Core Area. Modify BLM-authorized grazing use on an allotment-by-allotment basis to protect soil, water, vegetative resources, and wildlife.	No changes made.	No change (same as 2014)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 6055: When a permittee or lessee voluntarily takes non-use of their grazing preference in a specific grazing allotment, permit annual periods of non-use of grazing preference, without penalty, on a case-by-case basis when the advantage to greater sage-grouse habitat or other resource values warrant.	No changes made.	Completely revised – revised by rangewide
MD 6056: Include terms and conditions on grazing permits and leases that ensure plant growth requirements are met and that adequate forage remains available for greater sage-grouse hiding cover as necessary. Do not permit new range improvement projects within 500 feet of water and riparian-wetland areas except to benefit watershed health or vegetation. Develop project-specific BMPs that become terms and conditions of the grazing permit.	No changes made.	Completely revised – revised by rangewide
MD 6057: Locate supplements such as minerals and salt in a manner designed to conserve, enhance, or restore greater sage-grouse habitat.	No changes made.	Completely revised – revised by rangewide
MD 6058: Prioritize completion of land health assessments and processing of grazing permits within greater sage-grouse Core Area and on allotments with riparian-wetland areas not achieving or making significant progress towards proper functioning condition. Emphasize allotments that have the best opportunities for riparian-wetland improvement or for conserving, enhancing, or restoring habitat for greater sage-grouse. When conducting land health assessments, include indicators and measurements of structure, condition, and composition of vegetation specific to achieving greater sage-grouse habitat objectives. If local/state seasonal habitat objectives are not available, use greater sage-grouse habitat recommendations from Connelly et al. 2000 and Hagen et al. 2007 or updated research findings.	No changes made.	Completely revised – revised by rangewide

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 6059: Work cooperatively with permittees, lessees, and other landowners to develop comprehensive grazing management strategies to develop site-specific objectives to conserve, enhance, or restore greater sage-grouse Core Area and general habitat areas. Develop a comprehensive grazing strategy to achieve these objectives. In Core Area, monitor measurable objectives in representative sites and evaluate grazing management to ensure that decisions are achieving greater sage-grouse habitat objectives.	No changes made.	Completely revised – revised by rangewide
MD 6060: Monitor precipitation and vegetative production trends on BLM-administered lands as a tool to understand impacts to soil, water, and vegetative resources. Monitor measurable objectives and evaluate grazing management to confirm that decisions are achieving greater sage-grouse habitat objectives.	No changes made.	Completely revised – revised by rangewide and state-specific
MD 6061: Allotments are categorized as M, I, and C (see Appendix G (p. 231)). Re-categorize as appropriate during livestock grazing permit renewals.	No changes made.	Partially revised – to update Appendix referenced
MD 6062: When livestock grazing permits and/or grazing preference are voluntarily relinquished in portions of or all of an allotment, analyze suitable livestock grazing management, including closure to livestock grazing where appropriate, based on benefits to resources and other uses.	No changes made.	Partially revised – – revised by addition of rangewide GRSG language
MD 6063: Establish stocking rates in areas preferred by livestock that allow for appropriate utilization levels by livestock, adjusted for the anticipated intensity of use necessary to provide sufficient forage and cover to support and maintain healthy, diverse wildlife and wild horse populations and to achieve the Wyoming Standards for Healthy Rangelands. Utilization levels may vary based on the implementation of a comprehensive grazing strategy or as needed to achieve vegetation objectives.	No changes made.	Partially revised – revised by addition of rangewide GRSG language

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 6064: Prioritize the management of hot-season grazing on riparian-wetland and meadow complexes to promote recovery or maintenance of key vegetation species appropriate for the ecological site and water quality through the use of comprehensive grazing strategies (see Glossary) as identified in Appendix G (p. 231). In areas of continuous season-long grazing where rangeland health standards are not met, modify existing grazing permits to incorporate rest and/or deferment of grazing to facilitate rangeland health recovery and attainment of rangeland health standards.	No changes made.	Partially revised – to update Appendix referenced and apply applicable rangewide GRSG grazing language
MD 6065: Continue implementation of existing allotment management plans. Develop and implement new comprehensive grazing strategies and Allotment Management Plans with grazing permittees/lessees and interested public to achieve desired resource goals. Grant administrative use authorizations on a case-by-case basis with approval from the Authorized Officer. All administrative use agreements will specify the following: what type of use is allowed and for what purpose; times, dates or seasons of access; where the use will occur; and additional stipulations required to provide for adequate resource protection and to meet planning decisions.	No changes made.	No change (same as 2014)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 6066: Utilizing Required Design Features and BMPs such as those in Appendix E (p. 215) applied as Conditions of Approval, develop and install range improvement projects necessary to implement comprehensive grazing strategies which will lead to improved rangeland health, or to enhance successful comprehensive grazing strategies already in place. Benefits associated with the projected improvement in rangeland health should exceed the adverse impacts associated with the project infrastructure. Avoid projects that would expand grazing on the landscape without a clear link to a comprehensive grazing strategy and consideration of other resources.	No changes made.	Partially revised – to update Appendix referenced and add rangewide GRSG language regarding range improvements
MD 6067: Evaluate existing project infrastructure in the development of comprehensive grazing strategies. In consultation with the livestock grazing permittees authorized to use the allotment, identify projects that are no longer necessary, or that are contributing to adverse impacts to other resources, and modify or remove projects as appropriate to mitigate impacts. Evaluate whether the infrastructure contributes to the introduction or spread of invasive nonnative species, and develop mitigation (including removal of infrastructure) to reduce or eliminate weed infestation and spread.	No changes made.	Partially revised –add rangewide GRSG language regarding range infrastructure
MD 6068: Remove or modify fences and cattleguards on a case-by-case basis to enhance other resource values and to facilitate livestock, wild horses, and wildlife movement and management.	No changes made.	Partially revised –add rangewide GRSG language regarding fencing
MD 6069: Establish and manage future forage reserves as opportunities arise within the planning area on a voluntary basis or as lands are acquired.	No changes made.	Completely revised – revised by rangewide

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 6070: Retain designated stock driveways. Permit other livestock trails on a case-by-case basis.	No changes made.	No change (same as 2014)
MD 6071: Require that forage supplements have label information stating that the material is safe/compatible for sheep, wildlife, and wild horses in areas where their ranges overlap. Require that all forage supplement labels be submitted to the field office for approval by the Authorized Officer prior to use.	No changes made.	No change (same as 2014)
MD 6072: Prohibit placement of salt and mineral supplements, such as low-moisture block supplements, in the following areas: • Within 0.5 mile of water and riparian-wetland areas • Within 0.6 mile of the perimeter of occupied greater sage-grouse leks • Within 0.5 mile of areas being reclaimed from surface disturbance	No changes made.	No change (same as 2014)
MD 6073: Modify or implement livestock grazing management (Appendix G (p. 231)) to facilitate successful reclamation efforts.	No changes made.	Partially revised – to update Appendix referenced
MD 6074: Determine livestock grazing management for acquired lands consistent with the management objectives for the acquisition or for the area in which the land is located, for example, an ACEC, WSA, or within the National Trails Management Corridor.	No changes made.	No change (same as 2014)
MD 6077: In greater sage-grouse Core Area, authorize Special Recreation Permits that, through mitigation or design, will have neutral or beneficial impacts to greater sage-grouse.	Action was removed in 2019.	No change (same as 2019)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 6090: Sustain or enhance the Johnny Behind the Rocks RMZ (4,828 acres) for nonmotorized recreationists to engage in horseback riding, hiking, trail running, wildlife viewing, and mountain biking so that participants in visitor assessments/surveys report a higher than average (mean average of 4.0 on a 5-point scale) realization of the following experience and benefit outcomes: • **Experiences:** Enjoying the sensory experience of a natural landscape, enjoying exercise and physical fitness, developing skills and abilities, enjoying having access to close to home outdoor amenities, and feeling that this community is a special place to live. • **Benefits:** Improved mental and physical health, greater connection to nature, improved opportunity to view wildlife close up, greater sense of place, improved outdoor recreation skills, heightened sense of satisfaction with our community, and reduced adverse human impacts such as litter, vegetative trampling, and unplanned trails.	No changes made.	No change (same as 2014)
MD 6091: Create and maintain the following desired future recreation setting qualities in the Johnny Behind the Rocks RMZ: • **Physical Recreation Setting:** The natural setting may have subtle modifications that would be noticed but not draw the attention of the casual observer wandering through the area. Facility and trail development will focus on sufficient densities and developments to provide for a full day (6 to 8 hours or up to 40 miles of trail) of use. Non-trail facilities and structures will continue to be rare and co-located within close proximity to the highway/parking area.	No changes made.	No change (same as 2014)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
• **Social Recreation Setting:** Usually 3-6 encounters per day off travel routes and 7-15 encounters per day on travel routes. Group size is usually small. • **Operational Recreation Setting:** Excluding the adjacent highway, the Blue Ridge Road, and livestock permittee access to range improvements; the area will be managed for mountain bikes and other nonmotorized use(s). Mechanized/motorized trail building will be approved as needed to support the identified outcome objective. Onsite controls and services will be present, but harmonize with the natural environment.		
MD 6092: Mineral and ROW actions in the Johnny Behind the Rocks RMZ are managed with the following restrictions: • Oil and gas leasing subject to NSO • Closed to geophysical exploration • Closed to phosphate exploration • Recommend for withdrawal to locatable mineral entry • Closed to mineral material sales • Excluded from ROW actions	No changes made.	No change (same as 2014)
MD 6093: Initiate the following recreation decisions to support the identified outcome objective and desired future setting condition: • Utilize monitoring and evaluation to adjust management techniques and implementation decisions as necessary to reach desired future setting conditions and provide identified recreation opportunities (activities, experiences, and benefits). • New trails will be identified and authorized in a master trails plan and supported through implementation-level decision making.	No changes made.	No change (same as 2014)

2014Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
• Pursue land exchanges and access agreements for parcels in and adjacent to this RMZ. • Solicit partnerships and cooperative agreements to monitor outcome attainment and preferences through customer assessments (focus group interviews or visitor studies). • Monitor recreation setting condition through onsite patrols May through November.		
MD 6094: Close the Johnny Behind the Rocks RMZ to motorized travel, except with an allowance for administrative access agreements with livestock grazing permittees. This management decision does not close motorized travel on the Blue Ridge Road and other roads adjacent to or outside of the SRMA. Motorized travel on and west of Cedar Ridge will be closed as a result of this decision.	No changes made.	No change (same as 2014)
MD 6095: The Johnny Behind the Rocks area is open to cross-country nonmotorized travel.	No changes made.	No change (same as 2014)
MD 6096: Manage the Johnny Behind the Rocks RMZ as VRM Class II.	No changes made.	No change (same as 2014)
MD 6113: Mineral and ROW actions in the Dubois Mill-Site SRMA are managed with the following restrictions: • Closed to oil and gas leasing • Closed to geophysical exploration • Closed to phosphate leasing • Open to locatable minerals • Closed to mineral material disposals • Excluded to major ROWs • Avoided for minor ROWs	No changes made.	No change (same as 2014)

2.19.2 Relevant Appendices

The following table shows which appendices from the 2014 and 2019 plans have management direction that would change by the Proposed RMP Amendment. If 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The 2014 Appendices can be found on the Lander RMP ePlanning website. The 2019 Appendices can be found on the Wyoming GRSG ePlanning website.

ARMPA Appendix Name	Year	Type of Change to Existing Appendix Language in the Proposed RMP AmendmentProposed Plan
A: Maps	2014	Completely Revised-revised by rangewideYes
A: Approved RMP Amendment with Management Goals, Objectives, and Decisions	2019	Partially Revised based on changes in Proposed RMP AmendmentYes
B: Reclamation Objectives and Standards	2014	No change (same as 2014)No
C: Exception, Modification, and Waiver Criteria, Avoidance Criteria, and Special Management for Designated Corridors	2014	Partially Revised- Applies rangewide exceptions, modifications, and waivers
D: Lander Air Resources Management Plan	2014	No change (same as 2014)
E: Required Design Features and Best Management Practices	2014, 2019	Partial change – no change (same as 2019) except the addition of livestock grazing BMPs
F: Stipulations and Conditions of Approval in Designated Development Areas and in Non-Designated Development Areas	2014	No change (same as 2014)
G: Livestock Grazing Allotments and Range Improvements	2014	No change (same as 2014)
H: Wyoming BLM Mitigation Guidelines for Surface-Disturbing and Disruptive Activities	2014	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
I: Oil and Gas Stipulations	2014	Partially Revised- Applies rangewide exceptions, modifications, and waivers
K: Lands Identified for Disposal	2014	No change (same as 2014)
L: Wild Horse Management in the Lander Planning Area	2014	No change (same as 2014)
N: Monitoring and Evaluation Plan	2014	Partially revised – revised by adding rangewide GRSG monitoring language
C: Greater Sage-Grouse Habitat Management Strategy	2019	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
No similar existing appendix		Addition of rangewide predator management as new appendix

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Appendix 2.20
Worland, Wyoming RMP Revisions

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2.20 WORLAND, WYOMING RMP REVISIONS

This appendix presents the approved RMP revision language from the record of decision for the Worland RMP that relate to GRSG management, and changes that were made in the 2019 GRSG amendment effort. The tables below note which goals, objectives, appendices, and management decisions/actions would be amended by the Proposed RMP Amendment (RMPA), either partially or completely, and which existing decisions would not be amended at all. The types of change to existing management direction from the Proposed RMPA include: no change, partial revision, complete revision, and new direction. Note that any references to tables and appendices are to those applicable RMP appendices that are listed in **Section 2.20.2** of this appendix. For the additional state-specific Wyoming management direction for the Proposed RMPA, see Chapter 2, Table 2-13.

2.20.1 Worland RMP (Wyoming)

Table 1. Comparison of Proposed RMP Amendment to Existing GRSG RMP Management Decisions in the Worland RMP (Wyoming)

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan (no change, partial revision, complete revision, new direction)
Land Use Plan Revisions/Amendments to the Worland RMP		
MO MR:2.3: Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority will be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 CFR 3162.3-1(h).	Leasing is allowed in PHMA. Where the BLM has a backlog of Expressions of Interest for leasing, the BLM will prioritize its work first in non-habitat management areas, followed by lower priority habitat management areas (e.g., GHMA) and then higher priority habitat management areas (i.e., PHMA). To the extent consistent with federal regulation, law, and policy, priority would be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA, and subject to applicable stipulations for the conservation of Greater Sage-Grouse, priority would be given to development in non-habitat areas first and then in the least suitable habitat for Greater Sage-Grouse. The implementation of these priorities will be subject to valid existing rights and any applicable law or regulation, including, but not limited to, 30 U.S.C. 226(p) and 43 CFR 3162.3-1(h). Where a proposed fluid	Completely revised – revised by rangewide

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
	mineral development project on an existing lease could adversely affect Greater Sage-Grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts on the extent compatible with lessees' rights to drill and produce fluid mineral resources. To incentivize development to locate outside of PHMA, the BLM would work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts on Greater Sage-Grouse or its habitat and will ensure that the best information about the Greater Sage-Grouse and its habitat informs and helps to guide development of such federal leases.No changes made.	
MO MR:2.4: Where a proposed fluid mineral development project on an existing lease could adversely affect Greater Sage-Grouse populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources. The BLM will work with the lessee, operator, or project proponent in developing an APD for the lease to avoid and minimize impacts to Greater Sage-Grouse or its habitat and will ensure that the best information about the Greater Sage-Grouse and its habitat informs and helps to guide development of such federal leases.	No changes made.	Completely revised – revised by rangewide
**MD 2005: Consider interest in exploration for, or leasing of, federal coal (Map 3-5), if any on a case-by-case basis. Allow coal exploration licenses subject to the regulations of 43 CFR 3410, and subject to guidance mitigating for surface-disturbing activities in the *Wyoming BLM Standard Oil and Gas-Lease Stipulations*	No changes made.	Partially revised – revised by addition/replacement of applicable rangewide GRSG management

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
(Appendix B, *Oil and Gas Lease Notices and Lease Stipulations, including Exception, Modification, and Waiver Criteria* (p. 211)). Before issuing a coal exploration license, require the authorized officer to prepare an environmental assessment or environmental impact statement, if necessary, of the potential effects of the proposed exploration on the natural and socioeconomic environment of the affected area. If an application for a federal coal lease is received, conduct an appropriate land use and environmental analysis, including the coal screening process, to determine whether the area(s) proposed for leasing is (are) acceptable for coal development and leasing (as per 43 CFR 3425). If public lands are determined to be acceptable for further consideration for coal leasing, amend the land use plan as necessary. Only accept federal coal lease applications on those federal coal lands with development potential identified as suitable for further leasing consideration, after application of the coal screens and unsuitability criteria. At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR 3461.5. PHMA is essential habitat for maintaining Greater Sage-Grouse for purposes of the suitability criteria set forth at 43 CFR 3461.5(o)(1). The BLM will also consider that USFWS has found "the core area strategy…if implemented by all landowners via regulatory mechanisms, would provide adequate protection for sage-grouse and their habitats in the state" when considering leasing coal in PHMAs under the criteria set for at 43 CFR 3461.5(o)(1) (USFWS 2010).		

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 2013: Process oil and gas lease applications on a case-by-case basis. Ensure that leasing activities in PHMAs comply with Greater Sage-Grouse RMP decisions and remain in compliance with laws, regulations, and policy.	Process oil and gas lease applications on a case-by-case basis. Ensure that leasing activities in PHMAs comply with Greater Sage-Grouse RMP decisions and remain in compliance with laws, regulations, and policy (See MDs 4106, 4107, 4108, 4110, and 4152).	Partially revised (2019) – to update Management Direction referenced
MD 2023: Delineate **Oil and Gas Management Areas (Map 3-9) (333,488 acres of federal mineral estate) around existing intensively-developed fields, applying a 2-mile buffer from the outer boundary of the existing field (Map 3-10); adding enhanced oil recovery areas identified by the Governor's Office Enhanced Oil Recovery Institute and excluding Greater Sage-Grouse PHMAs. Manage these areas primarily for oil and gas exploration and development. Oil and gas development, including enhanced oil recovery operations, within Oil and Gas Management Areas is allowed to take place at the same level and density as the existing development in the field. Levels and densities beyond the existing field development may require additional reclamation or compensatory offsite mitigation. As oil and gas fields expand or exploration reaches beyond the Oil and Gas Management Areas depicted on Map 3-9, Oil and Gas Management Areas may be enlarged as appropriate. To enlarge Oil and Gas Management Areas, the expansion area would: i) have to be adjacent to the field and under valid oil and gas lease(s) with stipulations allowing surface occupancy and development; ii) have to have a surface density of, on average, at least four well pads per 640-acres; a determination that additional well density is required to efficiently and adequately produce the oil or gas resource;	No changes made.	Partially revised – to update map and acres referenced

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
iii) have a project-specific environmental analysis prepared to analyze the impacts and determine operating methods, mitigation, and BMPs to be used in the efficient and comprehensive development of the field; iv) need surface resources to be satisfactorily mitigated; and v) need commitment to accelerate reclamation as required by the authorized officer.		
MO FM:1.5:: Following wildland fires, conduct appropriate emergency stabilization and rehabilitation when and where needed. In priority Greater Sage-Grouse habitat areas, prioritize suppression immediately after life and property to conserve the habitat. In general Greater Sage-Grouse habitat, prioritize suppression where wildfires threaten priority Greater Sage-Grouse habitat.	No changes made.	No change (same as 2015)
MD FM:2.1: Consult and cooperate with adjacent landowners, state and local governments, and other stakeholders to plan and implement prescribed fire and other vegetation treatments across the landscape. In areas of general Greater Sage-Grouse habitat, design and implement fuels treatments with an emphasis on protecting existing sagebrush ecosystems.	No changes made.	No change (same as 2015)
MD 3008: Suppress fires threatening Greater Sage-Grouse habitats and crucial winter wildlife habitat within Wyoming big sagebrush communities. Where fire would be utilized to meet resource objectives, work closely with resource specialists to protect and improve Greater Sage-Grouse habitat. For fuels management, the BLM would consider multiple tools for fuels reduction and would analyze in NEPA compliance documentation before electing to implement prescribed fire in PHMAs.	No changes made.	No change (same as 2015)

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
If prescribed fire is used in Greater Sage-Grouse habitat, the NEPA analysis for the Burn Plan will address: • why alternative techniques were not selected as a viable options; • how Greater Sage-Grouse goals and objectives would be met by its use; • how the COT Report objectives would be addressed and met; and • a risk assessment to address how potential threats to Greater Sage-Grouse habitat would be minimized. Prescribed fire as a vegetation or fuels treatment in Greater Sage-Grouse habitat shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire could be used to meet specific fuels objectives that would protect Greater Sage-Grouse habitat in PHMAs (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Prescribed fire in known crucial winter wildlife habitat shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in and/or around crucial winter wildlife habitat must be strategically-designed to reduce wildfire risk and protect winter range habitat quality.		

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MO BR:2.6: In PHMAs, the desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70 percent) with a minimum of 15 percent sagebrush cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Technical Reference 1734-6 [BLM 2005c]).	No changes made.	No change (same as 2015)
MG BR:9: GREATER SAGE-GROUSE – Sustain the integrity of the sagebrush biome to provide the amount, continuity, and quality of habitat that is necessary to maintain sustainable populations of Greater Sage-Grouse and other species by achieving the objectives below.	No changes made.	Completely revised – revised by rangewide
MO BR:9.1: Maintain large patches of high quality sagebrush habitats, with emphasis on patches occupied by Greater Sage-Grouse.	No changes made.	No change (same as 2015)
MO BR:9.2: Maintain connections between sagebrush habitats, with emphasis on connections between habitats occupied by Greater Sage-Grouse.	No changes made.	No change (same as 2015)
MO BR:10.1: Reconnect large patches of sagebrush habitat with emphasis on reconnecting patches occupied by stronghold and isolated populations of Greater Sage-Grouse.	No changes made.	No change (same as 2015)

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 4058: Maintain or improve important wildlife habitats through vegetative manipulations, habitat improvement projects, livestock grazing strategies and the application of *The Wyoming Guidelines for Managing Sagebrush Communities with Emphasis on Fire Management* (Wyoming Interagency Vegetation Committee 2002) and the *Wyoming BLM Standard Mitigation Guidelines for Surface-Disturbing and Disruptive Activities* (Appendix F, *Wyoming Bureau of Land Management Mitigation Guidelines for Surface-Disturbing and Disruptive Activities* (p. 349)), BMPs (Appendix C, *Required Design Features and Best Management Practices* (p. 249)), and similar guidance updated over time.	No changes made.	Partially revised – to update Appendices referenced, as well as adding rangewide GRSG objectives
MD 4070: Conduct habitat enhancement vegetation treatments within sagebrush communities as opportunities and funding allow, consistent with EO 2015-4 (Wyoming Office of the Governor 2015).	No changes made.	Partially revised – to update EO referenced
MD 4071: Modify identified hazard fences, and analyze and construct new fences in accordance with wildlife needs, the BLM Fencing Handbook 1741-1, and WO IM 2010-022, *Managing Structures for the Safety of Sage-grouse, Sharp-tailed grouse, and Lesser Prairie-chicken*, and similar guidance and policy as updated over time.	No changes made.	Partially revised – revised by adding rangewide GRSG fence language
MD 4076: Allow water development projects in crucial elk winter range and in greater Greater Sage-Grouse nesting habitat with 10 inches or less annual precipitation only when adverse effects can be avoided, minimized and/or compensated based on site-specific analysis. Allow existing uses pending site-specific analysis on a priority basis.	No changes made.	Partially revised – revised by adding rangewide GRSG water development language

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 4080: Avoid wind energy projects in big game crucial winter range and raptor concentration areas. Wind-energy development would be avoided in Greater Sage-Grouse PHMAs (Map 3-17), and not allowed unless it can be sufficiently demonstrated that the development activity would not result in declines of Greater Sage-Grouse PHMA populations. Sufficient demonstration of "no declines" should be coordinated with the WGFD and USFWS.	No changes made.	Partially revised – revised by addition of rangewide for GRSG portion of MD
MD 4087: Discourage the use of broad-spectrum insecticides where insect control is required. Target pest control toward key problem areas and schedule applications to be effective in minimum doses in Greater Sage-Grouse brood-rearing areas. Field Offices may implement treatments within Greater Sage-Grouse habitat utilizing RAATS protocols.	No changes made.	No change (same as 2015)
MD 4088: Avoid aerial pesticide spraying in favor of ground applications to minimize drift into non-target areas in Greater Sage-Grouse habitat unless benefits of treatments are likely to outweigh impacts.	No changes made.	No change (same as 2015)
MD 4089: Avoid applying pesticides to Greater Sage-Grouse breeding habitat during the nesting and early brood-rearing season (March 15 through June 30) to reduce the loss of food supply to chicks and avoid the chance of secondary poisoning unless benefits of treatments are likely to outweigh impacts.	No changes made.	No change (same as 2015)

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 4090: Maintain seeps, springs, wet meadows, and riparian vegetation in a functional and diverse condition for young Greater Sage-Grouse and other species that depend on forbs and insects associated with these areas. Consider management actions if desirable green vegetation associated with these wet areas is not available, accessible, or cannot be maintained with current livestock, wildlife, or wild horse use, and the impacts are outweighed by the improved habitat quality.	No changes made.	No change (same as 2015)
MD 4091: Restore Greater Sage-Grouse brood-rearing habitats in riparian/wetland areas.	No changes made.	No change (same as 2015)
MD 4092: Restore lost riparian functioning systems by repairing abnormally incised drainages to raise water tables and increase water storage and brood-rearing habitats within Greater Sage-Grouse habitat.	No changes made.	No change (same as 2015)
MD 4093: Manage vegetation composition diversity and structure, as determined by ESD, or other methods that reference site potential, and WGFD protocols to achieve Greater Sage-Grouse habitat management objectives, in cooperation with stakeholders. Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to Greater Sage-Grouse habitat to determine if they should be restored to Greater Sage-Grouse or habitat of higher quality for Greater Sage-Grouse. If these seedings provide value in conserving or enhancing Greater Sage-Grouse habitats, then no restoration would be necessary. Assess the compatibility of these seedings for Greater Sage-Grouse habitat during the land health assessments. Burned areas within PHMAs would be restored to suitable habitat with consideration given to ESDs,	No changes made.	Partially revised– revised by addition of rangewide GRSG habitat objectives for GRSG portion of MD

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
reference sites, site potential and local variability. The BLM could bring in burned area rehabilitation and Burned Area Emergency Response teams who would work cooperatively with partners at the federal, state, and local levels to rehabilitate and restore Greater Sage-Grouse habitats in a manner consistent with the core habitat populations area strategy for conservation. DDCT reviews would be conducted in coordination with the WGFD Habitat Protection Program located in Cheyenne, Wyoming at the WGFD headquarters. Areas within PHMAs would be prioritized for restoration of Greater Sage-Grouse habitat beyond immediate response.		
MD 4094: Maintain sagebrush and understory diversity (relative to ecological site description) in crucial seasonal Greater Sage-Grouse habitats unless such removal is necessary to achieve Greater Sage-Grouse habitat management objectives. For example, thinning small patches of dense sagebrush may increase desirable forbs in early brood-rearing habitat.	No changes made.	No change (same as 2015)
MD 4095: Increase the composition and canopy cover of Wyoming big sagebrush, within existing nonnative grass seedings with less than 5 percent sagebrush canopy cover, to greater than or equal to neighboring sagebrush communities or historical levels. (See Shrubland-Salt Desert/Salt Bottom on Map 3-15; deeper soiled, and gentler sloped portions of the Shrubland-Salt Desert/Salt Bottom, colored in pink, would be those areas where sagebrush restoration efforts could be conducted.)	No changes made.	Partially revised – to update Map referenced
MD 4096: Investigate opportunities to increase sagebrush in lower precipitation zones.	No changes made.	No change (same as 2015)

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 4097: Plan and construct mining and mineral development activities, to the degree possible given state water rights, to minimize disturbances that would result in alterations to springs and riparian Greater Sage-Grouse habitat. Alternative water sources may be developed to replace natural sources that have been affected or destroyed during these development activities.	No changes made.	No change (same as 2015)
MD 4098: Treat constructed or non-natural water storage impoundments to control mosquito breeding (and the associated spread of West Nile virus), to prevent disease spread to Greater Sage-Grouse as necessary.	No changes made.	No change (same as 2015)
MD 4099: In cooperation with stakeholders, manage to promote the growth and persistence of native shrubs, grasses, and forbs needed by Greater Sage-Grouse for seasonal food and concealment.	No changes made.	No change (same as 2015)
MD 4100: In cooperation with stakeholders, design and locate fences so as not to disturb PHMAs. Increase the visibility of fences in these areas which have been identified as hazardous to flying Greater Sage-Grouse.	No changes made.	Partially revised – revised by adding rangewide GRSG fence language
MD 4101: Conduct fire management activities to minimize overall wildfire size and frequency in sagebrush plant communities where Greater Sage-Grouse habitat objectives are at risk. General priorities for habitat protection: Priority # 1 – Protection of Greater Sage-Grouse PHMAs. Priority # 2 – Wyoming big sagebrush communities outside Greater Sage-Grouse PHMAs and habitats recovering from disturbance within or adjacent to Greater Sage-Grouse PHMAs.	No changes made.	No change (same as 2015)

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 4102: Annually maintain FMPs to incorporate updated sagebrush habitat information as well as fire suppression priorities in sagebrush habitats. Incorporate fire management objectives for the management of sagebrush ecosystems into FMPs. Provide fire management objectives for sagebrush ecosystems to initial attack personnel at the beginning of each fire season.	No changes made.	No change (same as 2015)
MD 4103: Establish fuels treatment projects at strategic locations to minimize size of wildfires and limit loss of Greater Sage-Grouse habitat.	No changes made.	No change (same as 2015)
MD 4104: Reintroduce appropriate fire regimes to limit conifer encroachment into the sagebrush plant communities. Take into account invasive herbaceous species and Fire Regime Group and FRCC (measure of departure from historic fire regime) with treatments. Where possible, achieve a balance between treating areas that have significantly departed from the historic fire regime (Condition Class 3) and areas that are functioning within an appropriate fire regime (Condition Class 1).	No changes made.	No change (same as 2015)
MD 4105: Remove conifers encroaching into sagebrush habitats in a manner that considers tribal and cultural values. Prioritize treatments closest to occupied Greater Sage-Grouse habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2 as defined in Miller et al. (2005). Refine the location of specific priority areas to be treated by utilizing site-specific analysis and principles like those included in the FIAT report (Chambers et. al. [2014]) and other ongoing modeling efforts to address conifer encroachment.	No changes made.	No change (same as 2015)

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 4106: **Inside PHMAs Prohibit surface occupancy and surface-disturbing activities on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks. The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse (Map 3-17). **Outside PHMAs** Prohibit surface-disturbing and disruptive activities and apply a NSO restriction within a ¼-mile radius of the perimeter of occupied Greater Sage-Grouse leks (Map 3-17). Outside Greater Sage-Grouse PHMAs, the BLM's goal is to sustain important habitats that support core populations and to maintain lek persistence over the long term in sufficient proportions of the Greater Sage-Grouse population to facilitate movement and genetic transfer between core populations, including those found in adjacent states.	**Inside PHMAs** Prohibit surface occupancy and surface-disturbing activities on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped). **Outside PHMAs** Prohibit surface-disturbing and disruptive activities and apply a NSO restriction within a ¼-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) (Map 3-17). Outside Greater Sage-Grouse PHMAs, the BLM's goal is to sustain important habitats that support core populations and to maintain lek persistence over the long term in sufficient proportions of the Greater Sage-Grouse population to facilitate movement and genetic transfer between core populations, including those found in adjacent states. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD 4152).	Partially revised (2019) – to update map referenced, update EO referenced, and reference Fluid Mineral Appendix (updated to reflect rangewide and state-specific changes, including fluid mineral waivers, exceptions, and modifications)
MD 4107: **Inside PHMAs Prohibit disruptive activities on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks from March 15 to June 30 (81,281 acres). **Outside PHMAs** Prohibit disruptive activities on or within a ¼ mile radius of the perimeter of occupied Greater Sage-Grouse leks from March 15 to June 30 (3,157 acres). **Inside PHMAs** Prohibit surface-disturbing and/or disruptive activities from March 15 to June 30 to protect Greater Sage-Grouse breeding, nesting, and early	**Inside PHMAs** Prohibit disruptive activities on or within a 0.6-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) from March 15 to June 30 (81,281 acres). **Outside PHMAs** Prohibit disruptive activities on or within a ¼ mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) from March 15 to June 30 (3,157 acres). **Inside PHMAs** Prohibit surface-disturbing and/or disruptive activities from March 15	Partially revised (2019) – to update acreage, update EO referenced, and reference Fluid Mineral Appendix (updated to reflect rangewide and state-specific changes, including fluid mineral waivers, exceptions, and modifications)

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brood-rearing habitat (1,021,583 acres). Apply this timing limitation throughout the PHMAs. Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis. **Outside PHMAs** Prohibit surface-disturbing and/or disruptive activities in Greater Sage-Grouse nesting and early brood-rearing habitat within a 2-mile radius of the perimeter of occupied Greater Sage-Grouse leks from March 15 to June 30. Note: Where credible data support different timeframes for these seasonal restrictions, dates may be expanded by up to 14 days prior to or subsequent to the above dates.	to June 30 to protect Greater Sage-Grouse breeding, nesting, and early brood-rearing habitat (1,021,583 acres). Apply this timing limitation throughout the PHMAs. Activities in unsuitable habitats would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis. **Outside PHMAs** Prohibit surface-disturbing and/or disruptive activities in Greater Sage-Grouse nesting and early brood-rearing habitat within a 2-mile radius of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) from March 15 to June 30. Note: Where credible data support different timeframes for these seasonal restrictions, dates may be expanded by up to 14 days prior to or subsequent to the above dates. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD 4152).	
MD 4108: **Greater Sage-Grouse winter concentration areas: Surface-disturbing and/or disruptive activities in sage-grouse winter concentration areas would be prohibited from December 1–March 14. Activities in unsuitable habitats within PHMAs would be evaluated under the exception and modification criteria and could be allowed on a case-by-case basis. Protection of additional mapped winter concentration areas in GHMAs would be implemented only where winter concentration areas are identified as supporting biologically significant numbers of	**Greater Sage-Grouse winter concentration areas:** Surface-disturbing and/or disruptive activities in sage-grouse winter concentration areas would be prohibited from December 1–March 14. The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD 4152). Protection of additional mapped winter	Partially revised (2019) – to update EO referenced, include SHMA, and to reference Fluid Mineral Appendix (updated to reflect rangewide and state-specific changes, including fluid mineral waivers, exceptions, and modifications) for winter concentration areas in PHMA

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sage-grouse nesting in PHMAs and/or attending leks within PHMAs. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Evaluate and allow activities in unsuitable habitats within PHMAs in accordance with exception and modification criteria on a case-by-case basis. Protection of additional mapped winter concentration areas in GHMAs would be implemented only where winter concentration areas are identified as supporting biologically significant numbers of Greater Sage-Grouse nesting in PHMAs and/or attending leks within PHMAs. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas.	concentration areas in GHMA would be implemented where winter concentration areas are mapped and designated by the State of Wyoming. Appropriate seasonal timing restrictions and habitat protection measures would be considered and evaluated in consultation with the WGFD in all identified winter concentration areas. Where credible data support different timeframes for this seasonal restriction, dates may be expanded by up to 14 days prior to or subsequent to the above dates.	
MD 4109: **Density of Disturbances: In Greater Sage-Grouse PHMAs, the density of disturbance of energy or mining facilities would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights (Appendix D, *Greater Sage-Grouse Habitat Management Strategy* (p. 271)). The one location and cumulative value of existing disturbances would not exceed 5 percent of habitat of the DDCT area. Inside PHMA, all suitable habitat disturbed (any program area) will not exceed 5 percent within the DDCT area using the DDCT process. Consolidate anthropogenic features from development and transmission on the landscape. Allow on a case-by-case basis high profile structures	**Density of Disturbances:** In Greater Sage-Grouse PHMAs, the density of disturbance of energy or mining facilities would be limited to an average of one site per square mile (640 acres) within the DDCT, subject to valid existing rights (2019 Wyoming GrSG ARMPA Appendix C, Greater Sage-Grouse Habitat Management Strategy). The one location and cumulative value of existing disturbances would not exceed 5 percent of habitat of the DDCT area. Inside PHMA, all suitable habitat disturbed (any program area) will not exceed 5 percent within the DDCT area using the DDCT process. Consolidate anthropogenic features from development and transmission on the landscape. Allow on a case-by-case basis high profile structures within Greater Sage-Grouse nesting habitat.	Completely revised – revised by rangewide and state-specific for surface disturbance cap Partially revised (2019) – to update Appendix referenced for density cap and to update WGFD Protocols for Treating Sagebrush to Benefit Sage-Grouse referenced

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within Greater Sage-Grouse nesting habitat. Sagebrush Treatment: For vegetation treatments in sagebrush within PHMAs, refer to WGFD Protocols for Treating Sagebrush to Benefit Sage-Grouse (WGFD 2011, as updated) and BLMWO IM 2013-128 (Sage-grouse Conservation Related to Wildland Fire and Fuels Management). These recommended protocols, subject to seasonal conditions of approval, would be used in determining whether proposed treatment constitutes a "disturbance" that would contribute toward the 5 percent threshold for habitat maintenance. Additionally, these protocols would be used to determine whether the proposed treatment configuration would be expected to have neutral or beneficial impacts for PHMA populations or if they represent additional habitat loss or fragmentation. Treatments to enhance sagebrush/grasslands habitat for Greater Sage-Grouse would be evaluated based upon habitat quality and the functionality/use of treated habitats post-treatment. The BLM would work collaboratively with partners at the state and local levels to maintain and enhance Greater Sage-Grouse habitats. Seasonal restrictions would be applied, as needed, for implementing fuels management treatments according to the type of seasonal habitat present. Wildfire burns will be treated as disturbed if sagebrush is reduced below 5 percent unless there is an implementation plan outlining restoration efforts and 3 years of data showing a trend back to suitable habitat.	Sagebrush Treatment: For vegetation treatments in sagebrush within PHMAs, refer to WGFD Protocols for Treating Sagebrush to Benefit Sage-Grouse (WGFD 2015, as updated) and BLM WO IM 2013-128 (Sage-grouse Conservation Related to Wildland Fire and Fuels Management). These recommended protocols, subject to seasonal conditions of approval, would be used in determining whether proposed treatment constitutes a "disturbance" that would contribute toward the 5 percent threshold for habitat maintenance. Additionally, these protocols would be used to determine whether the proposed treatment configuration would be expected to have neutral or beneficial impacts for PHMA populations or if they represent additional habitat loss or fragmentation. Treatments to enhance sagebrush/grasslands habitat for Greater Sage-Grouse would be evaluated based upon habitat quality and the functionality/use of treated habitats post-treatment. The BLM would work collaboratively with partners at the state and local levels to maintain and enhance Greater Sage-Grouse habitats. Seasonal restrictions would be applied, as needed, for implementing fuels management treatments according to the type of seasonal habitat present. Wildfire burns will be treated as disturbed if sagebrush is reduced below 5 percent unless there is an implementation plan outlining restoration efforts and 3 years of data showing a trend back to suitable habitat.	

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*MD 4110: New project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek from 6:00 pm to 8:00 am during the breeding season (March 1 to May 15). Specific noise protocols for measurement and implementation will be developed as additional research and information emerges.	Within PHMA (core only), new project noise levels, either individual or cumulative, should not exceed 10 dBA (as measured by L50) above baseline noise at the perimeter of the lek (or lek center if no perimeter is yet mapped) from 6:00 pm to 8:00 am during the breeding season (March 1–May 15). The authorized officer may grant an exception on a case-by-case basis subject to appropriate site-specific analysis, mitigation requirements, and consultation with the State of Wyoming and consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4) (see MD SSS 4). In coordination with the State of Wyoming, specific noise protocols for measurement and implementation will be developed as additional research and information emerges. These measures would be considered at the site-specific project level where and when appropriate.	Partially revised (2019) – to update EO referenced
MD 4111: Allow motorized vehicle use in Greater Sage-Grouse PHMAs consistent with other resource objectives. Manage new road construction in and adjacent to Greater Sage-Grouse habitat consistent with applicable restrictions on surface-disturbing and disruptive activities. Avoid construction of new or local collector roads (as defined in BLM Manual 9113 [BLM 2011d]) within 1.9 miles of the perimeter of occupied Greater Sage-Grouse leks within PHMAs. Prohibit all new roads within 0.6 miles of the perimeter of occupied Greater Sage-Grouse leks within PHMAs. Construct roads to minimum design standards needed for production activities.	Allow motorized vehicle use in Greater Sage-Grouse PHMAs consistent with other resource objectives. Manage new road construction in and adjacent to Greater Sage-Grouse habitat consistent with applicable restrictions on surface-disturbing and disruptive activities. Avoid construction of new or local collector roads (as defined in BLM Manual 9113 [BLM 2011d]) within 1.9 miles of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) within PHMAs. Prohibit all new roads within 0.6 miles of the perimeter of occupied Greater Sage-Grouse leks (or lek center if no perimeter is yet mapped) within PHMAs. Construct roads to minimum design standards needed for production activities.	No change (same as 2019)

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**MD 4112: In PHMAs, implement mitigation and minimization guidelines and required design features, including specific measures for Greater Sage-Grouse (refer to Appendix C, *Required Design Features and Best Management Practices* (p. 249)), as applicable and consistent with EO 2015-4 (Wyoming Office of the Governor 2015). Incorporate Greater Sage-Grouse specific measures into project proposals as required design features or mitigation for any authorized federal action, regardless of surface ownership.	No changes made.	Completely revised – revised by rangewide for mitigation Partially revised – to update Appendix referenced and update EO referenced for RDFs
MD 4113: In PHMAs, require the development of a wildlife resource monitoring and mitigation plan to address potential impacts from mineral development on wildlife populations and/or habitat on a case-by-case basis.	No changes made.	No change (same as 2015)
MD 4114: Use the following travel management criteria in PHMAs: • During subsequent travel management planning, all routes within PHMAs would undergo a route evaluation to determine its purpose and need and the potential resource and/or user conflicts from motorized travel. Where resource and/or user conflicts outweigh the purpose and need for the route, the route would be considered for closure or considered for relocation outside of sensitive Greater Sage-Grouse habitat. • During implementation-level travel planning, threats to Greater Sage-Grouse and their habitat would be considered when evaluating route designations and/or closures. • During subsequent travel management planning, routes within PHMAs that do not have a purpose or need would be considered for closure.	No changes made.	No change (same as 2015)

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
• During subsequent travel management planning, routes within PHMAs that are duplicative parallel, or redundant would be considered for closure. • ● During subsequent travel management planning, OHV timing limitations would be considered in important seasonal habitats where OHV use is a threat. During subsequent travel management planning, consider limiting snow machine travel to designated routes or consider seasonal closures in Greater Sage-Grouse wintering areas from November 1 through March 31. • During subsequent travel management planning, routes in PHMAs not required for public access or recreation with a current administrative/agency purpose or need would be evaluated for administrative access only. • During subsequent travel management planning, prioritize restoration of routes not designated in a Travel Management Plan within PHMAs. • During subsequent travel management planning, consider using seed mixes or transplant techniques that will maintain or enhance Greater Sage-Grouse habitat when rehabilitating linear disturbances. • During subsequent travel management planning, consider scheduling road maintenance to avoid disturbance during sensitive periods and times to the extent practicable. Use time of day limits (after 10:00 AM to 7:00 PM) to reduce impacts on Greater Sage-Grouse during breeding and nesting periods.		

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
*MD 4115: The Greater Sage-Grouse adaptive management plan provides regulatory assurance that unintended negative impacts to Greater Sage-Grouse habitat will be addressed before consequences become severe or irreversible. Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives. With respect to Greater Sage-Grouse, all regulatory entities in Wyoming, including the BLM, use soft and hard triggers. Soft and hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts. See Appendix D, *Greater Sage-Grouse Habitat Management Strategy* (p. 271) for more information on soft and hard triggers. Soft Triggers Response: Soft triggers are indicators that management or specific activities may not be achieving the intended results of conservation action or that unanticipated changes to populations or habitats have occurred that have the potential to place habitats or populations at risk. The soft trigger is any deviation from normal trends in habitat or population in any given year. Metrics include, but are not limited to, annual lek counts, wing counts, aerial surveys, habitat monitoring, and DDCT evaluations. For population metrics, normal population trends are calculated as the 5-year running mean of annual population counts. BLM field offices, with the assistance of their respective land and RMP implementation groups, local WGFD offices, and local sage-grouse working groups will evaluate the metrics with the Adaptive	The Greater Sage-Grouse adaptive management plan provides regulatory assurance that unintended negative impacts to Greater Sage-Grouse habitat will be addressed before consequences become severe or irreversible. Adaptive management triggers are essential for identifying when potential management changes are needed in order to continue meeting Greater Sage-Grouse conservation objectives. With respect to Greater Sage-Grouse, all regulatory entities in Wyoming, including the BLM, use soft and hard triggers. Soft and hard triggers are focused on three metrics: 1) number of active leks, 2) acres of available habitat, and 3) population trends based on annual lek counts. See 2019 Wyoming GrSG ARMPA Appendix C, Greater Sage-Grouse Habitat Management Strategy for more information on soft and hard triggers. Soft Triggers Response: Soft triggers are indicators that management or specific activities may not be achieving the intended results of conservation action or that unanticipated changes to populations or habitats have occurred that have the potential to place habitats or populations at risk. The soft trigger is any deviation from normal trends in habitat or population in any given year. Metrics include, but are not limited to, annual lek counts, wing counts, aerial surveys, habitat monitoring, and DDCT evaluations. For population metrics, normal population trends are calculated as the 5-year running mean of annual population counts. BLM field offices, with the assistance of their respective land and RMP implementation groups, local WGFD offices, and local sage-grouse working groups will evaluate the	Completely revised – revised by rangewide

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
Management Working Group on an annual basis. The purpose of these strategies is to address localized greater sage-grouse population and habitat changes byproviding the framework in which management will change if monitoring identifies negative population and habitat anomalies in order to avoid crossing a hard trigger threshold. Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short or long term, as allowed by law. The project level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal factor. The management agency (BLM) and the Adaptive Management Work Group will implement an appropriate response strategy to address causal factors not attributable to a specific project or to make adjustments at a larger regional or statewide level. Hard Trigger Response: Hard triggers are indicators that management is not achieving desired conservation results. Hard triggers would be considered a catastrophic indicator that the species is not responding to conservation actions, or that a larger-scale impact or set of impacts is having a negative effect. Within the range of normal population variables (5-year running mean of annual population counts), hard triggers shall be determined to take effect when two of the three metrics exceeds 60 percent of normal variability for the area under management in a single year, or when any of the three metrics exceeds 40 percent of normal variability for a 3 year time period within a 5-year range of analysis. A minimum of 3 consecutive years in a 5-year period is used to determine	metrics with the Adaptive Management Working Group on an annual basis. The purpose of these strategies is to address localized Greater Sage-Grouse population and habitat changes by providing the framework in which management will change if monitoring identifies negative population and habitat anomalies in order to avoid crossing a hard trigger threshold. Soft triggers require immediate monitoring and surveillance to determine causal factors and may require curtailment of activities in the short or long term, as allowed by law. The project level adaptive management strategies will identify appropriate responses where the project's activities are identified as the causal factor. The management agency (BLM) and the Adaptive Management Work Group will implement an appropriate response strategy to address causal factors not attributable to a specific project or to make adjustments at a larger regional or statewide level. Hard Trigger Response: Hard triggers are indicators that management is not achieving desired conservation results. Hard triggers would be considered a catastrophic indicator that the species is not responding to conservation actions, or that a larger-scale impact or set of impacts is having a negative effect. Within the range of normal population variables (5-year running mean of annual population counts), hard triggers shall be determined to take effect when two of the three metrics exceeds 60 percent of normal variability for the area under management in a single year, or when any of the three metrics exceeds 40 percent of normal variability for a 3 year time period within a 5-year range of analysis. A minimum of 3 consecutive years in a 5-year period is used to determine	

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
trends (i.e., years 1-2-3, years 2-3-4, years 3-4-5).	trends (i.e., years 1-2-3, years 2-3-4, years 3-4-5). Upon determination that a hard trigger has been tripped, the BLM will immediately defer issuance of discretionary authorizations for new actions within the Biologically Significant Unit for a period of 90 days. In addition, within 14 days of a determination that a hard trigger has been tripped, the Adaptive Management Work Group will convene to develop an interim response strategy and initiate an assessment to determine the causal factor or factors (hereafter called the causal factor assessment). The AMWG would define a process to review and reverse adaptive management actions once the identified causal factor is resolved (e.g., returning to previous management once objectives of interim management strategy have been met). In making amendments to this plan, the BLM will coordinate with the USFWS as BLM continues to meet its objective of protecting, restoring, and enhancing Greater Sage-Grouse habitat by reducing, minimizing or eliminating threats to that habitat. The hard and soft trigger data will be analyzed as soon as it becomes available after the signing of the ROD and then at a minimum, analyzed annually thereafter.	
MD 4142: Base future adjustments to the appropriate management level on monitoring information and multiple use considerations through development of and/or revisions to HMA Plans. Update HMA plans to include Greater Sage-Grouse objectives.	No changes made.	No change (same as 2015)

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
No similar action.	*MD 4151: The BLM will update its Greater Sage-Grouse habitat management areas, including biologically significant units (BSUs), in conjunction with the State of Wyoming's core areas, upon issuance of any Wyoming Governor's Executive Order revising or amending the core area boundaries and upon completion of appropriate NEPA analysis and process. The BLM will complete the appropriate NEPA documentation (including appropriate public comment) prior to adopting any revised core area boundaries (e.g., maintenance action or plan amendment, environmental assessment, etc.).	Partially revised – to change reference from BSUs to HAF multi-scale areas
No similar action.	*MD 4152: Specific to management for Greater Sage-Grouse, all RMPs are amended as follows: Adopt the State of Wyoming's Greater Sage-Grouse Compensatory Mitigation Framework to the extent consistent with federal law, regulations, and policy. In all Greater Sage-Grouse habitat, when authorizing third-party actions in designated Greater Sage-Grouse habitat, the BLM will seek to achieve the planning-level Greater Sage-Grouse management goals and objectives through implementation of mitigation and management actions, consistent with valid existing rights and applicable law. Under this Plan Amendment, management would be consistent with the Greater Sage-Grouse goals and objectives, and in conformance with BLM Manual 6840, Special Status Species Management. In accordance with BLM Manual 6840, the BLM will undertake planning decisions, actions and authorizations "to minimize or eliminate threats affecting the status of [Greater Sage-Grouse] or to improve the condition of [Greater Sage-Grouse] habitat" across the planning area.	Completely revised – revised by rangewide

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
	Accordingly, before authorizing third-party actions that result in habitat loss and degradation, the BLM will complete the following steps, in alignment with the Governor of Wyoming's Executive Order 2015-4 (July 29, 2015): 1. Work jointly with the WGFD to evaluate projects and recommend mitigation in the form of avoidance and minimization. 2. The WGFD will determine if the State requires or recommends any additional mitigation – including compensatory mitigation – under State regulations, policies, or programs related to the conservation of Greater Sage-Grouse. 3. Incorporate state required or recommended mitigation into the BLM's NEPA decision-making process, if the WGFD determines that compensatory mitigation is required to address impacts to GRSG habitat as a part of State policy or authorization, or if a proponent voluntarily offers mitigation. 4. Analyze whether the compensatory mitigation (deferring to the appropriate State authority to quantify habitat offsets, durability, and other aspects used to determine the recommended compensatory mitigation action): • achieves measurable outcomes for Greater Sage-Grouse habitat function on a landscape scale as determined by WGFD that are at least equal to the lost or degraded values in accordance with the Governor of Wyoming's Executive Order 2015-4. • provides benefits that are in place for at least the duration of the impacts. • accounts for a level of risk that the mitigation action may fail or	

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
	not persist for the full duration of the impact. 5. Ensure mitigation outcomes are consistent with the State of Wyoming's mitigation strategy and principles outlined in 2019 Wyoming GrSG ARMPA Appendix C, The Greater Sage-Grouse Habitat Management Strategy. The BLM has determined that compensatory mitigation must be voluntary unless required by other applicable law and in recognition that State authorities may also require compensatory mitigation (IM 2019-018, *Compensatory Mitigation*, December 6, 2018). Therefore, consistent with valid existing rights and applicable law, when authorizing third-party actions that result in habitat loss and degradation, the BLM will consider voluntary compensatory mitigation actions only as a component of compliance with a State mitigation plan, program, or authority, or when offered voluntarily by a project proponent. Project-specific analysis will be necessary to determine how a compensatory mitigation proposal addresses impacts from a proposed action. The BLM will cooperate with the State to determine appropriate project design and alignment with State policies and requirements, including those regarding compensatory mitigation. When the BLM is considering compensatory mitigation as a component of the project proponent's submission or based on a mitigation requirement from the State, the BLM's NEPA analysis would evaluate the need to avoid or minimize impacts of the proposed project and achieve the goals and objectives of this RMPA. The BLM will defer to the appropriate State authority to quantify habitat offsets, durability,	

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
	and other aspects used to determine the recommended compensatory mitigation action.	
MO LR:1.5: Effects of infrastructure projects, including siting, will be minimized using the best available science, updated as monitoring information on current infrastructure projects becomes available.	No changes made.	No change (same as 2015)
MD 6014: The Secretary's policy is, generally, not to dispose of public lands. However, FLPMA Sections 201 & 202 state the Secretary shall 'prepare and maintain on a continuing basis an inventory of all public lands and their resource and other values...' and '...develop, maintain, and, when appropriate, revise land use plans which provide by tracts or areas for the use of the public lands', respectively. Therefore, as mandated by FLPMA Sections 201 & 202, the following tract(s) of public land have been found to meet criteria for disposal in FLPMA Section 203 (Sales) and/or FLPMA Section 206 (Exchanges) during this land use planning effort (Appendix I, Land Disposal and Acquisition (p. 379); Map 3-21. The identification of a public land tract as having met FLPMA criteria for disposal is NOT, in itself, a decision to dispose of public lands. The process for disposing of public lands via FLPMA Section 203 or Section 206 is a lengthy multi-decisional process requiring a comprehensive site-specific analysis, survey, and follow-on decisions prior to a final decision being made by the Department of Interior. Disposal can include none, some, or all of the mineral estate as allowed by 43 CFR 2720 and FLPMA Section 209(b)(1). A mineral potential report would determine if a surface estate disposal includes none, some, or all of the mineral estate. (Map 3-21)	Retain approximately 2,048,905 acres of BLM-administered land. 52,080 acres of BLM-administered land are available for disposal by sale, exchange or other means (Map 3-21) (Appendix I, Land Disposal and Acquisition (p. 381)). Disposal can include none, some, or all of the mineral estate as allowed by 43 CFR 2720 and FLPMA Section 209(b)(1). A mineral potential report would determine if a surface estate disposal includes none, some, or all of the mineral estate. Lands classified as PHMAs and GHMAs for Greater Sage-Grouse will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, is in the public's best interest or (2) the agency can demonstrate that the disposal of the lands, including land exchanges, will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse. Consider exceptions where there is mixed ownership. Allow land exchanges for additional or more contiguous federal ownership patterns within PHMAs. For PHMAs with minority federal ownership, include an additional, effective mitigation agreement for any disposal of federal land. Consider pursuing a permanent conservation easement as a final preservation measure. For lands in GHMAs that are identified for disposal, the BLM will only dispose of such lands consistent	Partially revised (2019) – to update Map referenced, to update Appendix referenced, and to add SHMA

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
Lands classified as PHMAs and GHMAs for Greater Sage-Grouse will be retained in federal management unless: (1) the agency can demonstrate that disposal of the lands, including land exchanges, will provide a net conservation gain to the Greater Sage-Grouse or (2) the agency can demonstrate that the disposal of the lands, including land exchanges, will have no direct or indirect adverse impact on conservation of the Greater Sage-Grouse. Consider exceptions where there is mixed ownership. Allow land exchanges for additional or more contiguous federal ownership patterns within PHMAs. For PHMAs with minority federal ownership, include an additional, effective mitigation agreement for any disposal of federal land. Consider pursuing a permanent conservation easement as a final preservation measure. For lands in GHMAs that are identified for disposal, the BLM will only dispose of such lands consistent with the goals and objectives of this plan, including, but not limited to, the land use plan objective to maintain or increase Greater Sage-Grouse abundance and distribution. Note: All land actions to acquire or dispose of lands would require a site specific analysis under NEPA.	with the goals and objectives of this plan, including, but not limited to, the land use plan objective to maintain or increase Greater Sage-Grouse abundance and distribution. Note: All land actions to acquire or dispose of lands would require a site specific analysis under NEPA.	
**MD 6028: Designate ROW corridors as shown on Map 3-24. PHMAs are designated as avoidance areas for high voltage transmission line and pipeline ROWs. All authorizations in these areas must comply with the conservation measures outlined in this Approved RMP, including the RDFs and avoidance criteria presented in Appendix C, *Required Design Features and Best Management Practices* (p. 249). Within PHMAs, specific to management for Greater Sage-	Designate ROW corridors as shown on Map 3-24. PHMAs are designated as avoidance areas for high voltage transmission line and pipeline ROWs. All authorizations in these areas must comply with the conservation measures outlined in this Approved RMP, including the RDFs and avoidance criteria presented in 2019 Wyoming GrSG ARPMA Appendix B, Required Design Features and Best Management Practices. Within PHMAs, specific to management for	Partially revised – revised by adding rangewide GRSG major ROW language

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
Grouse, all RMPs are amended as follows: **New Transmission Lines (greater than 115 kV):** Allow new transmission lines greater than 115 kV in PHMA only (1) when located within 0.5 miles or less of an existing 115 kV or greater transmission lines constructed prior to 2008; or (2) in designated RMP corridors authorized for aboveground transmission lines. Do not count Transmission lines routed using one or more of the two criteria listed above against the DDCT 5 percent disturbance cap. Consider new transmission lines greater than 115 kV proposed outside of these areas where it can be demonstrated that declines in Greater Sage-Grouse populations could be avoided through project design and/or mitigation. These projects will be subject to the density and disturbance restrictions for PHMAs. Incorporate the *Framework for Sage-grouse Impact Analysis for Interstate Transmission Lines* (BLM 2012b) and other appropriate documents into the review of transmission line proposals, consistent with the three routing criteria described above. For new projects within PHMAs that may require future utility lines, including distribution and transmission lines or pipelines, include the proposed utility lines in their DDCT as part of the proposed disturbance. Count lines permitted, but not located in the above mentioned routes or a designated corridor, toward the 5 percent disturbance calculation (line distance is equal to the anticipated construction footprint or construction ROW width multiplied by length and includes all access roads, staging area, and other surface disturbance associated with	Greater Sage-Grouse, all RMPs are amended as follows: **New Transmission Lines (greater than 115 kV):** Allow new transmission lines greater than 115 kV in PHMA only (1) when located within 0.5 miles or less of an existing 115 kV or greater transmission lines constructed prior to 2008; or (2) in designated RMP corridors authorized for aboveground transmission lines. Do not count Transmission lines routed using one or more of the two criteria listed above against the DDCT 5 percent disturbance cap. Consider new transmission lines greater than 115 kV proposed outside of these areas where it can be demonstrated that declines in Greater Sage-Grouse populations could be avoided through project design and/or mitigation. These projects will be subject to the density and disturbance restrictions for PHMAs. Incorporate the Framework for Sage-grouse Impact Analysis for Interstate Transmission Lines (BLM 2012b) and other appropriate documents into the review of transmission line proposals, consistent with the three routing criteria described above. For new projects within PHMAs that may require future utility lines, including distribution and transmission lines or pipelines, include the proposed utility lines in their DDCT as part of the proposed disturbance. Count lines permitted, but not located in the above mentioned routes or a designated corridor, toward the 5 percent disturbance calculation (line distance is equal to the anticipated construction footprint or construction ROW width multiplied by length and includes all access roads, staging area, and other surface disturbance associated with	

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
construction outside of the construction ROW). **New Electric Distribution Lines (less than 115 kV):** Require burial of new electric distribution lines where economically feasible. If not economically feasible, distribution lines may be authorized when effectively designed/mitigated to protect Greater Sage-Grouse and when the authorized officer determines that overhead installation is the action alternative with the fewest adverse impacts while still meeting the project need. Consider agricultural and residential lines to be adequately mitigated for Greater Sage-Grouse if constructed at least 0.6 mile from the lek perimeter with appropriate timing constraints and constructed to the latest APLIC standards. These ROW authorizations will be subject to approval by the State Director. **Pipelines:** Allow new pipelines through PHMAs: (1) within an RMP corridor currently authorized for that use or designated through future RMP amendments; or (2) constructed in or adjacent to existing utilities (buried and aboveground) or roads. Pipelines constructed in RMP corridors or adjacent to existing utilities or roads will require completion of a DDCT analysis for baseline data collection, but the project is not required to meet the threshold of 5 percent. However, within 6 months of the completion of construction, the project proponent will provide the authorized officer with as-built drawings so that the total disturbance within PHMAs can be calculated annually.	construction outside of the construction ROW). **New Electric Distribution Lines (less than 115 kV):** Require burial of new electric distribution lines where economically feasible. If not economically feasible, distribution lines may be authorized when effectively designed/mitigated to protect Greater Sage-Grouse and when the authorized officer determines that overhead installation is the action alternative with the fewest adverse impacts while still meeting the project need. Consider agricultural and residential lines to be adequately mitigated for Greater Sage-Grouse if constructed at least 0.6 mile from the lek perimeter (or lek center if no perimeter is yet mapped) with appropriate timing constraints and constructed to the latest APLIC standards. These ROW authorizations will be subject to approval by the State Director. **Pipelines:** Allow new pipelines through PHMAs: (1) within an RMP corridor currently authorized for that use or designated through future RMP amendments; or (2) constructed in or adjacent to existing utilities (buried and aboveground) or roads. Pipelines constructed in RMP corridors or adjacent to existing utilities or roads will require completion of a DDCT analysis for baseline data collection, but the project is not required to meet the threshold of 5 percent. However, within 6 months of the completion of construction, the project proponent will provide the authorized officer with as-built drawings so that the total disturbance within PHMAs can be calculated annually.	

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 6029: Manage 1,767,274 acres as ROW avoidance areas (Map 3-24). Manage PHMAs as ROW avoidance areas for new ROW or SUA permits (799,391 acres). Within PHMAs where new ROWs/SUAs are necessary, locate new ROWs/SUAs within designated RMP corridors or adjacent to existing ROWs/SUAs where technically feasible. Subject to valid existing rights, including non-federal land inholdings, locate new, required ROWs/SUAs adjacent to existing ROWs/SUAs or where impacts to Greater Sage-Grouse are minimized. Work with proponents to design ROW applications to protect Greater Sage-Grouse.	No changes made.	Partially revised – revised by adding rangewide GRSG ROW language
MD 6040: Allow temporary closures to motorized vehicle use in areas that pose public health and safety risks, and/or where resource damage is imminent. In PHMAs and GHMAs, temporary closures will be considered in accordance with 43 CFR subpart 8364 (Closures and Restrictions); 43 CFR subpart 8351 (Designated National Area); 43 CFR subpart 6302 (Use of Wilderness Areas, Prohibited Acts, and Penalties); 43 CFR subpart 8341 (Conditions of Use). Temporary closure or restriction orders under these authorities are enacted at the discretion of the authorized officer to resolve management conflicts and protect persons, property, and public lands and resources. Where an authorized officer determines that off-highway vehicles are causing or will cause considerable adverse effects upon soil, vegetation, wildlife, wildlife habitat, cultural resources, historical resources, threatened or endangered species, wilderness suitability, other authorized uses, or other resources, the affected areas shall be immediately closed to the type(s) of vehicle causing the	No changes made.	Partially revised – to include SHMA

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
adverse effect until the adverse effects are eliminated and measures implemented to prevent recurrence. (43 CFR 8341.2) A closure or restriction order should be considered only after other management strategies and alternatives have been explored. The duration of temporary closure or restriction orders should be limited to 24 months or less; however, certain situations may require longer closures and/or iterative temporary closures. This may include closure of routes or areas.		
MD 6054: Design recreational sites, recreation facility development, and recreational access to avoid riparian habitat areas or develop and manage them in a manner that minimizes effects on riparian habitats. Construction of recreation facilities within PHMA must conform with the avoidance and minimization measures of this plan. If it is determined that these conservation measures are inadequate for the conservation of Greater Sage-Grouse, the BLM will require and ensure compensatory mitigation that provides a net conservation gain to the species.	Design recreational sites, recreation facility development, and recreational access to avoid riparian habitat areas or develop and manage them in a manner that minimizes effects on riparian habitats. Construction of recreation facilities within PHMA must conform to the avoidance and minimization measures of this plan. If it is determined that these conservation measures are inadequate for the conservation of Greater Sage-Grouse, the BLM will consider mitigation consistent with the applicable State management strategy (currently Governor of Wyoming's Executive Order 2015-4 (see also MD 4152).	Partially revised – to update mitigation reference
**MD 6198: In cooperation, consultation, and coordination with permittees/lessees, cooperators, and interested public, develop and implement appropriate livestock grazing management actions to enhance land health, improve forage for livestock, and meet other multiple use objectives by using the *Wyoming Guidelines for Livestock Grazing Management*, other appropriate BMPs (see Appendix C, *Required Design Features and Best Management Practices* (p. 249)), and development of appropriate range improvements. The BLM will prioritize (1) the review of grazing	In cooperation, consultation, and coordination with permittees/lessees, cooperators, and interested public, develop and implement appropriate livestock grazing management actions to enhance land health, improve forage for livestock, and meet other multiple use objectives by using the Wyoming Guidelines for Livestock Grazing Management, other appropriate BMPs (see 2019 Wyoming GrSG ARMPA Appendix B, Required Design Features and Best Management Practices), and development of appropriate range improvements. The BLM will	Completely revised – revised by rangewide

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMAs. In setting workload priorities, precedence will be given to existing permits/leases in areas not meeting Land Health Standards, with focus on allotments containing riparian areas or wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., wildfire) and legal obligations. The BLM will collaborate with appropriate federal agencies, and the State of Wyoming as contemplated under EO 2013–3 (Wyoming Office of the Governor 2013), to 1) develop appropriate conservation objectives; (2) defined a framework for evaluating situations where Greater Sage-Grouse conservation objectives are not being achieved on federal land, to determine if a causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and 3) identify appropriate site-specific actions to achieve Greater Sage-Grouse conservation objectives within the framework.	prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMAs. In setting workload priorities, precedence will be given to existing permits/leases in areas not meeting Land Health Standards, with focus on allotments containing riparian areas or wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., wildfire) and legal obligations. The BLM will collaborate with appropriate federal agencies, and the State of Wyoming as contemplated under EO 2013–3 (Wyoming Office of the Governor 2013), to 1) develop appropriate conservation objectives; (2) defined a framework for evaluating situations where Greater Sage-Grouse conservation objectives are not being achieved on federal land, to determine if a causal relationship exists between improper grazing (by wildlife or wild horses or livestock) and Greater Sage-Grouse conservation objectives; and 3) identify appropriate site-specific actions to achieve Greater Sage-Grouse conservation objectives within the framework.	
*MD 6202: Utilize a rangeland health assessment, resource monitoring, or analysis to determine if livestock grazing adjustments in amounts, kinds, or season are necessary. The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMAs will include specific management thresholds based on Greater Sage-Grouse Habitat Objectives Table (Table 2.7, "Greater Sage-Grouse Seasonal Habitat Objectives" (p. 22)) and Land Health Standards (43 CFR 4180.2) and one or more defined	Within PHMA, if monitoring data show the wildlife/special status species standard has not been met nor progress being made toward meeting that standard, there would be an evaluation and a determination made as to the cause. If it is determined that the current authorized livestock use is a significant causal factor in failing to achieve the wildlife/special status species standards, the BLM would address the achievement or progress toward achieving the LHSs (43 CFR 4180.2) and, if needed,	Completely revised – revised by rangewide

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. Greater Sage-Grouse Habitat Objectives Table (Table 2.7, "Greater Sage-Grouse Seasonal Habitat Objectives" (p. 22)), Land Health Standards (43 CFR 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.	Greater Sage-Grouse habitat maintenance or improvement. When NEPA analysis is required for a specific implementation action, one alternative would include mechanisms to make adjustments to meet or make progress toward meeting the wildlife/special status species standard. The analysis should also identify the BLM-approved data collection methodologies used for monitoring conditions and determining when adjustments are necessary. If current grazing management meets land health standards and provides for Greater Sage-Grouse habitat, there would be no need to analyze an alternative for Greater Sage-Grouse. Authorized uses in PHMA that incorporate habitat objectives for Greater Sage-Grouse must develop desired conditions based on Greater Sage-Grouse habitats present in the allotment and the ecological potential of sites that supports these habitats. Metrics used to monitor for objectives must be developed and inform the wildlife/SSS portion of the Standards for Healthy Rangelands. Within PHMA, seasonal habitat objectives for Greater Sage-Grouse apply only to those habitats delineated within an allotment during the specific season (e.g., breeding season objectives during breeding season). Data needed to inform the relationship between the authorized use and habitat condition would come from sample locations that appropriately reflect the impact of the authorized use on habitat conditions. Data points should fall within Greater Sage-Grouse seasonal habitat areas and be collected on ecological sites that have the potential to produce Greater Sage-Grouse habitat.	

2015 Approved RMPs	2019 BLM GRSG Approved RMP Amendments	Type of Change to Existing Management Direction in the Proposed RMP Amendment Proposed Plan
MD 6214: Allotments within PHMAs, focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.	No changes made.	No change (same as 2015)

2.20.2 Relevant Appendices

The following table shows which appendices from the 2015 and 2019 plans have management direction that would change by the Proposed RMP Amendment. If 2019 is not listed in the year, then no change was made to the appendix between the 2015 and 2019 plans. The 2015 Appendices can be found on the Bighorn Basin RMP ePlanning website. The 2019 Appendices can be found on the Wyoming GRSG ePlanning website.

ARMPA Appendix Name	Year	Type of Change to Existing Appendix Language in the Proposed RMP Amendment
A: Maps	2015	Completely Revised-revised by rangewide
A: Approved RMP Amendment with Management Goals, Objectives, and Decisions	2019	Partially Revised based on changes in Proposed RMP Amendment
B: Oil and Gas Lease Notices and Lease Stipulations; including Exception, Modification, and Waiver Criteria	2015	Partially Revised- Applies rangewide exceptions, modifications, and waivers
C: Required Design Features and Best Management Practices	2015, 2019	Partial change – no change (same as 2019) except the addition of livestock grazing BMPs
D: Greater Sage-Grouse Habitat Management Strategy	2015	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
C: Greater Sage-Grouse Habitat Management Strategy	2019	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
F: Wyoming Bureau of Land Management Mitigation Guidelines for Surface-Disturbing and Disruptive Activities	2015	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
G: Federal Oil and Gas Operations on Split-Estate Lands	2015	No change (same as 2015)
H: Monitoring and Evaluation	2015	Partially revised – revised by adding rangewide GRSG monitoring language
I: Land Disposal and Acquisition	2015	No change (same as 2015)
J: Recreation Management	2015	No change (same as 2015)
L: Implementation	2015	Partially Revised to incorporate applicable changes from Proposed RMP Amendment
M: Bighorn Basin Air Resource Management Plan	2015	No change (same as 2015)
N: Seasonal Raptor Stipulations for All Surface-Disturbing and Disruptive Activities	2015	No change (same as 2015)
O: Livestock Grazing	2015	No change (same as 2015)
No similar existing appendix		Addition of rangewide predator management as new appendix

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Appendix 3

Greater Sage-Grouse Habitat Management Area State-by-State Mapping Strategies

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Appendix 3. Greater Sage-Grouse Habitat Management Area State-by-State Mapping Strategies

This appendix describes the BLM's GRSG habitat management area approach and state specific mapping strategies that were utilized in identifying habitat management areas (HMAs). The BLM identifies two primary rangewide habitat management areas, Priority Habitat Management Areas (PHMA) and General Habitat Management Areas (GHMA). Many individual BLM states also identify state-specific HMAs that respond to local habitat variation and management needs within those states. This appendix provides a description of the rangewide and state specific habitat management areas and the manner in which they have been updated as part of this RMP Amendment effort.

New spatial information published since 2015 provided data used in the revision of habitat management area boundaries to provide for increased conservation of GRSG. This information included GRSG habitat persistence (Wann et al., 2022), habitat and genetic connectivity (Cross et al., 2018, Row et al., 2018, Cross et al., 2022, Oyler-McCance et al., 2022), GRSG distribution (Doherty et al., 2016, Coates et al., 2021) and likelihood of sagebrush habitat persistence under changing climatic conditions (Palmquist et al., 2021, Rigge et al., 2022). The BLM reviewed this new data and coordinated with state wildlife agencies to propose adjustments to the habitat management areas to enhance GRSG conservation as a component of the RMP Amendment effort. Some states (OR, NV, WY) were already in the process of updating habitat management area delineations based on local data and the BLM worked closely with these states to consider all data in these revisions.

3.1 RANGEWIDE HABITAT MANAGEMENT AREAS

3.1.1 Priority Habitat Management Areas (PHMA)

PHMAs have the highest value to maintaining sustainable GRSG populations and can include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors. The BLM intent for these areas is to maintain and enhance habitat conditions that will support persistent and healthy GRSG populations through management to minimize habitat loss and degradation.

In response to cooperating agency and public comments and internal review of the effects of the Draft RMPA/EIS alternatives on GRSG and GRSG habitat, the BLM has identified areas within PHMA that will receive increased protections and these areas are referred to as PHMA with limited exceptions.

PHMA with Limited Exceptions

PHMA with limited exceptions are areas within PHMA where additional protections to support conservation of GRSG habitat would reduce impacts from highly probable resource threats.

Process and Criteria Used for Identifying PHMA with Limited Exceptions

The BLM received multiple comments across a broad spectrum of the public and cooperating agencies raising concerns about the impacts of renewable energy, fluid mineral, and rights of way development in GRSG habitats, including application of exceptions. In response, the BLM determined it would be appropriate to apply solar and wind development exclusion with exceptions in PHMA based on the rangewide nature of this development threat. The BLM further reviewed areas of habitat connectivity and population strongholds

to determine if additional protections would be necessary. The BLM focused this review primarily in the potential ACECs identified in Alternatives 3 and 6 due to the rigorous process that went into identifying these areas with relevant and important GRSG values. (The BLM considered all available data and multiple lines of information at multiple spatial scales to determine what, if any areas met relevance and importance criteria for ACEC designation. The incorporation of local information, and considerations of data accuracy and scale of application were carefully reviewed to identify potential areas of high value or concern related to GRSG use and conservation. Refer to Appendix 5 for greater detail on identifying potential ACEC areas).

In considering whether additional protections beyond those provided by the exclusion with exceptions to solar in wind development proposed in PHMA were necessary; the BLM considered the remaining risks that might still exist related to renewable energy, fluid mineral, and rights of way development. The review identified areas within existing PHMA (referred to as PHMA with limited exceptions) to be managed as exclusion areas for solar and wind development with no exceptions, no surface occupancy for fluid minerals with no exceptions, and exclusion areas for major rights-of-way with limited exceptions. Limiting the number of exceptions from management measures already in use for PHMA did not justify giving these areas a separate designation but rather recognizing they are areas within PHMA that require a limited amount of further protection. In addition, since the changes in management were consistent across the range, the areas were less suited to an ACEC designation, which are generally tailored to different values and locations.

Following is a state-by -state summary of the areas identified:

Colorado: The area identified as the Case Flat potential ACEC in Alternatives 3 and 6 was identified as requiring limited exceptions to PHMA protections due primarily to the threat from fluid mineral development. This 4,547-acre area provides a unique wintering habitat that supports the population in North Park, Colorado (refer to Appendix 5 for more information).

Idaho: The area identified as the Shoshone Basin potential ACEC in Alternatives 3 and 6 was identified as requiring limited exceptions to PHMA protections due primarily to the threat from major rights of way and wind energy development. The 257,472-acre Shoshone Basin area is contiguous with the North Fork O'Neil Nevada population, one of the largest intact habitat areas in that state. By providing the additional protections from major rights of way and renewable energy development, Shoshone Basin allows for seamless conservation across state lines and supports the population of GRSG that use both areas (refer to Appendix 5 for more information).

Montana: The area identified as South Valley Phillips potential ACEC in Alternatives 3 and 6 was identified as requiring limited exceptions to PHMA protections due to noteworthy genetic connectivity/value and population density, coupled with a relatively high proportion of federal ownership compared to the rest of Management Zone 1. In addition, the 615,888-acre South Valley Phillips area is an intact sagebrush landscape adjacent to other protected federal lands (notably Charles M. Russell National Wildlife Refuge) and provides the wintering habitat for GRSG migrating in from north of the Milk River, including Canada, maintaining the persistence of those birds, which are listed as endangered in Canada (refer to Appendix 5 for more information).

Nevada/California: The areas identified as Warm Springs, North Fork O'Neil, Owyhee East[1], Grass-Kobe Valley, South Fork Dixie Flats, Idaho Border, Hays Canyon, Vya-Massacre, and Buffalo Skedaddle potential

[1] As the two areas are adjacent, the Owyhee East potential ACEC area was incorporated into the North Fork O'Neil PHMA with limited exceptions area in the Proposed RMP Amendment.

ACECs in Alternatives 3 and 6 were identified as requiring limited exceptions to PHMA protections due primarily to the threats from major rights of way and renewable energy. Following are the acreages of each of the PHMA with limited exception areas: Warm Springs (89, 539 acres), North Fork O'Neil (1,546,044 acres), Grass-Kobe Valley (488,972 acres), South Fork Dixie Flats (133,406 acres), Idaho Border (49,140 acres), Hays Canyon (350,502 acres), Vya-Massacre (305,529 acres), Buffalo Skedaddle (190,800 acres). GRSG habitat is naturally fragmented by Nevada's basin and range geology. These areas represent remaining intact sagebrush habitat with minimal anthropogenic disturbance. Significant habitat losses due to wildfire and challenging restoration due to the low elevation, dry climate make conserving these remaining intact landscapes a conservation priority (refer to Appendix 5 for more information).

Oregon: The existing 32,952-acre High Lakes ACEC was identified as requiring limited exceptions to PHMA protections due primarily to the threats from major rights of way and renewable energy development. The additional restrictions in High Lakes for GRSG will also help maintain the sagebrush landscape integrity in that area, which supports dense populations of GRSG and other sagebrush associates such as pronghorn (refer to Appendix 5 for more information).

Utah: No areas were identified as requiring additional protections beyond those provided by PHMA management direction in the Proposed RMP Amendment.

Wyoming: The area identified as the Little Sandy/Golden Triangle ACEC in the Draft RMPA/EIS was identified as requiring limited exceptions to PHMA protections due to the unique ecological qualities, limited existing invasive annual grasses and anthropogenic infrastructure, and the threat of fluid mineral development. The 272,557-acre Little Sandy/Golden Triangle area is a large expanse of intact sagebrush that supports portions of the densest population of GRSG across its entire range. This area also provides important habitat for other sagebrush associated species, including elk, pronghorn and mule deer with known migration routes through this area (refer to Appendix 5 for more information).

3.1.2 General Habitat Management Areas (GHMA)

GHMAs are lands that are or have the potential to become occupied seasonal or year-round habitat outside of PHMA, managed to sustain GRSG populations. These areas are defined differently by state wildlife management agencies, but generally are of poorer GRSG habitat quality with reduced occupancy when compared to PHMA. Some state wildlife agencies have identified areas of GHMA as important for restoration, connectivity, or seasonal habitats, and most require mitigation for unavoidable impacts within this designation. The intent for GHMA is to maintain habitat conditions to support GRSG populations consistent with the state agency designations of recovery, connectivity, or seasonal habitats.

3.2 COLORADO

The BLM has incorporated Habitat Management Area (HMA) boundaries submitted by Colorado Parks and Wildlife (CPW) into the mapping efforts for the Greater Sage-Grouse Resource Management Plan Amendment effort. BLM Colorado relies on CPW's expertise as the state wildlife agency to map greater sage-grouse (GRSG) habitat using the best available science. The revised habitat Priority Habitat Management Area (PHMA) and General Habitat Management Area (GHMA) boundaries currently represent the best-known habitat delineations of GRSG habitat in Colorado.

The definitions of PHMA and GHMA have not changed since initially defined in the 2015 ARMPA. PHMAs have been identified as having the highest conservation value to maintaining sustainable GRSG populations. They include breeding, late brood-rearing, and winter concentration areas. The BLM has identified these areas in coordination with CPW. GHMAs are areas of seasonal or year-round GRSG habitat outside of

priority habitat. The BLM has identified these areas in coordination with CPW. In Colorado, the BLM and CPW incorporate an additional category, Linkage Management Areas (LMA) which were previously referred to as Linkage Connectivity Habitat Management Areas (LCHMAs) in the 2015 and 2019 ARMPAs. LMAs have been identified as broader regions of connectivity important to facilitate the movement of GRSG and maintain ecological processes, though they are not considered occupied habitat (Colorado Greater Sage-grouse Steering Committee, 2008). The BLM has removed the terms 'connectivity' and 'habitat' from the classification to reduce confusion with other applications of the term connectivity. Similarly, these areas are not considered occupied habitat though they might still contain sagebrush or associated vegetation communities that could serve as stop over points for grouse moving between populations. More information on the background and mapping methodology for LMAs can be found in the Colorado Sage-Grouse Conservation Plan (Colorado Greater Sage-grouse Steering Committee, 2008).

Prior to the current planning process, the BLM and CPW adopted refined HMA maps based on the modeling efforts of Olsson Consultants on behalf of the Associated Governments of Northwest Colorado (DOI-BLM-CO-S000-2020-0003-CX). The multi-year (2016-2019) collaborative mapping process refined the previously mapped areas to remove non-habitat in HMAs or expand areas with documented GRSG use. The 2019 re-mapping effort incorporated state-specific, timely research and mapping tools. For the full methodology, see Olsson Project No. 016-516 (2019).

The refined HMA (2019) dataset was created by preparing fine-scale population-specific Species Distribution Models (SDMs) to map revised PHMA and GHMA areas for each of the six GRSG populations within the current occupied range of Colorado. First, known presence locations of marked GRSG were used to train Random Forest and Resource Selection Function (RSF) models to estimate seasonal (e.g., breeding, summer-fall and winter) habitat suitability. Secondly, the seasonal model results were classified into high or low habitat suitability categories and subsequently compiled to produce a year-round habitat suitability map. Third, the resulting year-round habitat suitability maps were used to develop revised PHMA and GHMA areas for each population. All areas classified as highly suitable habitat in each population's year-round classified habitat layer were classified as PHMA, while the remaining low habitat suitability areas were classified as GHMA. Finally, the current occupied range for each population was modified to exclude areas identified as unsuitable habitats (Olsson 2019). CPW reviewed the dataset and made minor modifications to include areas outside of previously mapped occupied range where evidence of GRSG occupancy exists. The BLM made slight modifications to the dataset by incorporating a minimum mapping unit and snapping the GIS layers to the state boundary. The 2019 mapping update did not model or adjust LMA boundaries.

During the current planning effort, the BLM coordinated with CPW to review the previous HMA compared to new data that became available since 2015. The BLM and CPW also coordinated with the wildlife agencies from Wyoming and Utah to determine if there was relevant cross-border information. The BLM and CPW revised two areas in the Northwest CO population to incorporate new (2017-2022) lek count data and to incorporate GRSG location data provided by Utah Division of Wildlife Resources. The updates resulted in approximately 49,000 acres of previously mapped GHMA becoming PHMA and 1,400 acres of previously unmapped areas becoming GHMA.

Alternative 1 uses the refined HMA (2019) dataset that was incorporated into the 2015 Northwest Colorado GRSG ARMPA via plan maintenance action. Alternative 2 uses the previous HMA dataset that was originally used for the 2015 and 2019 ARMPAs. Because of the timing of the preliminary injunction for the 2019 ARMPA, the BLM only applied the maintenance action and updated maps to the 2015 ARMPA.

Alternatives 4, 5, and 6 incorporate the most recent lek count and telemetry data from both Colorado and adjacent states. Based on these data, approximately 49,000 acres of previously mapped GHMA would be classified as PHMA and 1,400 acres of previously unmapped areas would be classified as GHMA. Both changes occur in the Northwest Colorado population. They difference between alternative 1 and alternatives 4, 5, and 6 is a 4.2% increase of PHMA in Northwest Colorado resulting in a 2.6% increase of PHMA in all of Colorado. The portion of previously unmapped area that would be classified as GHMA represents a 0.05% increase of total habitat management area extent in the Northwest Colorado population.

Alternative 3 represents the total habitat management area extent of alternatives 4, 5, and 6 but PHMA and GHMA would both be classified as PHMA. Alternative 3 includes the 1,400 acres of previously unmapped area in the Northwest Colorado population and therefore has a larger spatial extent than Alternative 1.

Compared to all other alternatives, alternative 2 includes the highest acreage because many of the interior areas of non-habitat had not been removed. However, there are some areas where the most recent data indicate GRSG use that would not be captured by the alternative 2 HMAs. Using the HMAs in alternative 2 would require more on-the-ground verification and more plan criteria that addresses non-habitat. Alternatives 1, 4, 5, and 6 still require implementation-level verification but represent a more accurate depiction of GRSG habitat in Colorado. Alternatives 3, 4, 5, and 6 incorporate the most recent GRSG data.

The Proposed RMP Amendment is nearly identical to the HMA delineations for Alternatives 4, 5, and 6 with minor differences. CPW, based on information provided by Utah Division of Wildlife Resources, provided the BLM with more refined GHMA layers for the expanded mapped area in Northwest Colorado which increased the mapped GHMA extent by approximately 200 acres. In addition, approximately 500 acres of GHMA were converted to PHMA in the North Park population due to inclusion of a known, mapped winter concentration area with high conservation value. This reclassification is consistent with the definition of PHMA above.

3.3 IDAHO

BLM Idaho reviewed and revised HMAs for Alternatives 3, 4, 5, and 6 due to the availability of new data on GRSG, vegetation, and new range wide science on GRSG. BLM Idaho worked closely with Idaho's Governor's Office of Species Conservation (OSC), the Idaho Department of Fish and Game (IDFG), and other cooperating agencies during the review and revisions. First, IDFG worked to revise the extent of HMA based on biology, i.e. GRSG observations and habitat. Second, BLM Idaho reviewed HMA revisions as well as new range wide science and made HMA designations based on the 2015 Idaho-Southwest Montana Approved Resource Management Plan Amendment (ARMPA) for Alternatives 3 and 4. Third, the State of Idaho (OSC, IDFG) independently reviewed 2015 HMAs and new information including the modified HMA extent from Alternatives 3 and 4 and solicited input from stakeholders and other state agencies. The state provided BLM Idaho an initial draft in early May and a final draft in late September, taking into account the above input and assigning HMA designations based on definitions from the Idaho 2021 Plan (State of Idaho 2021). The BLM used the State of Idaho's final draft for HMA designations for Alternative 5 without modification and for Alternative 6, with the BLM's addition of ACECs within PHMA.

3.3.1 Data Sources

Data sources used during HMA review and revisions for all alternatives included:

- **GRSG observations and population data:**
  - Lek survey data
  - Idaho breeding bird density (IDFG 2020)

  - GPS and VHF radiotelemetry studies, including individual movements and connectivity areas between seasonal ranges
  - Other reliable observations of unmarked birds since 2000 (e.g. incidental observations during targeted sage-grouse surveys and big game aerial surveys, falconry reports)
- **GRSG habitat models:**
  - General Habitat Suitability Index (HSI; seasons pooled) (IDFG 2018, 2019a)
  - Winter habitat suitability model (IDFG 2019b)
  - Late Brood-rearing (LBR) habitat suitability model (IDFG 2019b)
  - Spring habitat suitability model (IDFG 2019b)
  - GRSG breeding habitat (Doherty et al. 2016)
  - Craters of the Moon (CRMO) Sage-Grouse Habitat (Univ of Idaho and NPS 2018)
- **Remote sensing habitat models:**
  - Sagebrush cover (Rangeland Condition Monitoring Assessment and Projection [RCMAP] 2020, 2021)
  - Tree canopy cover (Rangeland Analysis Platform [RAP] 2021; Allred et al. 2021)
  - Annual grass cover (RCMAP 2020)
- **Other data:**
  - Fire history; perimeters through 2021 (BLM, NIFC data)
  - Visual interpretation of ortho-imagery (e.g., 2021 NAIP [OCM Partners 2023], Google Earth imagery)
  - Anthropogenic features from the Idaho Sage-grouse Habitat Quantification Tool

Additional data sources used for Alternative 4 included:

- **New range wide science on GRSG**
  - GRSG breeding bird density (Doherty et al. 2016)
  - GRSG lek persistence (Wann et al. 2023)
  - Genetic connectivity (Row et al. 2018, Cross et al. 2023)
  - Sagebrush Conservation Design tool (Doherty et al. 2022)

3.3.2 Methods

HMA Background for Alternatives 3, 4, 5, and 6

First, IDFG revised the extent of HMA using the 2015 HMA as a base map and revised HMA based on direct evidence of habitat use (i.e., locations of observations) or a body of evidence that predicts GRSG space use irrespective of land ownership. Habitat was delineated using the best available science from the data sources listed above.

HMA Additions. In general, HMA was added if an area met one or more of the following criteria: documented GRSG observations, ≥ 3 models predicted suitable habitat, known winter or summer seasonal distributions, suitable (≥ 8%) sagebrush cover, and low (< 30%) tree canopy cover. With few exceptions, additions were located within a 10-km buffer of occupied and pending leks (i.e., 2022 management status). This criterion was a means to exclude seemingly good sagebrush habitat that appeared to be unoccupied.

HMA Subtractions. Areas that were subtracted from the 2015 HMA map generally lacked GRSG observations, had low habitat model agreement (< 3 models), low sagebrush cover and/or high tree canopy cover and annual grass cover (> 20%). Non-habitat areas were generally removed from the margins, whereas some

small gaps of non-habitat within existing HMAs were filled, particularly if near GRSG observations. Occupied areas subject to more recent disturbance were not subtracted, particularly if they were expected to recover naturally or through restoration and are adjacent to quality habitat.

A concerted effort was made to consistently represent habitat across the state, and rationales were developed to justify additions and subtractions. Local experts were consulted as needed. The new 'biology map' was used for the HMA extent for Alternatives 3 and 4 and an early draft of Alternatives 5 and 6.

HMA for Alternative 4

For HMA designations under Alternative 4, BLM Idaho evaluated the GRSG biology map's proposed additions and subtractions, and the new range wide science on GRSG and designated HMA based on the 2015 ARMPA definitions:

PHMA (Priority): Areas identified as having the highest value to maintaining sustainable GRSG populations. Areas of PHMA largely coincide with areas identified as priority areas for conservation in the United States Fish and Wildlife (USFWS) Conservation Objectives Team (COT) report. These areas include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors.

IHMA (Important): Areas that provide a management buffer for PHMA and connect patches of PHMA. IHMA encompass areas of generally moderate to high conservation value habitat and populations but that are not as important as PHMA.

GHMA (General): Areas where some special management will apply to sustain GRSG populations; areas of occupied seasonal or year-round habitat outside of PHMA or IHMA.

Efforts were made to protect PHMA by a) avoiding isolating or fragmenting large blocks of PHMA, and b) applying new rangewide science, i.e. lek persistence, breeding bird density, genetic connectivity. To focus on areas with high conservation value based on the new science, BLM Idaho combined the following data layers: lek persistence (medium or high; Wann et al 2022), breeding bird density (50 and 25 relative percentage of the population and the highest densities of breeding birds; Doherty et al. 2016); and genetic connectivity (> 90% or > 95%; Cross et al. 2023). This resulted in a raster layer with values ranging from 0 to 6. Any areas classified as 3 or higher by this model were compared with the existing HMA designation. If these areas were not in PHMA, new polygons were drawn, generally following the extent of values ≥ 4, or corresponding to either two of the three layers (lek persistence, breeding bird density, Priority Genetic Pathways). In some instances, the polygon boundary was refined with information from the Key Habitat map or aerial imagery. Areas with high tree cover (≥ 30%) or high annual grass cover (≥ 20%) were excluded from additional areas of high conservation value and were not added to PHMA.

HMA for Alternative 5

For this alternative, the BLM used HMA boundaries for GRSG provided by the State of Idaho for consideration in the LUP effort. This map was created by the IDFG and OSC to assist the BLM in their land use planning effort initiated in 2021 (86 FR 66331).

Consistent with the other alternatives, the state's map for alternative 5 adopts a 3-tiered habitat zoning strategy – PHMA, IHMA, and GHMA - to represent a management continuum strategy for GRSG conservation (see the 2021 Idaho Plan for more details, available at https://species.idaho.gov/wildlife-species/greater-sage-grouse/).

This HMA map was based on IDFG's "Biology Map" (version 03/08/2023), which describes GRSG habitat extent (i.e., space use) in Idaho, with the BLM's 2019 GRSG HMA applied. Between draft and final HMA maps, the State of Idaho refined the HMA extent further. HMAs were updated using new science and state policy direction. HMA types reflect breeding bird density (indexed by male lek attendance), habitat quality (suitability, the extent, configuration, and degree of fragmentation), GRSG occupancy and movements patterns. Data sources used are those listed under GRSG observations, Habitat suitability models, and remote sensing habitat models (see details listed above).

In general, PHMA encompassed high and medium-high BBD (25-50%), large areas of intact, habitat (medium and high HSI, high sagebrush cover (>8%), low tree canopy cover (<30%), and low annual herbaceous cover (<20%)), important connectivity and seasonal habitat, especially winter, as evidenced by telemetry locations, and a lack of disturbance (e.g., fire, anthropogenic features). IHMA serves to connect and buffer PHMA and encompassed slightly lower quality and/or more fragmented habitat, with lower BBD (50-100%). GHMA encompassed more marginal habitat outside of PHMA and IHMA, with the lowest BBD (100% or outside the 10km occupied lek buffers) and more limited sage-grouse space use.

When information was lacking, best professional judgments were made. There were a few exceptions to these general rules concerning policy (e.g., special community values) and land ownership. Other science products were referenced, e.g., lek persistence, landscape importance, sagebrush ecological integrity, and genetic connectivity models, but these were not primary decision support tools.

HMA for Alternative 6

For this alternative, the HMA boundaries were the same as for Alternative 5. Though BLM used this as the starting point, Alternative 6 also mapped ACECs (see Appendix 5).

HMA for the Proposed RMP Amendment

HMA for the Proposed RMP Amendment is as the HMA under Alternative 5, except for two polygons in Custer County. Both of these areas (west of Thousand Springs Valley and Sage Creek; and along the valley of the Big Lost River) were mapped as GHMA under Alternative 5. After additional review, it was determined that these areas provide important connectivity areas between PHMA to the north and south; therefore, these polygons were mapped as IHMA under the Proposed RMP Amendment.

3.3.3 Montana/Dakotas

In the Montana-Dakotas portion of their range, GRSG are found in southwestern Montana and across eastern Montana from the Canadian to the Wyoming border, as well as in northwestern South Dakota, and southwestern North Dakota. In Montana, there are about 1,000 confirmed active GRSG leks, out of 1,892 known lek locations (MT FWP 2022). The number of confirmed active leks has grown since 2002 as survey efforts have identified new leks and have been able to identify the status of unconfirmed leks. The Dakotas are on the far eastern edge of GRSG range and the two states' populations are considered at a higher risk of extirpation because of their small numbers and isolation. GRSG in the Dakotas form a population connected to areas in eastern Montana and northeast Wyoming, though it is unclear how many birds move between the states (Cross et al. 2016, Row et al. 2018, Oyler-McCance et al. 2022). In addition, GRSG may reside near (within a handful of miles) their spring breeding grounds, leks, or undertake migratory movements between seasonal habitats. Differences between seasonal movements across the range may be driven by weather, juxtaposition of seasonal habitats, and other factors. Therefore, to account for differences between states and GRSG populations, the strategy for identifying HMAs, in cooperation with state natural resource entities, varies both among the three states, and across Montana.

In Montana, the Governor's Executive Order (EO) 12-2015 delineated core areas, general habitat, and connectivity habitat. Core areas capture the leks for 75-80% of displaying males and associated breeding and other seasonal habitats. These areas are considered the highest conservation priority. General Habitat, therefore, contains about 1/5 of the displaying males and is also an important component. The EO states, "Development scenarios in General Habitat are more flexible than in Core Areas, but should still be designed and managed to maintain populations, habitats, and essential migration routes, since this Conservation Strategy requires habitat connectivity and movement between populations in Core Areas." The Montana EO also identifies connectivity habitat, specifically a corridor where birds move from spring and summer areas close to the Canadian border to wintering areas farther south in Valley County.

Conversely, both North and South Dakota use a different approach than Montana to account for fewer leks, small populations sizes, and being found on the periphery of the range. Both states included all active leks (known breeding population) in their core areas. In South Dakota, active leks were buffered by 4 mi (6.4km) and in North Dakota 5.3m (8.5km) to capture breeding areas and habitat (SD GF&P 2022, NDG&F 2014). Then these buffered areas were refined to account for large areas of non-habitat, bird location information, resource selection functions, and expert opinion (along with collaboration with neighboring states and the BLM). In 2022, the State of South Dakota Game, Fish, and Parks released a new GRSG Action Plan with update core areas accounting for new GRSG movement data.

In the 2015 GRSG Plans in MT-Dakotas, the BLM used the core areas from the three states and general habitat from Montana as a starting point to identify HMAs. The BLM designated Priority, Restoration, and General HMAs (PHMA, RHMA, and GHMA). Primarily PHMA is equivalent to the state identified core areas. Two main differences exist, first small adjustments were made during the planning process based on cooperating agency and public input to identify PHMA in some areas. Second, the BLM designated some core areas as RHMA, where there were ongoing or imminent impacts to these high-quality habitats to emphasize the long-term restoration needs. The objectives for these areas include restoring habitat in order to provide the ability for establishing or enhancing GRSG populations. In Montana the EO general habitat was used as a starting point to identify GHMA, and individual plans worked with local experts and stakeholders to refine these, as needed. To identify general habitat in North and South Dakota the BLM used the current occupied range, along with local vegetation mapping and biologists' opinion, to account for areas where there is limited evidence of breeding habitat but known seasonal or sporadic use by GRSG.

To create HMAs for this current planning effort the BLM built off these prior efforts and again engaged cooperating agencies and stakeholders in the process. The BLM combined local knowledge, experience since the 2015 plans, and updated state information to compliment and provide context to new range wide and management zone habitat modeling efforts. The new GRSG science was used to identify areas to consider emphasizing based on management zone or rangewide importance, and to refine the type, quality, and location of habitat areas. Throughout the process the BLM sought consistency, as appropriate and supported, with state natural resource entity core and general (also connectivity in MT) habitat areas. The two types of possible changes to be made in the range of alternatives by considering new information since prior planning efforts are: First, areas that should be added (or omitted) that provide (or do not) habitat for GRSG; and Second, what changes to HMA types should be made across Montana-Dakotas. HMAs are delineated as approximate boundaries and representations of habitat, utilize models and coarse grain data, and don't account for the dynamic nature of GRSG populations. Therefore, habitat characteristics should be verified with local data and efforts and there may be areas of non-habitat contained within HMAs.

The BLM considered designating (including new areas and adjustments) four types of HMAs. These include the 2015 types, PHMA, RHMA, and GHMA, and an additional HMA called Connectivity (CHMA) to capture unique, potential migration areas, particularly in silver sage habitat. Priority habitat (PHMA) includes areas with relatively limited impacts and containing substantial and high-quality habitat. These areas have been identified as having the highest conservation value to maintaining sustainable GRSG populations or maintaining the extent of the GRSG range. Restoration Habitat (RHMA) are areas with ongoing or imminent impacts that recently (i.e., in the 21st Century) contained substantial and high-quality GRSG habitat. In general, these areas differ from other HMAs as the BLM is identifying separate management actions to emphasize restoring habitat to establish or enhance GRSG populations. General habitat (GHMA) are areas with or without ongoing or imminent impacts containing seasonal or year-round habitat outside other HMA, including for the purpose of promoting movement and genetic diversity. Finally, Connectivity Habitat (CHMA) are areas that provide regions of connectivity important to facilitate the movement of GRSG and maintain ecological processes. While typically unoccupied or with inactive leks, this HMA boundary represents where stopover sites may exist, likely within a matrix of degraded or converted habitat or non-habitat, particularly in silver sagebrush habitats in northern Montana.

In both Alternatives 1 and 2 HMAs are the 2015 designations, as MT/Dak was not part of the 2019 plan amendments. In these alternatives two areas of the state with known GRSG habitat do not have designated HMAs because the Butte Field Office and the Upper Missouri River Breaks National Monument (UMRBNM) were not part of the 2015 planning effort. While there are no designated HMAs for Butte and UMRBNM these RMPs contain GRSG related objectives and management actions. While there are some differences between the MT EO habitat boundaries and the BLM 2015 GRSG Plan HMAs, the proportion of birds found in different habitat types remains similar. The BLM PHMA and RHMA boundaries encompass 75-80% of known displaying males (similar to core areas) with the remaining 1/5 to 1/4 of the state population found in GHMA (similar to general habitat). In North and South Dakota BLM PHMA matches the core habitat identified by those states at the time, capturing the majority of breeding habitat for all known active leks.

Alternative 3 considers HMA boundary adjustments to the 2015 plans, utilizing those HMAs as a starting point. Changes account for areas of GRSG habitat or leks identified since 2015, removal of areas that are not, and highly unlikely to be, occupied in the future and state identified connectivity habitats in Montana. This alternative would consider the same management across all HMAs, (i.e., all occupied HMAs as PHMA), therefore changes are focused on refining the extent of habitat. Through the planning process the BLM identified that in North Dakota and South Dakota GRSG habitat extent has not changed since 2015 Records of Decision (RODs). In Montana the BLM added in areas of habitat mapped by MT FWP where there is evidence of use, while also removing areas designated by the BLM in 2015 but are not considered GRSG habitat by MT Fish, Wildlife, and Parks (FWP) or based on multiple lines of evidence are not GRSG habitat. In addition, habitat in Butte and UMRBNM was included as HMAs. Finally, due to the unique behavior of GRSG in silver sage habitat (in the Havre, Malta, and Glasgow Field Offices under the HiLine RMP) the BLM mapped and designated Connectivity habitat (CHMA). These areas included state connectivity habitat as well as additional areas that may also provide for GRSG movement between known populations. All changes were made by considering local knowledge, cooperating agency input, and multiple sources of information, e.g., based on the preponderance of evidence.

For Alternative 4, 5 and 6 the outer boundaries (extent) for these alternatives remains the same as determined in Alternative 3. In addition, HMA designation do not vary between the alternatives 4, 5 and 6. The CHMA areas identified in Alternative 3 were included in 4, 5 and 6 as well. The criteria used to consider adjustment from prior HMA designations was to improve consistency between BLM field offices, between

BLM and state delineations, and between states (including Idaho and Wyoming), while accounting for new science and on-the-ground knowledge to consider adjustments to HMA boundaries. In some instances, meeting all criteria was not possible, as aspects were in conflict (e.g., consistency between multiple entities). The BLM weighed these various inputs and utilized the preponderance of evidence to designate HMA types. Overall, the goal is that changes are supported with a sound rationale including relevant biological and/or management considerations. The types of changes made in comparison with Alternative 1 and 2 HMAs include switching between RHMA and PHMA (where different management was not needed or for consistency across boundaries), changing GHMA to PHMA (areas of regional importance and for consistency with the state core areas or across state borders), switching GHMA to CHMA or identifying new CHMA (areas where habitat remains that may be important for movement), and changing PHMA to GHMA (improved consistency with state core areas). The proportion of breeding birds in HMAs among the three states remain about the same as Alternatives 1 and 2, with around 80% of birds (breeding habitat) in PHMA in Montana, whereas all known leks are within PHMA in North and South Dakota.

Consistent definitions are needed for HMAs in Montana/Dakotas due to variations in language between existing plans, lack of CHMA definitions in Alternatives 1 and 2, and to apply HMA definitions in the Upper Missouri River Breaks National Monument and Butte RMPs. HMAs would be defined in all applicable action alternatives as:

PHMA: Areas with limited impacts containing substantial and high quality GRSG habitat that have been identified as having the highest conservation value to maintaining both sustainable sage-grouse populations and the range of GRSG. Management actions would emphasize the protection and enhancement of GRSG. Areas are delineated using mapped state core areas, GRSG density/habitat models, genetic connectivity information, and other resource information that the BLM has identified in coordination with respective state and federal agencies. HMAs are delineated as approximate boundaries and representations of habitat, and therefore there may be areas of non-habitat contained within.

RHMA: Areas with ongoing or imminent anthropogenic impacts that recently (i.e. in the 21st Century) contained substantial and high-quality GRSG habitat and/or supported high density sustainable GRSG populations. Management actions would emphasize restoring habitat in order to provide the ability for establishing or enhancing GRSG populations to sustainable, dense levels. Areas are delineated using mapped state core areas, GRSG density/habitat models, genetic connectivity information other resource information, and human disturbance/footprint data. HMAs are delineated as approximate boundaries and representations of habitat, and therefore there may be areas of non-habitat contained within.

GHMA: Areas with or without ongoing or imminent impacts containing seasonal or year-round habitat outside other habitat management areas, including for the purpose of promoting movement and genetic diversity. Management actions will maintain, enhance, or restore habitat for GRSG. HMAs are delineated as approximate boundaries and representations of habitat, and therefore include potential or unoccupied habitat and may contain areas of non-habitat.

CHMA: Areas that provide regions of connectivity important to facilitate the movement of GRSG and maintain ecological processes, including between priority populations, adjacent states, and across international borders. This HMA boundary represents where stopover sites may exist, likely within a matrix of degraded or converted habitat or non-habitat. Areas are delineated using results from analyses of seasonal migratory movements and habitat characteristics conducive to movements, particularly between silver sagebrush and big sagebrush habitats.

Proposed RMP Amendment HMA Approach

To delineate HMAs for the Proposed RMP Amendment the BLM built on the strategy for identifying HMAs described above (state core sage-grouse areas, cooperating agencies, consistency as appropriate, and addressing the unique circumstances for GRSG in the region including peripheral populations). Additional information from the public comment period on the Draft EIS and continued coordination led to minor changes in HMAs from the preferred alternative (Alternative 5). For the Proposed RMP Amendment, the BLM would designate Priority and General HMAs, along with three unique HMA types. (PHMA, GHMA, and UHMA). The BLM identified "Unique" HMA (UHMA) types where there were ongoing or imminent impacts to these high-quality habitats and emphasis on the long-term habitat needs was necessary, or where the peripheral nature of the population introduced management challenges. Connectivity HMAs (CHMA), as described in the alternatives above, was added as a category of UHMAs. In addition, newer regulations and programs in the BLM have utilized the term "restoration," therefore, different terminology was used to avoid confusion with Restoration Management Areas (RHMA) as described in the DEIS. Finally, adjustments to HMAs in the Proposed RMP Amendment in Wyoming required changes to the edge mapping approach used in the preferred. Overall, changes between the Draft EIS and the Proposed RMP Amendment were made to avoid confusion and allow for specific objectives and management to address habitat. Specific areas with changes between preferred and proposed include:

- Little Missouri HMA (LMHMA): This area encompasses connected habitat on the Montana and North Dakota border. The LMHMA is a combination of the Cedar Creek RHMA and the North Dakota PHMA from Alternative 5 (preferred). The delineation of the LMHMA emphasizes better consistency with state management direction, objectives pertinent to challenges of the area, and cross-boundary coordination.
- South Carter HMA (SCHMA): A portion in south Carter County (on the Wyoming border) identified for unique management due to ongoing bentonite development in the area. The SCHMA was PHMA in Alternative 5 and RHMA in Alternative 1/2 (but the SCHMA is reduced in size relative to the RHNMA area).
- Musselshell-Yellowstone: Found within the Billings Field Office, areas of crested wheatgrass with lower habitat value. Formerly RHMA in the preferred alternative but changed to GHMA in the Proposed RMP Amendment (avoid confusion, management same as GHMA).
- West Decker: Found within the Billings and Miles City Field Offices, State of Montana core habitat, but surrounded by heavy surface disturbance. Formerly RHMA in the preferred alternative but changed to PHMA in the Proposed RMP Amendment (avoid confusion, despite challenges with surrounding habitat, management same as PHMA).
- Montana-Wyoming border: Updated areas in the Billings and Miles City Field Offices to account for changes in the Wyoming HMAs under the Proposed RMP Amendment.

Consistent definitions are needed for HMAs in Montana/Dakotas due to variations in language between existing plans and to apply new HMA definitions across offices. For the Proposed RMP Amendment, the HMAs would be defined as:

PHMA: Areas with limited impacts containing substantial and high quality GRSG habitat that have been identified as having the highest conservation value to maintaining sustainable sage-grouse populations. Management actions would emphasize the protection and enhancement of GRSG. Areas are delineated using core and connectivity data or maps and other resource information that the BLM has identified in coordination with respective state and federal agencies. HMAs are delineated as approximate boundaries and representations of habitat, and therefore there may be areas of non-habitat contained within.

GHMA: Areas with or without ongoing or imminent impacts containing seasonal or year-round habitat outside other habitat management areas, including for the purpose of promoting movement and genetic diversity (e.g., ranging from less dense occupied areas/leks to sporadic use/connectivity areas). Management actions will maintain, enhance, or restore habitat for GRSG. HMAs are delineated as approximate boundaries and representations of habitat, and therefore include potential or unoccupied habitat and may contain areas of non-habitat.

Unique HMAs: Areas identified that need different objectives or management to address unique challenges. For example, these are areas identified as habitats by state agencies but contain ongoing and imminent impacts due to oil and gas development and associated infrastructure, habitat conversion, mining, disease, and/or the peripheral nature of the population. Due to the unique circumstances management actions are needed that emphasize long-term reclamation and habitat goals, and maintain connectivity, in order to provide/enhance habitat for recovery of GRSG populations. These include three areas:

- **Little Missouri HMA**: Identified core area by the states of Montana and North Dakota. This area contained high-quality GRSG habitat in Montana and encompasses the remaining GRSG habitat in North Dakota. However, a substantial portion of the area is a unitized oil and gas field (the Cedar Creek Anticline). Formerly occupied habitat has been converted or degraded, an outbreak of West Nile Virus impacted bird numbers, and GRSG are challenged by being on the periphery of their range. Unique management is needed to maintain connectivity of sagebrush and GRSG habitat between Montana and North Dakota and focus restoration efforts.
- **South Carter HMA:** Identified core area by the State of Montana. However, this area is primarily developed or existing bentonite claims. Unique management is needed to balance GRSG habitat and mineral development, in the short term, while planning for longer-term reclamation.
- **Connectivity HMA**: Areas that provide regions of connectivity important to facilitate the movement of GRSG and maintain ecological processes, including between priority populations, adjacent states, and across international borders, including but not limited to Montana Connectivity areas. This HMA boundary represents where stopover sites may exist, likely within a matrix of degraded or converted habitat or non-habitat (such as in Montana general habitat within the HiLine). Areas are delineated using results from analyses of seasonal migratory movements and habitat characteristics conducive to movements, particularly between silver sagebrush and big sagebrush habitats.

3.4 NEVADA/CALIFORNIA

Greater Sage-Grouse Habitat Management Area (HMA) delineation in the BLM's resource management plan amendments (RMPAs) in Nevada and northeastern California is informed by a science-based modeling process developed by the US Geological Survey (USGS). As a summary, the model is informed by the following: resource selection information informed by telemetry locations from radio-marked greater sage-grouse (GRSG); the relationship of those telemetry points with associated habitat characteristics such as land cover composition, water resources, habitat configuration, elevation, and topography (each at multiple spatial scales related to the observed GRSG movement patterns); and a space use index based on GRSG breeding densities at leks. The modeled combination of these habitat characteristics and site use resulted in a model output of potential management prioritization scenarios (e.g., Priority, General and Other Habitat Management Area categories). The strength of using this model to identify the Habitat Management Areas (HMAs) is that it can be updated as new data become available.

Following the USFWS 2010 finding (75 Fed. Reg. 13910 [Mar. 23, 2010]) that the listing of GRSG was warranted but precluded and that regulatory mechanisms to protect the species were lacking, both the BLM and State of Nevada began planning processes to increase conservation and management of GRSG and its habitat. In 2013, there was a coordinated decision between the BLM, State of Nevada and US Forest Service (USFS) to develop a single science-based HMA delineation process (https://www.blm.gov/press-release/greater-sage-grouse-maps-available-public-comment) that coalesced in 2014 with the USGS publication: Spatially explicit modeling of greater sage-grouse (*Centrocercus urophasianus*) habitat in Nevada and northeastern California: a decision-support tool for management (Coates et al. 2014).

Mapping efforts prior to this publication varied widely as seen in the 2013 Nevada and Northeastern California GRSG Proposed Land Use Plan Amendment and Draft Environmental Impact Statement (2013 DEIS). In that document, the HMA maps in the BLM's Preferred Alternative and the state's Alternative differed by over 34 million acres in the management categories that were to become Priority, General and Other HMAs and included a nearly 5-million-acre difference for Priority and General HMAs (combined). This was due to each agency using differing strategies to identify the important GRSG areas, as well as lack of a consistent mapping approach. Following the release of the 2013 DEIS, the Sagebrush Ecosystem Program provided the BLM with the 2014 Nevada Greater Sage-grouse Conservation Plan, which included an HMA map for use in the state's Alternative and for consideration by the BLM and USFS in developing the Proposed Alternative in the 2015 Final EIS (2015 FEIS). Ultimately, the HMAs identified in the state and federal maps were both based on the 2014 USGS model, but included different naming conventions for HMA categories. In terms of HMA acres, the Proposed Alternative included about 1.2 million, or five percent, more than the state's Alternative within the 23-million-acre management area.

A central strength of adopting a science-based strategy, and challenge for management, is that science continues to improve over time as additional information is collected and new mapping products and techniques become available. The need to update the map as new information became available was disclosed and discussed throughout the 2013 DEIS, 2015 FEIS and ROD, and Nevada's Sage-grouse Conservation Plan. Following September publication of the BLM's 2015 ROD, the Sagebrush Ecosystem Program (SEP) adopted a new state map (on December 11, 2015) that included the results of an updated version of the 2014 HMA model (Coates et al., 2016) and removed modeled HMA that fell outside of the Nevada Department of Wildlife's Population Management Unit boundaries.

On September 23, 2015, Western Exploration LLC and several additional plaintiffs filed a complaint seeking judicial review of the BLM and USFS actions under the Administrative Procedure Act, 5 U.S.C. § 706. While litigation continued, the BLM was not able to update the HMA map included in the 2015 ROD to reflect changes made in the State of Nevada's HMA map. On March 31, 2017, the court ordered the BLM to conduct supplemental NEPA analysis to evaluate substantial changes between the 2013 DEIS and 2015 FEIS, including the addition of SFAs and their management, while not supporting other claims.

On October 11, 2017, the BLM released a Notice of Intent to consider the possibility of amending some, all or none of the BLM land use plans that were amended or revised in 2014 and 2015 regarding GRSG conservation. This effort resulted in targeted amendments to BLM RMPs through the March 2019 ROD. Through this planning effort, the Nevada and Northeastern California Sub-region updated the BLM's HMA map to match the State of Nevada's map within Nevada. However, these updates could not be completed in California where updated satellite imagery was not available during the USGS 2016 model update. USGS later updated the model to include new imagery of lands in California (Brussee et al., 2019).

On October 16, 2019, the U.S. District Court for the District of Idaho issued a preliminarily injunction, temporarily preventing the BLM from implementing the 2019 amendments, but did not vacate them. Since the 2019 plans were temporarily enjoined, the BLM reverted to the HMA map included in the 2015 ARMPA. Consistent with the intent of the BLM's decision to identify GRSG HMAs using the USGS model, the BLM updated the HMA map for Nevada and California through a plan maintenance action in 2022. This action allowed the Nevada BLM and the State of Nevada to use the same HMA map and for the California BLM to incorporate the 2019 model results into HMAs in California.

In late 2022, the BLM worked with the USGS and other state, local, and federal partners to begin updating the 2016 HMA model. This update is consistent with the approach from the previous two efforts while also incorporating new data and information related to habitat selection and space use. It also includes survival rates during reproductive life stages and specific seasons (e.g., brood-rearing or winter) and identifies corridors that link seasonal habitats. This update allows areas of high importance to current population dynamics (i.e., source areas) to be mapped. The final version of the USGS HMA model was not published in time for inclusion in the BLM's 2024 Draft RMPA/EIS. However, USGS provided the BLM with unpublished results for use in preparing the Draft RMPA/EIS range of alternatives and impact analyses. This ensured that the BLM was using the best science available at the time.

Within the Proposed RMPA/Draft EIS, the HMA maps for NV/CA differ by Alternative. The HMA map in Alternative 1 displays management areas as identified in the maintained 2015 ARMPA. Maintenance Action # 5 (BLM 2022) updated the 2015 ARMPA HMA with information USGS published in 2016 and 2019 (Coates et al., 2106, Brussee et al., 2019). Alternative 2 uses HMA delineations as presented in the 2019 ARMPA. Alternative 3 uses the draft results of the updated model (Milligan et al. 2024 (in review)) but treats all categories of HMA as PHMA. Alternative 4 also uses the draft results of the updated model and includes all three HMA categories (areas identified as PHMA+ by USGS are merged with PHMA). Alternatives 5 and 6 take into consideration the Population Management Units (PMUs) defined by NDOW and uses the same HMA results as Alternative 4 within these units. Areas identified by the USGS model that are outside of PMUs have not been occupied by grouse for decades and are not included in the state's management of the population. Despite providing landscapes characteristics that are likely consistent with GRSG habitat, these areas are not considered important to population persistence. The HMAs in the Proposed RMP Amendment are similar to Alternative 5 except that they use the published results of the updated model (Milligan et al. 2024) within PMUs. It also includes areas delineated as PHMA with Limited Exceptions. All areas within those boundaries are managed according to that designation regardless of how they were modeled. More than 95% of the area within those boundaries is modeled as PHMA or PHMA with limited exceptions in the published results. Modeled GHMA or OHMA within those boundaries connect patches of modeled PHMA and are managed as PHMA with limited exceptions due to their importance on the landscape in maintaining connected populations and to avoid errant gaps within those boundaries.

The unpublished results that the BLM used for the Draft RMPA/EIS included more than six years of additional field data collected since the last published version (Coates et al., 2016) and advances in methodology to produce the HMA model (The unpublished draft HMA results were the best available estimate of how HMA would change in comparison to the 2015 and 2019 ARMPA versions (current management). Omitting this information, because it was not final or published, would have resulted in less transparency with the public regarding the development of the updated model. In the Draft RMPA/EIS, the BLM anticipated and disclosed that changes to the model and associated maps were likely between the Draft and Final EIS and that the BLM would adopt the published information in the proposed management. The Draft EIS provided alternative uses of the model in supporting management of GRSG habitat in the planning region. However, the Draft

RMPA/EIS did not amend or address the decision to use the model, and future iterations of the model, for that purpose. The iterative evolution of the model is anticipated as addressed in both the 2015 and 2019 RODs that focus on using the results of the model as the primary tool to identify alignment of GRSG HMAs. These anticipated updates are also consistent with the BLM using the best available information to consider decisions, as well as Congress' direction that the BLM maintain and use updated inventories of public land resources as part of the planning process. The results of the published model (Milligan et al. 2024) were incorporated in the Final EIS. Updated HMA acreage can be found in **Chapter 2**, **Table 2-14**. For comparison, acreages from the Draft EIS can be found in Chapter 2, Table 2-3 of the Draft EIS. The Draft EIS can be accessed at the BLM National NEPA Register at https://eplanning.blm.gov/eplanning-ui/project/2016719/510. The range of variance between the acres identified between the Draft EIS and the Final EIS were within the range of alternatives analyzed in the Draft EIS.

Not all areas within HMAs will include characteristics associated with GRSG habitat. For example, areas of connectivity between seasonal habitats or areas recovering from fire might not support vegetation used by GRSG but these areas will be included in HMAs. Mapping errors are also anticipated to occur with HMA maps and the proposed management within this Proposed RMPA/Final EIS provides mechanisms to adjust management accordingly.

Within the USGS modeling framework, Priority HMA is defined as: 1) areas with relatively high habitat selection index (HSI) and relatively high likelihood of occupancy, or 2) source areas, which were defined as high selection and high survival during reproductive life stages, that were outside of areas of high occupancy. General HMA includes those areas of: 1) relatively high HSI but low occupancy, 2) relatively low HSI but high occupancy, or 3) relatively low HSI corridors that connect seasonal priority habitats (i.e., nesting areas around leks to brood-rearing source areas). Areas with moderate to low HSI and low evidence of occupancy were included as Other HMA.

The BLM's definitions for HMA are as follows:

Priority HMA: Areas that have been identified as having the highest conservation value to maintaining sustainable greater sage-grouse populations. These areas are occupied seasonally or year-round and include breeding, late brood-rearing, and winter concentration areas.

General HMA: An area that is likely to be occupied seasonally or year-round outside of a Priority Habitat Management Area and where management will apply to sustain the greater sage-grouse populations. GHMA may include active leks, seasonal habitats, and fragmented or marginal habitat, as well as areas identified as corridors connecting seasonal habitats.

Other HMA: Areas with appropriate environmental conditions for greater sage-grouse that are less used by greater sage-grouse or have marginal habitat suitability.

3.5 OREGON

The definitions of PHMA and GHMA have not changed since initially defined in the 2015 ARMPA. PHMA and GHMA are defined as follows:

PHMA: BLM-administered lands identified as having the highest value to maintaining sustainable GRSG populations. Areas of PHMA largely coincide with areas identified as Priority Areas for Conservation in the USFWS's COT report. These areas include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors.

GHMA: BLM-administered lands where some special management will apply to sustain GRSG populations; areas of occupied seasonal or year-round habitat outside of PHMA and connectivity corridors.

IM 2012-044 directed the BLM to collaborate with state wildlife agencies to identify and map GRSG Preliminary Priority Habitat and Preliminary General Habitat. In Oregon, the BLM developed maps for these habitats based on the Oregon Department of Fish and Wildlife's (ODFW) GRSG core and low-density habitat maps (Hagen 2011) for the 2015 BLM Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment. The ODFW core and low-density habitats were initially delineated in 2011 and had not been updated since this initial mapping. Since 2011 Oregon has discovered over 150 new leks, acquired over a million locations from radio- and GPS- marked GRSG, and has benefitted from improved habitat suitability models. Additionally, there are many GRSG leks used in the 2011 mapping process that are no longer occupied by GRSG. Hence, in March 2022 ODFW notified the BLM, other partners, and the public that they would be reviewing and revising Oregon's GRSG core and low-density habitat designations and Oregon's Greater Sage-grouse Conservation Assessment and Strategy using new information and again using the methods and process published in Hagen 2011.

The ODFW's draft GRSG core and low-density habitat designation maps were not available for the BLM's Draft EIS analysis needs in early 2023. After coordinating with ODFW, Oregon BLM followed the steps described in the ODFW Greater Sage-grouse Conservation Assessment and Strategy for Oregon (Hagen 2011 pp. 79-83) using data collected up through the 2022 field season. The BLM developed maps that were conservative (i.e., few areas clipped or reduced to omit non-habitat and therefore likely to show more habitat than the ODFW map), and were rough estimates of expected core and low-density areas that were anticipated in the ODFW maps being drafted at that time.

For alternative 3 in the Draft RMPA/EIS all BLM identified core and low-density habitat from the model was considered draft Priority HMA. In addition to habitat identified by the model, the spring and summer kernel density estimates (90% utilization) from radio- or GPS-tagged GRSG marked in Oregon from 2000 through 2022 provided by ODFW was included as priority habitat. The areas defined as General HMA in the 2015 BLM Oregon Greater Sage-Grouse Approved Resource Management Plan Amendments, based on combining ODFW low density habitat layer with the Durtsche et al. 2010 model layer, were not edited and were added as Priority HMA.

For alternatives 4, 5, and 6 in the draft EIS, all BLM newly modeled core habitat was considered Priority PHMA minus non-habitat clipped areas. For alternative 4 the areas defined as General HMA in the 2015 BLM Oregon Greater Sage-Grouse Approved Resource Management Plan Amendments were not edited and were included as General HMA in addition to the newly modeled low-density habitat.

However, for alternatives 5 and 6 in the Draft RMPA/EIS the areas defined as General HMA used the newly modeled low-density habitat and Habitat Assessment Framework (HAF) mapped seasonal habitats (rather than the Durtsche 2010 model used in alternatives 1 through 4). The seasonal habitat maps the BLM developed with ODFW provide more accurate boundaries for GRSG distribution than maps generated from ODFW low density and Durtsche et al (2010). Not all Oregon GRSG areas had HAF seasonal habitats mapped as of February 2023 for the Draft RMPA/EIS, but all areas were completed in time to be included in the Proposed RMPA/Final EIS.

ODFW completed their GRSG core and low-density habitat designation map update, and the Oregon Fish and Wildlife Commission approved it in December 2023, which was not in time for incorporation into the BLM's Draft EIS analysis. Oregon BLM uses the final ODFW habitat designation for PHMA and GHMA in

the action alternatives and the Proposed RMP Amendment in the Proposed RMPA/Final EIS. Therefore, the HMA boundaries for PHMA and GHMA under alternatives 4, 5, 6, and the Proposed RMP Amendment are the same. Under Alternative 3, all of the ODFW habitat designation acres are identified as PHMA. The HMA acres identified utilizing the ODFW guidance available at the time the Draft EIS was being developed the can be found in Chapter 2, Table 2-3 of the Draft EIS. The Draft EIS can be accessed at the BLM National NEPA Register at https://eplanning.blm.gov/eplanning-ui/project/2016719/510. The HMA acres for Oregon that utilize the updated ODFW final data can be found in **Chapter 2**, **Table 2-14**. The range of variance between the acres identified between the Draft EIS and the Final EIS were within the range of alternatives analyzed in the Draft EIS.

3.6 UTAH

HMA definitions are defined below for both the 2015 and 2019 GRSG planning efforts. For HMA designations under Alternatives 3, 4, 5, 6, and the Proposed RMP Amendment, BLM Utah evaluated the GRSG new rangewide science and the State of Utah's 2019 SGMA boundaries to propose additions and subtractions consistent with the concepts for each alternative as identified below in each alternative discussion, and designated HMAs based on the 2019 ARMPA definition for PHMA and the 2015 definition for GHMA.

BLM Utah 2015 PHMA: BLM-administered lands identified as having the highest value to maintaining sustainable GRSG populations. Areas of PHMA largely coincide with areas identified as Priority Areas for Conservation in the USFWS's COT Report. These areas include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors.

BLM Utah 2015 GHMA: BLM-administered lands where some special management will apply to sustain GRSG populations. Areas of occupied seasonal or year-round habitat outside of PHMA.

BLM Utah 2019 PHMA: Areas prioritized for managing greater sage-grouse populations (management is only applicable to actions on BLM-administered lands). These management areas include high-quality habitat, and may also include areas with poor quality, potential habitat, and non-habitat. PHMA largely coincides with the State of Utah's Sage-Grouse Management Areas (SGMAs). In the SGMA, the state identified areas of seasonal habitat, non-habitat, and opportunity areas, though management is focused on the habitat. PHMA are areas that include all the seasonal habitats for the corresponding greater sage-grouse populations, including breeding, late brood-rearing, winter areas, and migration or connectivity corridors.

BLM Utah 2019 GHMA: Not Applicable since GHMA was removed.

The BLM Utah coordinated closely with the State of Utah in developing HMA maps for this planning process. Both the BLM and the state prioritized GRSG populations and associated habitat into these two categories, though there varying levels of inclusion across the different alternatives. For all alternatives, PHMA represents areas of the highest value to maintaining sustainable GRSG populations, areas of seasonally or year-round occupied habitat, and/or areas where sagebrush restoration or rehabilitation can provide additional GRSG habitat. Based on new science and information discussed in coordination with cooperating agencies, local biologists, etc., GHMA and PHMA was adjusted across alternatives 3, 4, 5, and 6 using various alternative concepts/strategies. One of the primary differences among the alternatives is how GHMA is used. Of the 380 known occupied GRSG leks in Utah, the alternatives include the following within PHMA:

- Alternative 1: 353 (92.8%) are in PHMA
- Alternative 2: 354 (93.1%) are in PHMA
- Alternative 3: 380 (100%) are in PHMA

- Alternative 4: 366 (96.3%) are in PHMA
- Alternatives 5 and 6: 342 (90%) are in PHMA
- Proposed RMP Amendment: 366 (96.3%) are in PHMA

Alternative 1 in Utah would retain PHMA and GHMA as identified in the 2015 GRSG ARMPA. In that effort, the BLM used the State of Utah's Sage-Grouse Management Areas (SGMA) as the primary tool to identify PHMA (with a few exceptions such as the Tavaputs Plateau), and the state's 2009 occupied GRSG habitat map as the basis of the GHMA. The SGMAs and PHMA focused on managing the most important GRSG populations in the state, regardless of the quality of the habitat associated with those populations.

It is important to note that the State of Utah's 2009 occupied habitat data was very broad in nature, and was developed to identify the general areas of potential habitat where GRSG could potentially be found and may not have reflected where birds were actually known to exist. As such, some areas identified for GHMA in the 2015 GRSG ARMPA have subsequently been identified as non-habitat. This includes areas such as west of Sanpete Valley (west of Ephraim and Mt. Pleasant), Porphyry Bench near Price, and South Slope of the Uintah's Blue Bench area north of Duchesne. While these areas were identified as habitat during the 2015 planning effort and included as GHMA in that effort, they have not had any documented birds using them for over 20 years, have no occupied or historically known leks, are poor-quality habitat, and do not provide connectivity habitat for birds moving between population areas or seasonal habitats. Under Alternative 1, there are five occupied leks that occur outside of PHMA/GHMA boundaries: two are in the Box Elder area, one in Sheeprocks, and two in the Rich area.

In the 2015 ARMPA, 97.5 percent of the BLM's PHMA was contained in areas identified as habitat in the State of Utah SGMAs. Further, 99.5 percent of the state's mapped habitat within SGMAs is within PHMA. The major difference between the BLM and State of Utah maps was how areas of lower priority are depicted. The state chose not to map lower priority areas of occupied GRSG habitat outside SGMAs, whereas the BLM mapped these areas as GHMA. Further, based on the State of Utah's Conservation Plan, SGMAs "encompass more than 90 percent of Utah's breeding populations, seasonal movements and the landscapes that provide the greatest potential to increase sage-grouse "usable space" [through habitat protection and enhancements]" (State of Utah, 2019). The state determined that GRSG "habitats outside the SGMAs are not required for long-term conservation of the species. Much of this habitat has already been heavily disturbed by human and natural causes, and it is not suitable for enhancement or improvement. Therefore, sage-grouse populations in these areas are not considered essential to perpetuate the species in Utah" and the state did not provide any "specific management actions for this habitat" (State of Utah 2019).

Statewide (Alternative 1) - Habitat Management Area Acres

- 5,548,837 acres in PHMA
  - 2,079,470 of the BLM-administered surface acres are in PHMA
  - 1,197,778 of the BLM-administered mineral estate are in PHMA
- 1,684,818 acres in GHMA
  - 437,737 of the BLM-administered surface acres are in GHMA
  - 403,125 of the BLM-administered mineral estate are in GHMA
- 42,069 acres as Occupied Anthro Mountain (National Forest System lands)

Leks Under Alternative 1 HMAs:

- 353 (92.8%) of the 380 occupied leks in Utah are in PHMA
- 14 (3.7%) of the 380 occupied leks in Utah are in GHMA

- 7 (1.8%)of the 380 occupied leks in Utah are in Occupied Anthro Mountain
- 5 (1.3%) of the 380 occupied leks in Utah are outside any Utah habitat management area

Alternative 2 is based on the BLM's 2019 GRSG ARMPA. In that effort, the BLM sought to increase HMA alignment with the State of Utah's SGMAs and prioritized the importance of management prescriptions on PHMA. This was to focus protection in the state on the seasonal habitats that support over 95 percent of GRSG populations in Utah, while removing the designation and management of GHMA to de-emphasize management in areas that were less important or not habitat. Other than removal of GHMA, there were very few changes in the HMAs under Alternative 2, though some differences in the BLM's PHMA and the State's SGMA remained in the West Tavaputs area, where the BLM maintained PHMA in an area where the state did not include an SGMA. Under Alternative 2, based on 2023 occupied leks, 19 occupied leks would occur outside of PHMA boundaries: 2 in the Box Elder population area, 4 in the Rich County area, 1 in the Sheeprocks area, 5 in Morgan-Summit area, and 7 in South Slope of the Uintah's Blue Bench area north of Duchesne. Most of these leks do not occur on BLM-administered lands.

Statewide (Alternative 2) - Habitat Management Area Acres

- 5,548,837 acres in PHMA
  - 2,079,476 of the BLM-administered surface acres are in PHMA
  - 1,235,904 of the BLM-administered mineral estate are in PHMA
- 0 acres in GHMA
- 42,069 acres as Occupied Anthro Mountain (National Forest System lands)

Leks Under Alternative 2 HMAs:

- 354 (93.1%) of the 380 occupied leks in Utah are in PHMA
- 0 of the 380 occupied leks in Utah are in GHMA
- 7 (1.8%) of the 380 occupied leks in Utah are in Occupied Anthro Mountain
- 19 (5%) of the 380 occupied leks in Utah are outside any Utah habitat management area

Alternative 3 HMA boundaries were developed to represent the strongest GRSG management approach within the BLM's jurisdiction. All HMAs in Alternative 3 are managed as PHMA. PHMA under Alternative 3 encompasses a total of 9,802,136 acres. As compared to the other alternatives, the PHMA boundaries under Alternative 3 more closely aligns with the State of Utah's SGMA areas, though the management under Alternative 3 is more restrictive than what the state recommends. The state's SGMAs were developed to be inclusive of a variety of habitat types associated with the various GRSG populations throughout Utah. The state's plan clearly notes that the entirety of the SGMAs do not provide habitat for GRSG, but include areas of habitat, non-habitat, and potential habitat (opportunity areas). In the 2015 and 2019 planning efforts, the BLM focused PHMA in the areas the state coarsely mapped as "habitat" within the SGMAs in the original 2013 GRSG State Plan. Under alternative 3, the BLM included the entirety of the SGMAs as PHMA, as well as areas of restoration areas that occurred on the periphery of the 2015 HMAs. The following are additional concepts used to build alternative 3:

- Include in PHMA all areas of GHMA from the 2015 plans.
- Apply new science, especially research on habitat connectivity, resulting in inclusion of the State of Utah's opportunity habitats.
- Include all occupied leks in PHMA.
- Include areas of non-habitat that are encompassed in large parts by PHMA or could provide corridors between valleys and occupied habitat.

- Include areas of GRSG habitat treatments that occur on the periphery of 2015 HMAs.
- Remove municipalities >2,500 acres.

Alternative 3 is the only alternative where the GHMA from alternative 1 becomes PHMA. Expanding the GHMA designation in Alternative 1 to PHMA includes some areas of unoccupied habitat, historic habitat where birds have not been observed in 20 years or more or may have never occurred (e.g., habitat west of Sanpete Valley), areas of non-habitat (e.g., phase 3 pinyon-juniper, rock outcrops), areas which are currently not habitat but could become habitat through significant habitat restoration, etc., which raises the concern of "when applying leasing restrictions, the least restrictive constraint to meet the resource protection objective should be used" (2018 FEIS Appendix 2 p. 2-28). Under Alternative 3, there are no occupied leks that are not encompassed by PHMA.

Statewide (Alternative 3) - Habitat Management Area Acres

- 9,801,294 acres in PHMA
  - 3,567,018 of the BLM-administered surface acres are in PHMA
  - 2,379,058 of the BLM-administered mineral estate are in PHMA
- 0 acres in GHMA

Leks Under Alternative 3 HMAs:

- 380 (100%) of the 380 occupied leks in Utah are in PHMA
- 0 of the 380 occupied leks in Utah are in GHMA
- 0 of the 380 occupied leks in Utah are outside any Utah habitat management area

Alternative 4 would manage for a combination of PHMA and GHMA similar to alternatives 1 and 2. Some areas that were used to expand PHMA in alternative 3 were incorporated in alternative 4, such as the State of Utah's opportunity habitat, occupied leks, connectivity corridors based on the new science, as well as habitat improvement projects completed for the benefit of GRSG. However, many new areas of expansion would become GHMA where occupancy is uncertain or unknown (e.g., restoration areas, connectivity corridors). Under Alternative 4, there are no occupied leks that occur outside of PHMA or GHMA. The vast majority of leks are within PHMA, except for 2 leks in the Rich population area northeast of Mountain Green, 5 leks in Morgan-Summit area, and 7 leks on Tribal lands in South Slope of the Uintah's Blue Bench area north of Duchesne, which are in GHMA. Under Alternative 4, there are no occupied leks that fall outside PHMA or GHMA. The following are additional concepts used to build alternative 4:

- Adjust boundaries for PHMA to include areas where monitoring shows GRSG utilization.
- Remove some areas of GHMA that have not provided habitat for an extended period.
- Refine boundaries on the periphery of HMAs to more closely align with the Utah State University (USU) GRSG Seasonal Habitat Model.
- Remove municipalities >2,500 acres.

Statewide (Alternative 4) - Habitat Management Area Acres

- 5,833,555 acres in PHMA
  - 2,191,844 of the BLM-administered surface acres are in PHMA
  - 1,291,398 of the BLM-administered mineral estate are in PHMA
- 3,314,103 acres in GHMA
  - 1,195,069 of the BLM-administered surface acres are in GHMA
  - 990,776 of the BLM-administered mineral estate are in GHMA

Leks Under Alternative 4 HMAs:

- 366 (96.3%) of the 380 occupied leks in Utah are in PHMA
- 14 (3.7%) of the 380 occupied leks in Utah are in GHMA
- 0 of the 380 occupied leks in Utah are outside any Utah habitat management area

Alternatives 5 and 6 uses HMA boundaries developed, provided, and preferred by the State of Utah. The state incorporated agency biologist and stakeholder feedback to further refine the HMAs from alternative 4 and provide an expanded range of HMA delineation. This alignment prioritizes HMAs that encompass 95.6 percent of the male GRSG counted on leks during 2023 surveys. The following are additional concepts used to build this alternative:

- Expansion of HMAs to include active leks recently added to the state active sage-grouse lek data set;
- Expansion of HMAs to include wildlife management areas and other areas already subject to state-specific sage-grouse management;
- Refinement of HMAs using localized habitat assessment data and knowledge, including cross-state edge-mapping and review of existing BLM boundary adjustments;
- Updated HMAs to reflect changes in municipal boundaries; and
- Removal of large water bodies

Under alternatives 5 and 6, there are 25 occupied leks that are outside of PHMA or GHMA: 5 leks in Morgan-Summit on private lands, 7 leks in South Slope of the Uintah's Blue Bench area on Tribal lands, 7 leks in Anthro Mountain on National Forest System lands which are protected under the 2015 USFS Land Management Plan Amendment and Record of Decision, and 6 leks in West Tavaputs (5 on private, 1 on BLM). With this alignment, alternatives 5 and 6 would prioritize habitat management areas (PHMA and GHMA) that encompass 95.6 percent of the male GRSG counted on leks during 2023 surveys (not the percent of leks, but the percent of males counted on leks). This includes 2,740 (93.8%) males counted within PHMA, 54 (1.8%) counted in GHMA and 127 (4.3%) counted outside of any HMA.

Statewide (Alternatives 5 and 6) - Habitat Management Area Acres

- 4,876,186 acres in PHMA
  - 1,626,862 of the BLM-administered surface acres are in PHMA
  - 1,118,527 of the BLM-administered mineral estate are in PHMA
- 1,499,184 acres in GHMA
  - 645,971 of the BLM-administered surface acres are in GHMA
  - 348,908 of the BLM-administered mineral estate are in GHMA

Leks Under Alternatives 5 and 6 HMAs:

- 342 (90%) of the 380 occupied leks in Utah are in PHMA
- 13 (3.4%) of the 380 occupied leks in Utah are in GHMA (two in the Rich area, and 11 in the Sheeprocks area)
- 25 (6.6%) of the 380 occupied leks in Utah are outside any Utah habitat management area

Alternatives 5 and 6 do not include any HMA designation for portions of the Uintah population area south of Highway 40, including the Deadman's Bench, East Bench, and Book Cliffs areas. The GRSG populations within this area were steadily declining during the preparation of the 2015 FEIS; however, in Deadman's Bench, there were 2 leks that had less than 10 birds since 1989 and suggested that the population was

connected to other populations. Same with East Bench at the timing of the 2015 FEIS, "East Bench leks are the only known active leks in the last 10 years. However, it is unknown if there are leks on Tribal lands in the western portion of this area because UDWR does not have access." (2015 FEIS p. 3-25). In 2023, the leks in these areas were documented as unoccupied. In coordination with local biologists, there is some limited bird use in these areas; however, the extent of use is largely unknown and the leks are no longer considered occupied by the State of Utah.

Habitats in the South Slope of the Uintah's Blue Bench and Uintah Population Area (Deadman's Bench, East Bench, and Book Cliffs) have been fragmented due to mineral development activities through much of the area, which has likely contributed to loss of occupied leks within these areas since the 2015 plans. Under alternative 1 development could still occur in GHMA similar to what was analyzed in the 2015 Final EIS, "despite the…[greater sage-grouse] conservation measures, leasing and development in these areas could result in human alteration, direct loss, and fragmentation of seasonal [greater sage-grouse] habitats, which, in most cases, have already been fragmented by mineral development activities. Fragmentation could further limit the amount of usable habitat available for the small and declining population of [greater sage-grouse] that occupy this area [GHMA]" (2015 Final EIS, page 4-119). The limited information available for this area provides little insight into the population movements, important seasonal habitats, and connectivity with other populations. The BLM lacks regulatory discretion on resources within the South Slope of the Uintah's Blue Benchand Book Cliffs areas since they are predominantly private and Tribal lands. Split estate in this area is limited; therefore, the BLM does not have much regulatory responsibility over the mineral estate. The BLM has more jurisdiction in the Deadman's Bench and East Bench areas, removal of GHMA in these areas could result in further habitat loss, degradation, and direct disturbance to the small population of birds that occupy this area as a result of oil and gas leasing.

In addition to the differences in GHMA identified in Alternatives 5 and 6, Anthro Mountain and West Tavaputs have not been identified as either PHMA or GHMA.

Anthro Mountain-West Tavaputs – The Anthro Mountain area is predominantly National Forest System land and management would remain the same because USFS is not part of this current planning effort; however, there is a small sliver of BLM land (1,397 acres) in the very southern portion near the Bad Land Cliffs and predominantly Tribal lands in the very northernmost extent (Cottonwood Canyon/Cottonwood Ridge). Under alternatives 5 and 6, the BLM portion (1,397 acres) would not be managed as PHMA. The majority of telemetry use is on the USFS lands; however, some birds do use the BLM portions. The easternmost portion of Anthro Mountain has 7 occupied leks (all on USFS) and some birds have been documented moving up to 25 miles outside of the Anthro Mountain area.

The West Tavaputs area is a mix of BLM, State of Utah State Institutional Trust Lands Administration (SITLA), and private lands. There are 6 occupied leks in this area. "Telemetry data suggest some birds are moving large distances to separated areas of seasonal habitats, including movements off the plateau. These seasonal movements include Emma Park, West Tavaputs, Fruitland, and Blue Bench and can range between 14 and 33 miles" (2015 FEIS Section 3.3.5, p. 3-27). Similar to what was analyzed in the 2015 FEIS under Alternative E, "SGMAs would not include the Anthro Mountain and West Tavaputs populations. These populations may be important for redundancy and may provide connectivity to northeastern Utah GRSG populations. While there is documented movement between these two areas and other population areas (e.g., Emma Park and portions of the Uintah Population Area on private and Tribal lands), it is unknown what level of connectively is necessary to prevent isolation of populations and how important these areas are to maintaining genetic viability." (2015 FEIS, Section 4.3.6, p. 4-99).

The 2015 FEIS stated, "a total of 1,417 wells are predicted to be drilled from 709 pads within the occupied habitat of the Carbon Population Area, with a total disturbance estimated to be 6,384 acres. Development of 1,417 wells from 709 pads within occupied habitat in the Carbon Population Area would most likely impact some portions of the population to a greater degree than others. Removing management for Anthro Mountain and West Tavaputs would be similar to Alternative E from the 2015 Final EIS (Section 4.3.6 of the 2015 FEIS), which states "impacts would be the greatest in these areas because they have high oil and gas potential. The majority of the lands have already been leased, and they include GRSG habitat outside of PHMA and GHMA that would not be afforded any protection under this alternative." In the Carbon Population per the 2015 FEIS (4.3.2 p. 4-28 RFD), "most of the development is expected to occur in the Gasco, West Tavaputs, Gordon Creek, Drunkards Wash, and Brundage Canyon development areas. Developing 709 pads, additional wells, and ancillary facilities would likely cause direct habitat loss, functional habitat loss, and fragmentation and may impact the local GRSG population. The development in some of these areas may hinder the function of seasonal habitat for some of the local populations, causing localized population declines. The northern population that uses these areas for most of their life history needs would most likely decline. The population that is centered in the central region of the Carbon Population Area (Emma Park) would be impacted to a lesser degree because development is not currently focused in this area, this habitat would be left more intact, and the local birds are mostly nonmigratory." Potential connectivity for Tavaputs, Emma Park, and Tribal lands is unknown.

Sheeprocks – The Sheeprocks area is predominantly BLM, USFS, SITLA, and private land. There are 11 leks in this area. From 2007 to 2016, the 10-year running mean population of male birds on Sheeprock population area leks was 51 males, with 119 males in 2007 and 21 males in 2016. The 10-year decline went from an estimated 472 birds to 84 birds. Isolation and small-size was identified as a major causal factor in the Causal Factor Analysis [BLM 2021] for the Sheeprocks population. Since 2016 when Sheeprocks hit a hard population trigger under the 2015 ARMPA, the population has been augmented through translocations of sage-grouse from other populations in Utah. Telemetry data has been collected in association with the translocations. Translocations has led to a heavily augmented population that is isolated and shows no connectivity or movement corridors to other populations.

Under Alternatives 5 and 6, Sheeprocks would be entirely managed as GHMA. The boundary would also remove prior PHMA/GHMA north of Faust/Rush Valley and areas in the Little Sahara Recreation Area south of Old Highway 148 (Weiss Highway), which was identified in the 2019 planning effort. These are two small areas in the Sheeprocks area, which would be "managed as available for cross-country OHV use. Approximately 6,320 acres in the 5 Mile Pass area in GHMA on the northeastern portion of Sheeprocks, and 7,900 acres in the Little Sahara Sand Dunes area in GHMA on the southern portion of the Sheeprocks population would be managed as available for cross-country OHV use. The acres in both areas are directly adjacent to other areas that are also available to cross-country OHV use, and were originally part of the same open areas prior to 2015. The 2015 Final EIS notes that "habitat loss could occur associated with cross-country OHV use" (2015 Final EIS page 4-52). However, a review of GPS tracking data for GRSG in the Sheeprocks area indicates that none of the collared birds (a sub-sample of the total population) used the areas proposed to be made available to cross-country use again (Chelak and Messmer 2017). "Due to the long-term use in both of these areas prior to 2015, these areas have likely already experienced the habitat losses, so this change is not anticipated to result in impacts on greater sage-grouse or its habitat." [2018 FEIS p. 4-22].

Proposed RMP Amendment uses HMA boundaries that were coordinated with the State of Utah based on Alternatives 4 and 5.

The Proposed RMP Amendment would manage for a combination of PHMA, GHMA, and GHMA-Connectivity:

- Is similar to Alternative 5 and the State of Utah's Sage-grouse Management Areas (SGMA),
- incorporates 100% of occupied leks within PHMA or GHMA,
- incorporates connectivity corridors based on the new science as GHMA-Connectivity, which were GHMA in Alternative 4, and
- incorporates habitat improvement projects completed for the benefit of GRSG.

Under the Proposed RMP Amendment, there are no occupied leks that are outside of PHMA or GHMA. The Proposed RMP Amendment prioritizes habitat management areas (PHMA and GHMA) that encompass 100 percent of the occupied leks during 2023 surveys. There are no leks within GHMA-Connectivity.

Following coordination with Cooperating Agencies, the Proposed RMP Amendment:

- Retains Sheeprocks as PHMA rather than GHMA as it was identified in Alternative 5,
- Retains the importance of West Tavaputs as PHMA due to occupied leks and oil and gas remediation efforts completed as part of GRSG mitigation,
- Identifies areas that coincide with the State of Utah's SGMA as GHMA- Connectivity in between PHMA in Hamlin Valley, Bald Hills, Panguitch, Carbon, and Uintah population areas where the new science (Row et al. 2018) and telemetry indicate habitat importance for connectivity.
- Other GHMA habitat was retained where there were occupied leks, population connectivity across state borders, habitat restoration projects, and other known areas of occurrence (i.e seasonal habitat use).

3.6.1 Statewide (Proposed RMP Amendment) - Habitat Management Area Acres

Area Acres

- 5,778,435 acres in PHMA
- 2,134,470 of the BLM-administered surface acres are in PHMA
- 1,286,432 of the BLM-administered mineral estate are in PHMA
- 1,948,214 acres in GHMA
- 648,673 of the BLM-administered surface acres are in GHMA
- 529,664 of the BLM-administered mineral estate are in GHMA
- 411,219 acres in GHMA Connectivity
- 295,492 of the BLM-administered surface acres are in GHMA Connectivity
- 45,462 of the BLM-administered mineral estate are in GHMA Connectivity

Leks Under Proposed RMP Amendment HMAs:

- 366 of the 380 (96.3%) occupied leks in Utah are in PHMA
- 14 of the 380 (3.7%) occupied leks in Utah are in GHMA (2 in the Rich population area, 5 in Morgan-Summit, and 7 in the Blue Bench area of the Uintah population area on Uintah-Ouray Tribal lands)
- 0 of the 380 occupied leks in Utah are outside any Utah habitat management area

Proposed RMP Amendment Definitions in addition to those identified above:

General Habitat Management Areas (GHMA) – Connectivity are areas within GRSG GHMA habitat that contain an increased level of biological importance because they provide for connectivity between localized areas of PHMA, above that of regular GHMA, based on new science and telemetry studies. Management in GHMA-Connectivity is consistent with GHMA except for Utility Scale Wind and Solar and Major ROWs.

3.7 WYOMING

BLM Wyoming used the most current scientific information, GRSG leks, and local expertise to update and revise GRSG HMA's across the state. HMAs in Alternatives 5 and 6 in the Draft RMPA/EIS as well as the HMAs in the Proposed RMP Amendment /Final EIS were developed by the State of Wyoming and adopted by the BLM as developed. For Alternatives 3 and 4 in the Draft RMPA/EIS, the BLM first considered the existing HMA boundaries as identified in the 2015 and 2019 plans (Alternatives 1 and 2 respectively in the Draft EIS). Existing HMA boundaries were revised using the following data sources: (A) modeled GRSG lek persistence (Wann et al. 2023), (B) modeled sagebrush habitats that currently have high ecological integrity (Doherty et al. 2022), (C) modeled sagebrush habitats that are projected to have high ecological integrity into the near future (2030-2060) (Doherty et al. 2022), (D) genetic connectivity (Row et al. 2018; Cross et al. 2023), (E) sagebrush, invasive annual grass and conifer canopy cover (estimated in 2021; Rigge et al. 2022, Rigge et al. 2021b); (F) terrain ruggedness (i.e., a measure of the variation in terrain slope and aspect; Welty and Jefferies 2018); (G) fire perimeter data from 1985 to 2021 (National Interagency Fire Center); (H) active energy development data (Wyoming Oil and Gas Conservation Commission); (I) GRSG lek location and activity status (Wyoming Game and Fish Department; Whitford and Bish 2022); (J) National Agriculture Imagery Program (NAIP) aerial imagery (2019); and (K) local expertise and data.

The State of Wyoming's efforts to update GRSG core areas began in March 2023. The state generated Draft 1 of proposed changes to core areas the week of May 15. The state's Draft 1 polygons were overlayed with the BLM's HMA polygons so that the extent of both efforts was captured in Alternative 4.

Wyoming revised their core area designated habitats several times between release of Draft 1 in May and the version released October 18, 2023. The state's core area polygons from October were adopted by the BLM as Alternatives 5 and 6 in the Draft EIS. On April 4, 2024, Wyoming released the final version of the revised core area designated habitats, which the BLM adopted in the Proposed RMP Amendment in the Final EIS.

Three tiers of habitat designations were considered for HMAs: (1) Priority Habitat Management Areas (PHMA); (2) Stewardship Habitat Management Areas (SHMA); and (3) General Habitat Management Areas (GHMA). PHMA was the only designation considered in Alternative 3 in the Draft RMPA/EIS; PHMA and GHMA were designations considered in Alternative 4 in the Draft EIS; and PHMA, SHMA and GHMA were designations considered in Alternatives 5 and 6 in the Draft RMPA/EIS and in the Proposed RMP Amendment in the Final EIS. Definitions of PHMA and GHMA are the same as those in the 2019 sage-grouse plan, and the definition of SHMA is the same as that provided to the BLM by the State of Wyoming for the areas receiving this designation. Generalized management statements were added to the definitions of PHMA and GHMA for clarity and to align the information provided in these definitions with the definition of SHMA received from the state.

PHMAs: GRSG habitats that have the highest conservation value for maintaining or increasing GRSG populations. The management in these areas is focused towards maintaining, enhancing, and where necessary

restoring conditions suitable for GRSG across the seasonal ranges included as PHMA (breeding, brood-rearing, winter, and connectivity).

SHMAs: GRSG habitats that are generally characterized by large percentages of private land, existing disturbance and prior and existing rights, and fragmented landscapes but that continue to support substantial populations of GRSG, provide important connections between populations, and are important for maintaining GRSG populations. Management in SHMA is consistent with GHMA restrictions.

GHMA: all occupied and potential GRSG habitats not designated as PHMA or SHMA. Management in GHMA is focused on sustaining habitats suitable for GRSG populations using these areas.

Although the total area considered PHMA, SHMA and GHMA combined did not differ among Alternatives 3, 4, 5 and 6 in the Draft EIS, different combinations of habitat designations among the alternatives were considered to provide a range of alternatives and as such planning flexibility resulting from analyses in the Draft EIS. Alternative 3 was the conservation-forward alternative and the BLM analyzed all habitats occupied by GRSG plus habitats that provide suitable habitat conditions for the species in the State as PHMA. The overall extent of PHMA in alternative 3 was considered as the extent of PHMA, SHMA and GHMA combined in alternatives 4, 5, and 6.

Alternatives 4, 5, and 6 considered revisions to the current (Alternatives 1 and 2) PHMA (core area) designated areas. In general, Alternative 4 followed closely with the results of the research described above resulting in more habitats in the state being designated as PHMA compared to Alternative 5. Alternatives 5 and 6 put more weight on GRSG lek count information and existing and potential anthropogenic disturbance compared to Alternative 4 resulting in a more focused application of the PHMA designation to areas identified as being associated with GRSG leks supporting a greater percentage of the state's population of GRSG. An area in northeastern Wyoming was identified following the state's process as supporting high GRSG populations but was designated as SHMA in Alternative 5 because of high levels of existing disturbance and private lands. Revisions to the designation of areas currently considered PHMA (Alternatives 1 and 2) that no longer provide GRSG with suitable habitat conditions were incorporated into alternatives 4, 5, and 6. Designated HMAs (PHMA, SHMA and GHMA) in the Proposed RMP Amendment/Final EIS aligned closely with those analyzed in Alternative 5 (the preferred alternative) with some minor reductions in PHMA in southern and southwestern Wyoming.

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Appendix 4

Lek Status Definition Comparison

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Appendix 4. Lek Status Definition Comparison

Leks are traditional breeding display areas where male GRSG gather to attract and breed females (Connelly et al., 2011). Counts of males on leks are the primary method to monitor sage-grouse populations. Lek counts aid in estimating trend and potentially size of breeding populations and determine location of breeding habitats, informing conservation actions (Cook et al., 2022). Previous lek count guidelines (i.e., Autenrieth et al., 1982, updated by Connelly et al., 2003) have been adjusted by each state across the species' range, resulting in inconsistencies and unintentional biases that create challenges when calculating population trends across state lines (Cook et al., 2022). Given the importance of lek definitions and counts in guiding GRSG management across its range, the Western Association of Fish and Wildlife Agencies (WAFWA) has drafted new guidelines that provide consistent population trend analyses across political boundaries and management applications (Cook et al., 2022). Under all alternatives, including the Proposed RMP Amendment, the BLM is proposing to adopt the lek definitions developed by WAFWA to ensure consistency across the RMPs and with our State wildlife agency partners.

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Lek Definition Comparison – Nevada/California, Utah, Idaho, Oregon, Colorado, Wyoming, North Dakota, and South Dakota

Term	WAFWA Definition	NV/CA (2015 BLM plan unless otherwise noted)	UT (2015 BLM Plan unless otherwise noted)	ID (2015 BLM Plan unless otherwise noted)	OR (2015 BLM Plan unless otherwise noted)	CO (2015 BLM plan unless otherwise noted)	WY (2015 9-Plan BLM plan unless otherwise noted)	ND (2015 BLM plan only, no 2019 plan)	SD (2015 BLM plan only, no 2019 plan)
Lek	A lek is a traditional location where at least 2 male greater sage-grouse congregate during at least 2 springs within a 10-year period to perform their strutting display and opportunistically breed with females. Although males are territorial on leks and occupy an area, not a point, the representative location for the lek is the estimated or calculated center of the display activity. The 'lek' is the standard reporting and analysis unit for evaluating population status and long-term trends. Because males may alter their display locations within and between years (for numerous possible reasons), these multiple locations 'within' the lek have been referred to as "sub-leks", "satellite leks", "alternative leks", or "temporary leks". The location provided for the overall 'lek' should represent the dominant, largest, and/or most recent annual activity center. The lek identifier is the critical piece of data to remain consistent over time, the location can shift over time.	2015 plan: A traditional courtship display area attended by male sage-grouse in or adjacent to sagebrush dominated habitat. A lek is designated based on observations of two or more male sage-grouse engaged in courtship displays. Sub-dominant males may display on itinerant strutting areas during population peaks. Such areas usually fail to become established leks. Therefore, a site where less than five males are observed strutting should be confirmed active for two years before meeting the definition of a lek (Connelly et al. 2000; Connelly et al. 2003, 2004). Each state may have a slightly different definition of lek, active lek, inactive lek, occupied lek, and unoccupied leks. Regional planning will use the appropriate definition provided by the state of interest. 2019 Plan: . A traditional display area where two or more male Greater Sage-Grouse have attended in 2 or more of the previous 5 years. The area is typically in an open site in or next to sagebrush-dominated habitats (Connelly et al. 2003). Generally, lek sites are traditional, with the same lek sites used year after year (Scott 1942; Batterson and Morse 1948; Wiley 1978;	2015 plan: A traditional courtship display area attended by male sage-grouse in or adjacent to sagebrush dominated habitat. A lek is designated based on observations of two or more male sage-grouse engaged in courtship displays. Sub-dominant males may display on itinerant strutting areas during population peaks. Such areas usually fail to become established leks. Therefore, a site where less than five males are observed strutting should be confirmed active for two years before meeting the definition of a lek (Connelly et al. 2000, 2003, 2004). Each state may have a slightly different definition of lek, active lek, inactive lek, occupied lek, and unoccupied leks. Regional planning will use the appropriate definition provided by the state of interest. Leks can be different shapes, may move, and may change size year to year. When specific information is available for lek edges that information would be used for determining management buffers. 2019Plan: An arena where male Greater Sage-Grouse display for the purpose of gaining breeding territories and attracting females. These arenas are usually open areas with short	2015 plan: A traditional courtship display area attended by male GRSG in or next to sagebrush-dominated habitat. A lek is designated based on observations of two or more male GRSG engaged in courtship displays. Each state may have a slightly different definition of lek, active lek, inactive lek, occupied lek, and unoccupied leks. Regional planning will use the appropriate definition provided by the state of interest. 2019 plan: An area where male Greater Sage-Grouse display for the purpose of gaining breeding territories and attracting females. These arenas are usually open areas with short vegetation within sagebrush habitats, usually on broad ridges, benches, or valley floors where visibility and hearing acuity are excellent. (Note – 2019 plan does not include other definitions)	2015 Plan: An area where male sage-grouse display during the breeding season to attract females (also referred to as strutting-ground). Each state may have a slightly different definition of lek, active lek, inactive lek, occupied lek, and unoccupied leks. 2019 Plan: An arena where male sage-grouse display for the purpose of gaining breeding territories and attracting females. These arenas are usually open areas with short vegetation within sagebrush habitats, usually on broad ridges, benches, or valley floors where visibility and hearing acuity are excellent.	2015 plan: An arena where male sage-grouse display for the purpose of gaining breeding territories and attracting females. These arenas are usually open areas with short vegetation within sagebrush habitats, usually on broad ridges, benches, or valley floors where visibility and hearing acuity are excellent. Also called "strutting ground" (CPW 2008a). 2019 plan: Same as above, though omitted "Also called "strutting ground" (CPW 2008a)." (Note – 2019 plan does not include other definitions)	2015 plan: A courtship display area attended by male Greater Sage-Grouse in or adjacent to sagebrush dominated habitat. A lek is designated by two or more male sage-grouse engaged in courtship displays. For management purposes, leks with less than five males observed strutting should be confirmed active for two years to meet the definition of a lek (Connelly et al 2000, Connelly et al. 2003, 2004). 2019 Plan: An arena where male Greater Sage-Grouse display for the purpose of gaining breeding territories and attracting females. These arenas are usually open areas with short vegetation within sagebrush habitats, usually on broad ridges, benches, or valley floors where visibility and hearing acuity are excellent.	A traditional courtship display area attended by male Greater Sage-Grouse in or adjacent to sagebrush dominated habitat. A lek is designated based on observations of two or more male Greater Sage-Grouse engaged in courtship displays. Sub-dominant males may display on itinerant strutting areas during population peaks. Such areas usually fail to become established leks. Therefore, a site where less than five males are observed strutting should be confirmed active for two years before meeting the definition of a lek (Connelly et al 2000, Connelly et al. 2003, 2004). Each state may have a slightly different definition of lek, active lek, inactive lek, occupied lek, and unoccupied leks. Regional planning will use the appropriate definition provided by the state of interest.	For this RMP analysis, leks are areas used by sage-grouse during the mating season where males display to attract receptive females. Lek locations are typically used with great fidelity for decades or longer, though they may move some over time. These sites are characterized by low vegetation with sparse shrubs often surrounded by big sagebrush communities. Leks are considered to be the center of sage-grouse activities. Existence of a greater sage-grouse lek is supported by data collection. Supporting data defined as: a) minimum of 2 years with 2 or more males lekking on site (preferred); or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers, and droppings) during subsequent year. For the purpose of this RMP analysis, BLM follows South Dakota Game, Fish, & Parks in recognizing leks as active or inactive.

Term	WAFWA Definition	NV/CA (2015 BLM plan unless otherwise noted)	UT (2015 BLM Plan unless otherwise noted)	ID (2015 BLM Plan unless otherwise noted)	OR (2015 BLM Plan unless otherwise noted)	CO (2015 BLM plan unless otherwise noted)	WY (2015 9-Plan BLM plan unless otherwise noted)	ND (2015 BLM plan only, no 2019 plan)	SD (2015 BLM plan only, no 2019 plan)
Lek *(cont.)*	*(See above.)*	Autenrieth 1981). Taller sagebrush on the outskirts of the leks is necessary as a food source, escape cover, nesting cover for females, and loafing cover during the day (Patterson 1952; Gill 1965; Klebenow 1985).	vegetation within sagebrush habitats, usually on broad ridges, benches, or valley floors where visibility and hearing acuity are excellent.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*
Active	A lek that has 2 or more males counted during two or more years within the last 10 years.	2015: Any lek that has been attended by 2 or more males at least twice in the last 5 years 2019: 2 or more male observed at least twice in the last 5 years.	Any lek that has been attended by male sage-grouse during the strutting season	Any lek that has been attended by more than one male GRSG during the breeding season.	A lek attended by 1 male sage-grouse or more during the breeding season. Acceptable documentation of sage-grouse presence includes observation of birds using the site or recent signs of lek attendance (e.g. fresh droppings, feathers). New leks found during ground counts or surveys are given an annual status of active.	An open area that has been attended by more than two male sage-grouse more than two of the previous five years (Connelly et al. 2000a). This definition is derived mainly from observations of leks in large, stable populations and may not be appropriate for small populations with reduced numbers of males attending leks in fragmented sagebrush communities. Therefore, for smaller populations (e.g., Meeker – White River) that are isolated or disjunct from larger, more stable populations, an active lek is defined as an open area where one or more sage-grouse have been observed on more than one occasion engaging in courtship or breeding behavior. An area used by displaying males in the last five years is considered an active lek (CPW 2008a).	Any lek that has been attended by male Greater Sage-Grouse during the strutting season.	Any lek that has been attended by male Greater Sage- Grouse during the strutting season.	No similar definition.
Occupied	No similar definition.	A lek that has been active during at least one strutting season within the prior 10 years.	A lek that has been active during at least one strutting season within the prior 10 years.	A lek that has been active during at least one breeding season within the prior 5 years.	A regularly visited lek that has had 1 male or more counted in one or more of the last 7 years. Designate and protect surrounding area as Category 1 habitat.	A lek that has been active during at least one strutting season within the prior 10 years.	A lek that has been active during at least one strutting season within the prior 10 years.	A lek that has been active during at least one strutting season within the prior 10 years.	No similar definition.

Term	WAFWA Definition	NV/CA (2015 BLM plan unless otherwise noted)	UT (2015 BLM Plan unless otherwise noted)	ID (2015 BLM Plan unless otherwise noted)	OR (2015 BLM Plan unless otherwise noted)	CO (2015 BLM plan unless otherwise noted)	WY (2015 9-Plan BLM plan unless otherwise noted)	ND (2015 BLM plan only, no 2019 plan)	SD (2015 BLM plan only, no 2019 plan)
Inactive	A lek at which all observations within the last 10 years have been less than 2 males and that has had at least 2 males recorded during a lek count between 11 to 20 years ago.	2015 Plan: Any lek where sufficient data suggests that there 0 or 1 male during every visit (minimum 2 visits) in the last 5 years. 2019 Plan: 0 or 1 male observed during every visit (minimum two visits) in the last 5 years.	Any lek where sufficient data suggests that there was no strutting activity throughout a strutting season. Absence of strutting sage-grouse during a single visit is insufficient documentation to establish that a lek is inactive. This designation requires documentation of either: 1) an absence of sage-grouses on the lek during at least 2 ground surveys separated by at least seven days. These surveys must be conducted under ideal conditions (April 1-May 7 (or other appropriate date based on local conditions), no precipitation, light or no wind, half-hour before sunrise to one hour after sunrise) or 2) a ground check of the exact known lek site late in the strutting season (after April 15) that fails to find any sign (tracks, droppings, feathers) of strutting activity. Data collected by aerial surveys should not be used to designate inactive status as the aerial survey may actually disrupt activities.	Any lek where sufficient data suggests that there was no strutting activity throughout a breeding season. Absence of male GRSG during a single visit is insufficient documentation to establish that a lek is inactive. This designation requires documentation of one of the following scenarios: • An absence of GRSG on the lek during at least two ground surveys separated by at least seven days. These surveys must be conducted under acceptable conditions (clear to partly cloudy and winds less than 10 knots per hour) and in the absence of obvious disturbance (April 1-May 7 or other appropriate date based on local conditions) • A ground check of the exact known lek site late in the breeding season that fails to find any sign (tracks, droppings, feathers) of strutting activity. Data collected by aerial surveys should not be used to designate inactive status as the aerial survey may actually disrupt activities.	A lek with sufficient survey data to suggest that there was no male attendance throughout a breeding season. Absence of male grouse during a single visit is insufficient documentation to establish that a lek is inactive. This designation requires documentation of either: 1) an absence of birds on the lek during at least two ground surveys separated by at least seven days. These surveys must be conducted under acceptable weather conditions (clear to partly cloudy and winds less than 15 kilometers per hour [less than 10 miles per hour]) and in the absence of obvious disturbance or, 2) a ground check of the exact known lek site late in the strutting season that fails to find any sign (fresh droppings/feathers) of attendance. Data collected by aerial surveys alone may not be used to designate inactive status.	Any lek where sufficient data suggests that there was no strutting activity throughout a strutting season. Absence of strutting grouse during a single visit is insufficient documentation to establish that a lek is inactive. This designation requires documentation of either: 1) an absence of sage-grouses on the lek during at least 2 ground surveys separated by at least seven days. These surveys must be conducted under ideal conditions (April 1-May 7, or other appropriate date based on local conditions, no precipitation, light or no wind, half-hour before sunrise to one hour after sunrise) or 2) a ground check of the exact known lek site late in the strutting season (after April 15) that fails to find any sign (tracks, droppings, feathers) of strutting activity. Data collected by aerial surveys should not be used to designate inactive status as the aerial survey may actually disrupt activities.	Any lek where sufficient data suggests that there was no strutting activity throughout a strutting season. Absence of strutting grouse during a single visit is insufficient documentation to establish that a lek is inactive. This designation requires documentation of either: 1) an absence of sage-grouses on the lek during at least two ground surveys separated by at least seven days. These surveys must be conducted under ideal conditions (April 1-May 7 (or other appropriate date based on local conditions), no precipitation, light or no wind, half-hour before sunrise to one hour after sunrise) or 2) a ground check of the exact known lek site late in the strutting season (after April 15) that fails to find any sign (tracks, droppings, feathers) of strutting activity. Data collected by aerial surveys should not be used to designate inactive status as the aerial survey may actually disrupt activities.	Any lek where sufficient data suggests that there was no strutting activity throughout a strutting season. Absence of strutting grouse during a single visit is insufficient documentation to establish that a lek is inactive. This designation requires documentation of either: 1) an absence of Greater Sage-Grouses on the lek during at least two ground surveys separated by at least seven days. These surveys must be conducted under ideal conditions (April 1-May 7 (or other appropriate date based on local conditions), no precipitation, light or no wind, half- hour before sunrise to one hour after sunrise) or 2) a ground check of the exact known lek site late in the strutting season (after April 15) that fails to find any sign (tracks, droppings, feathers) of strutting activity. Data collected by aerial surveys should not be used to designate inactive status as the aerial survey may actually disrupt activities.	No similar definition.
Unoccupied lek	No similar definition.	A lek that has either been “destroyed” or “abandoned.”	A lek that has had no males counted in greater than 10 years.	An unoccupied lek is one that has not been active for 5 consecutive years. To be designated unoccupied, a lek must be inactive (see above criteria) for 5 consecutive breeding seasons.	A lek that has been counted annually and has had no birds for 8 or more consecutive years. Mitigation category based on habitat type and condition.	A lek that has either been “destroyed” or “abandoned.”	A lek that has either been “destroyed” or “abandoned.”	A lek that has either been “destroyed” or “abandoned.”	No similar definition.

Term	WAFWA Definition	NV/CA (2015 BLM plan unless otherwise noted)	UT (2015 BLM Plan unless otherwise noted)	ID (2015 BLM Plan unless otherwise noted)	OR (2015 BLM Plan unless otherwise noted)	CO (2015 BLM plan unless otherwise noted)	WY (2015 9-Plan BLM plan unless otherwise noted)	ND (2015 BLM plan only, no 2019 plan)	SD (2015 BLM plan only, no 2019 plan)
Historical	A lek at which all observations within the last 20 years have been less than 2 males, but previously met the definition of a lek. (Previously "Historic", Coates et al. 2021)	2015 Plan: Any lek that has been attended by 0 or 1 male during every visit (minimum 5 visits) in the last 30 years. 2019 Plan: 0 or 1 male observed during every visit (minimum five visits) in the last 30 years.	No similar definition.	No similar definition.	A lek that has been unoccupied prior to 1980 and remains so. Mitigation category based on habitat type and condition (1980 serves as the baseline for evaluating population objectives under ODFW's Sage-grouse Conservation Strategy, thus leks unoccupied prior to 1980 are not included in the baseline for population abundance and distribution.)	No similar definition.	(Former term for "unoccupied lek".) There are two types of unoccupied leks, "destroyed" or "abandoned." Management protection will not be afforded to unoccupied leks.	No similar definition.	No similar definition.
Pending Active	A lek with one observation of at least 2 males in the last 10 years and at least one observation of at least 2 males more than 10 years ago. This status captures leks insufficiently monitored to classify as Active, Inactive, or Historical but contains a more recent observation than Pending Historical. (Previously "Pending New", Coates et al. 2021)	2015 Plan: Any lek that has been attended by 2 or more males only once in the last 5 years. 2018 Plan: 2 or more males observed only once in the last 5 years.	No similar definition.	No similar definition.	(called "Occupied-pending") A lek not counted regularly in the last 7 years, but birds were present at last visit. Designate and protect surrounding area as Category 1 habitat. These leks should be resurveyed at a minimum of two additional years to confirm activity	No similar definition.	No similar definition.	No similar definition.	No similar definition.
Pending Historical	A lek with insufficient observations in the last 10 years to classify as Active, Inactive, Historical, or Pending Active. This requires one observation of at least 2 males recorded 11 to 20 years ago and at least one observation of at least 2 males more than 20 years ago. (Previously "Pending Old", Coates et al. 2021)	No similar definition.	No similar definition.	No similar definition.	(Called "Pending Lek") A lek not counted regularly in the last seven years, but birds were present one or more years of that period.	No similar definition.	No similar definition.	No similar definition.	No similar definition.

Term	WAFWA Definition	NV/CA (2015 BLM plan unless otherwise noted)	UT (2015 BLM Plan unless otherwise noted)	ID (2015 BLM Plan unless otherwise noted)	OR (2015 BLM Plan unless otherwise noted)	CO (2015 BLM plan unless otherwise noted)	WY (2015 9-Plan BLM plan unless otherwise noted)	ND (2015 BLM plan only, no 2019 plan)	SD (2015 BLM plan only, no 2019 plan)
Lek Complex	Considered an "outmoded" definition. 1. A grouping of leks that likely have frequent movement of individuals between leks. 2. A single lek recorded in multiple locations in multiple years in relatively close proximity. Sub-lek is a lek whose location generally ≤ ¼ mile from other sub-leks is an activity center for a specific year or series of years. A lek can be represent multiple sub-leks, or may contain only one sub-lek.	2015 Plan: A lek or group of leks within 2.5 kilometers (1.5 miles) of each other between which male GRSG may interchange from one day to the next. Fidelity to leks has been well documented. Visits to multiple leks are most common among yearlings and less frequent for adult males, suggesting an age-related period of establishment (Connelly et al. 2004). 2019 Plan: (called "Lek Cluster") A group of leks in the same vicinity, among which Greater Sage-Grouse may interchange over time, and representing a group of closely related individuals.	A lek or group of leks within 2.5 kilometers (1.5 miles) of each other between which male sage-grouse may interchange from one day to the next. Fidelity to leks has been well documented. Visits to multiple leks are most common among yearlings and less frequent for adult males, suggesting an age-related period of establishment (Connelly et al. 2004).	A lek or group of leks within 2.5 kilometers (1.5 miles) of each other between which male GRSG may interchange from one day to the next. Fidelity to leks has been well documented. Visits to multiple leks are most common among yearlings and less frequent for adult males, suggesting an age-related period of establishment (Connelly et al. 2004).	A collection of lek sites typically with small numbers of males which are associated with a larger lek site in the vicinity (less than or equal to 1 mile). A count of a lek complex generally includes systematically acquiring and recording information about all displaying males in a series of leks where no 2 lek sites are more than 1 mile apart.	A lek or group of leks within 2.5 km (1.5 mi) of each other between which male sage-grouse may interchange from one day to the next. Fidelity to leks has been well documented. Visits to multiple leks are most common among yearlings and less frequent for adult males, suggesting an age-related period of establishment (Connelly et al. 2004).	A lek or group of leks within 2.5 km (1.5 mi) of each other between which male sage-grouse may interchange from one day to the next. Fidelity to leks has been well documented. Visits to multiple leks are most common among yearlings and less frequent for adult males, suggesting an age-related period of establishment (Connelly et al. 2004).	A lek or group of leks within 2.5 kilometers (km) (1.5 miles) of each other between which male Greater Sage-Grouse may interchange from one day to the next. Fidelity to leks has been well documented. Visits to multiple leks are most common among yearlings and less frequent for adult males, suggesting an age-related period of establishment (Connelly et al. 2004).	No similar definition.
Destroyed lek	No similar definition.	A formerly active lek site and surrounding sagebrush habitat that has been destroyed and is no longer suitable for GRSG breeding	A formerly active lek site and surrounding sagebrush habitat that has been destroyed and is no longer suitable for sage-grouse breeding.	No similar definition	No similar definition.	A formerly active lek site and surrounding sagebrush habitat that has been destroyed and is no longer suitable for sage-grouse breeding.	A formerly active lek site and surrounding sagebrush habitat that has been destroyed and is no longer suitable for sage-grouse breeding.	A formerly active lek site and surrounding sagebrush habitat that has been destroyed and is no longer suitable for Greater Sage-Grouse breeding.	No similar definition.
Abandoned lek	No similar definition. Historical lek would be most similar.	A lek in otherwise suitable habitat that has not been active during a period of 10 consecutive years. To be designated abandoned, a lek must be "inactive" (see above criteria) in at least four non-consecutive strutting seasons spanning the 10 years. The site of an "abandoned" lek should be surveyed at least once every 10 years to determine whether it has been re-occupied by sage-grouse.	A lek in otherwise suitable habitat that has not been active during a period of 10 consecutive years. To be designated abandoned, a lek must be "inactive" (see above criteria) in at least four non-consecutive strutting seasons spanning the 10 years. The site of an "abandoned" lek should be surveyed at least once every 10 years to determine whether it has been re-occupied by sage-grouse.	No similar definition.	No similar definition.	A lek in otherwise suitable habitat that has not been active during a period of 10 consecutive years. To be designated abandoned, a lek must be "inactive" (see above criteria) in at least four non-consecutive strutting seasons spanning the 10 years. The site of an "abandoned" lek should be surveyed at least once every 10 years to determine whether it has been re-occupied by sage-grouse.	A lek in otherwise suitable habitat that has not been active during a period of 10 consecutive years. To be designated abandoned, a lek must be "inactive" in at least four non-consecutive strutting seasons spanning the 10 years. The site of an "abandoned" lek should be surveyed at least once every 10 years to determine whether it has been re-occupied by sage-grouse.	A lek in otherwise suitable habitat that has not been active during a period of 10 consecutive years. To be designated abandoned, a lek must be "inactive" (see above criteria) in at least four non-consecutive strutting seasons spanning the 10 years. The site of an "abandoned" lek should be surveyed at least once every 10 years to determine whether it has been re-occupied by Greater Sage-Grouse.	No similar definition.

Lek Status Definition Comparison – MT and WY 2015 Plans

Term	WAFWA Definition	Billings	Lewistown	HiLine	Miles City	Buffalo	Bighorn Basin	Lander
Lek	A lek is a traditional location where at least 2 male greater sage-grouse congregate during at least 2 springs within a 10-year period to perform their strutting display and opportunistically breed with females. Although males are territorial on leks and occupy an area, not a point, the representative location for the lek is the estimated or calculated center of the display activity. The 'lek' is the standard reporting and analysis unit for evaluating population status and long-term trends. Because males may alter their display locations within and between years (for numerous possible reasons), these multiple locations 'within' the lek have been referred to as "sub-leks", "satellite leks", "alternative leks", or "temporary leks". The location provided for the overall 'lek' should represent the dominant, largest, and/or most recent annual activity center. The lek identifier is the critical piece of data to remain consistent over time, the location can shift over time.	An assembly area where birds, especially sage-grouse, carry on display and courtship behavior. Also referred to as a "strutting ground".	A traditional courtship display area attended by male sage-grouse in or next to sagebrush dominated habitat. A lek is designated based on observations of two or more male sage-grouse engaged in courtship displays. Subdominant males may display on itinerant strutting areas during population peaks. Such areas usually fail to become established leks; therefore, a site where less than five males are observed strutting should be confirmed active for two years before meeting the definition of a lek (Connelly et al 20008; Connelly et al. 20039, Connelly, et al. 200410). Each state may have a slightly different definition of lek, active lek, inactive lek, occupied lek, and unoccupied leks. Regional planning will use the appropriate definition provided by the state of interest.	Data supports existence of lek. Supporting data defined as: (a) minimum of 2 years with 2 or more males lekking on site (preferred); or (b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers, and droppings) during subsequent year.	A traditional breeding area for sage-grouse and sharp-tailed grouse in which males assemble to establish dominance, display, and breed. Also called dancing grounds or strutting grounds. Confirmed sage-grouse lek: • a minimum of 2 years with 2 or more males lekking on site (preferred), or • 1 year with two or more males lekking on site, followed with evidence of lekking (vegetation trampling, feathers, and droppings) during the subsequent year.	A traditional courtship display area attended by male Greater Sage-Grouse in or adjacent to sagebrush dominated habitat. A lek is designated based on observations of two or more male Greater Sage-Grouse engaged in courtship displays. Before adding the suspected lek to the database, it must be confirmed by an additional observation made during the appropriate time of day, during the strutting season. Sign of strutting activity (tracks, droppings, feathers) can also be used to confirm a suspected lek. Sub-dominant males may display on itinerant (temporary) strutting areas during population peaks. Such areas usually fail to become established leks. Therefore, a site where small numbers of males (less than 5) are observed strutting should be confirmed active for two years before adding the site to the lek database.	A traditional courtship display area attended by male sage-grouse in or adjacent to sagebrush dominated habitat. A lek is designated based on observations of two or more male sage-grouse engaged in courtship displays. Before adding the suspected lek to the database, it must be confirmed by an additional observation made during the appropriate time of day, during the strutting season. Sign of strutting activity (tracks, droppings, feathers) can also be used to confirm a suspected lek. Sub-dominant males may display on itinerant (temporary) strutting areas during population peaks. Such areas usually fail to become established leks. Therefore, a site where small numbers of males (<5) are observed strutting should be confirmed active for two years before adding the site to the lek database	No similar definition. (only "occupied Lek" below)
Active	A lek that has more than 2 males counted during two or more lek counts within the last 10 years.	Data supports existence of lek. Supporting data defined as: a) minimum of 2 years with 2 or more males lekking on site (preferred) or b) 1 year with 2 or more males lekking on site followed with evidence of lekking (vegetation trampling, feathers, and droppings) during subsequent year.	No similar definition.	Default assignment unless criteria are met for "inactive" or "extirpated."	Default assignment unless criteria are met for "inactive" or "extirpated."	No similar definition.	No similar definition.	No similar definition.
Occupied	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.	A lek that has been active during at least one strutting season within the last 10 years.

Term	WAFWA Definition	Billings	Lewistown	HiLine	Miles City	Buffalo	Bighorn Basin	Lander
Inactive	A lek at which all observations within the last 10 years have been less than 2 males and that has had at least 2 males recorded during a lek count between 11 to 20 years ago.	10 years with no males or sign of lek activity - supported by surveys conducted during 3 or more years over the last 10 years. Sage grouse abundance patterns have generally fit within a 10-year time frame, encompassing both years of abundance and relative scarcity. For the purpose of assigning lek status, 10 years with 3 years of supporting data is minimal for characterizing a lek as inactive. However, the capacity for surveying leks at a greater annual frequency in 10 years is generally limited and therefore this Status Definition incorporates both biological (i.e., past abundance patterns) and current administrative factors.	No similar definition.	10 years with no sign of lek activity - supported by surveys conducted during 3 or more years over the last 10 years.	10 years with no sign of lek activity and supported by surveys conducted during 3 or more years over the last 10 years.	No similar definition.	No similar definition.	No similar definition.
Unoccupied lek	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.
Historical	A lek at which all observations within the last 20 years have been less than 2 males, but previously met the definition of a lek. (Previously "Historic", Coates et al. 2021)	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.
Pending Active	A lek with one observation of at least 2 males in the last 10 years and at least one observation of at least 2 males more than 10 years ago. This status captures leks insufficiently monitored to classify as Active, Inactive, or Historical but contains a more recent observation than Pending Historical. (Previously "Pending New", Coates et al. 2021)	No similar definition.	No similar definition.	No similar definition.	No similar definition	No similar definition.	No similar definition.	No similar definition.

Term	WAFWA Definition	Billings	Lewistown	HiLine	Miles City	Buffalo	Bighorn Basin	Lander
Pending Historical	A lek with insufficient observations in the last 10 years to classify as Active, Inactive, Historical, or Pending Active. This requires one observation of at least 2 males recorded 11 to 20 years ago and at least one observation of at least 2 males more than 20 years ago. (Previously "Pending Old", Coates et al. 2021)	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.
Lek Complex	Considered an "outmoded" definition. 1. A grouping of leks that likely have frequent movement of individuals between leks. 2. A single lek recorded in multiple locations in multiple years in relatively close proximity. Sub-lek is a lek whose location generally ≤ ¼ mile from other sub-leks is an activity center for a specific year or series of years. A lek can be represent multiple sub-leks, or may contain only one sub-lek.	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.
Destroyed lek	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.	No similar definition.
Abandoned lek	No similar definition. Historical lek would be most similar.	("Confirmed Extirpated") Habitat changes have caused birds to permanently abandon a lek (e.g., plowing, urban development, overhead power- line).	No similar definition.	("Extirpated") Habitat changes have caused birds to permanently abandon a lek (e.g., plowing, urban development, overhead power line).	(Extirpated) habitat changes have caused birds to abandon permanently a lek (e.g., plowing, urban development, overhead power lines).	No similar definition.	No similar definition.	No similar definition.
Provisionally confirmed Greater Sage-Grouse lek	—	—	—	Only one year of survey data is available but more than 5 males were observed.	—	—	—	—
Unconfirmed Greater Sage-Grouse lek	—	—	—	Single count with no subsequent survey or a reported lek without supporting survey data.	—	—	—	—

Appendix 5

Areas of Critical Environmental Concern for Greater Sage-Grouse Habitat

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Appendix 5. Areas of Critical Environmental Concern for Greater Sage-Grouse Habitat

5.1 INTRODUCTION

This appendix provides an overview of the potential Areas of Critical Environmental Concern (ACECs) considered in the Draft and Final EIS and describes the rangewide and state-by-state process the BLM undertook in identifying and addressing internal and externally provided ACEC nominations and evaluating areas for inclusion as potential ACECs in the RMPA. This appendix also provides an analysis of the effects of the alternatives on the potential ACECs that were considered under Alternatives 3 and 6.

The BLM identified 32 potential ACECs for consideration in the Draft EIS under Alternatives 3 and 6. Between the Draft EIS and the Final EIS the BLM refined the boundaries of some of the ACECs based on updated data and input and, in five instances in Idaho and Nevada/California, removed ACECs from consideration. All of the changes that occurred between Draft and Final EIS are described in the state-by state sections below. Following is a summary of the ACECs acres by state as identified in the Final EIS in both Alternatives 3 and 6.

Table 5-1. Summary of Potential GRSG ACECs by State

State	Acres of Potential ACEC in Draft EIS	Acres of Potential ACEC in Final EIS
Colorado	4,547	4,547
Idaho	3,438,307	1,689,386
Montana/Dakotas	726,062	726,050
Nevada/California	5,766,150	5,364,627
Utah	365,181	365,182
Wyoming	839,225	636,352
Total	**11,139,472**	**8,786,144**

Colorado

Case Flats – 4,547 acres

Idaho

Owyhee – 653,199 acres
Shoshone Basin – 244, 935 acres
Camas-Laidlaw – 457,724 acres
Big Desert – 333,528 acres
Triangle – 92,000 acres (identified in Draft EIS and removed from consideration in the Final EIS)
Antelope – 39,230 acres (identified in Draft EIS and removed from consideration in the Final EIS)
Mountain Valley Complex – 336,009 acres (identified in Draft EIS and removed from consideration in the Final EIS)
Upper Snake Complex – 247,491 acres (identified in Draft EIS and removed from consideration in the Final EIS)

Montana

South Valley Phillips – 615,888 acres
Carter Crook – 110,162 acres

Nevada/California
Warm Springs – 89,539 acres
North Fork O'Neil – 937,512 acres
Grass-Kobeh Valley –852,979 acres
South Fork Dixie Flats – 122,395 acres
Idaho Border – 49,019 acres
Hays Canyon – 340,850 acres
Vya-Massacre – 239,677 acres
Buffalo Skedaddle – 182,213 acres
Montana Mountain – 314,370 acres
Butte Long Valley – 606,293 acres
Eureka North and South – 66,905 acres
Monitor Valley – 173,507 acres
Reese River – 85,000 acres
Utah Border – 58,650 acres
Owyhee East - 487,122 acres
Owyhee West- 704,650 acres
Little Butte Long Valley – 85,510 acres (identified in Draft EIS and removed from consideration in the Final EIS)

Oregon
None identified.

Utah
Rich – 132,924 acres
Box Elder – 232,258

Wyoming
Golden Triangle/Little Sandy – 272,557 acres
Carter-Crook (border w/MT) – 19,400 acres
Sagebrush Focal Areas in South Central and Southwestern Wyoming – 33,166 acres
Greater South Pass and Upper Green River Basin – 311,229 acres

Management direction associated with these ACECs considered in Alternative 3 and Alternative 6 is summarized in **Chapter 2**, **Table 2-14** and detailed in **Appendix 21**, **Section 21.1.12** and **Table 2-14**. The management direction for ACECs under Alternative 3 and 6 is also summarized below in **Table 5-2**. Alternative 3 generally provides the highest level of protection. Under Alternative 3, the management protections for PHMA are the highest of all the alternatives and this direction would apply in the potential ACECs. This management direction includes closing the areas to the development of utility-scale solar, utility-scale wind, fluid minerals, non-energy leasable minerals, and saleable mineral/material management and proposing the areas for mineral withdrawal. In addition, ACECs under Alternative 3 also receive two additional protections not provided by the PHMA management direction: the exclusion for major rights-of-way with no exceptions (in PHMA under Alternative 3, designated corridors are avoidance areas) and for locatable minerals the requirement for operators to submit a plan of operations (refer to 43 CFR Part 3809.11(c)(3)) and obtain BLM approval before beginning any operations causing surface disturbance greater than casual use as defined in 43 CFR Part 3809.5 (in PHMA under Alternative 3, plan of operations are not required).

Table 5-2. Summary of ACEC Management Direction

Management Category	Alternative 3	Alternative 6
Fluid Mineral (including geothermal)	Closed	Open, No Surface Occupancy with w/exception that must be applicable to entire ACEC
Saleable Minerals & Materials	Closed	Closed to new operations except for free-use pits in support of maintenance for existing local roads and public safety.
Nonenergy Leasable Minerals	Closed	
Coal	BLM determines suitability pursuant to 43 CFR Part 3461.5	
Locatable Mineral	Proposed for withdrawal. Operators must submit a plan of operations (refer to 43 CFR Part 3809.11(c)(3)) and obtain BLM approval before beginning any operations (as defined in 43 CFR 3809.5).	Operators must submit a plan of operations (refer to 43 CFR Part 3809.11(c)(3)) and obtain BLM approval before beginning any operations (as defined in 43 CFR 3809.5).
Major Rights of Way	Major and Minor Rights of Way - Exclusion	Major Rights of Way – Exclusion. Minor rights of way – Avoidance. Designated RMP ROW corridors in the ACECs would be open for new ROWs, but new ROWs within the corridor would require compensatory mitigation to offset direct and indirect impacts of the development.
Solar (utility scale)	Exclusion	
Wind (utility scale)	Exclusion	
Criteria-Based Management for Non-Habitat	Process by which potential non-habitat may be reviewed via a field inspection.	
Mitigation	Apply the mitigation hierarchy to address changes in existing development or new development as the result of valid existing rights. Where avoidance or minimization will not fully offset a project's impacts compensatory mitigation is required and will at minimum meet the requirements of the state wildlife agency or other appropriate state authority, and BLM/DOI mitigation policy. If the state agency does not require mitigation, BLM will require compensatory mitigation to achieve no net habitat loss.	The BLM will apply the mitigation hierarchy. Where avoidance or minimization will not fully offset a project's impacts compensatory mitigation is required and will at minimum meet the requirements of the state wildlife agency or other appropriate state authority, and BLM/DOI mitigation policy. If the state agency does not require mitigation, or state-sponsored mitigation is determined by BLM to be inconsistent with BLM/DOI policy, BLM will require compensatory mitigation to achieve no net habitat loss.
Adaptive Management	Soft and hard adaptive management threshold based on habitat and population trends. Causal factor analysis is conducted to identify causal factor(s) and adaptive management response are instituted.	
Habitat Objectives	The habitat objectives identify the desired outcome for habitat on BLM-administered lands in all GRSG HMAs to support suitable GRSG habitat at multiple scales in order to support connected mosaics of sagebrush and provide seasonal habitats and dispersal.	

Management Category	Alternative 3	Alternative 6
Disturbance Cap	3% cap for new and pre-existing authorizations in the project analysis area and within HAF Fine-Scale boundaries while honoring valid existing rights. Cap would include infrastructure, fire, and agriculture.	All states: 3% cap in PHMA in the HAF Fine-Scale boundaries (5% in WY and MT). Applicable only to infrastructure. No exceptions to the disturbance cap.
Predation	Collaborate with appropriate state Agencies and others in their efforts to minimize impacts from predators on GRSG. Avoid new infrastructure in undisturbed habitat. Minimize food sources. Predator management plan requirement.	Same as Alt. 3 but predator management plan may be required.
Livestock Grazing	Unavailable to livestock grazing.	Managing livestock grazing to meet land health standards and avoid direct impacts to GRSG habitats from livestock range improvements.
Wild Horse and Burro	Wild horse and burros would be removed.	Manage within established appropriate management levels (AML). Incorporate GRSG habitat objectives into plans. Prioritize WH&B activities - such as monitoring, gathers, AML adjustments (due to causal factor) etc.

Under Alternative 6, the PHMA management direction for Alternative 5 would be applied in the potential ACECs but, unlike PHMA under Alternative 5, the following additional protections would be provided: potential ACECs would be closed to development of utility-scale solar and utility scale wind and would include additional protections related to fluid mineral development, saleable mineral/material management, major rights of way, the application of the disturbance cap with no exceptions, and for locatable minerals the requirement for operators to submit a plan of operations (refer to 43 CFR Part 3809.11(c)(3)) and obtain BLM approval before beginning any operations causing surface disturbance greater than casual use as defined in 43 CFR Part 3809.5.

Following is a comparative summary of the management direction for ACECs under Alternative 3 and 6. Refer to **Appendix 21**, **Section 21.1.12** and **Table 2-14** for full management descriptions.

5.2 AREAS OF CRITICAL ENVIRONMENTAL CONCERN (ACECS) POLICY AND REGULATIONS

The Federal Land Policy and Management Act (FLPMA) requires that priority shall be given to the designation and protection of areas of critical environmental concern (ACECs). ACECs are defined in FLPMA Section 103(a) (43 United States Code 1702) and in 43 Code of Federal Regulations (CFR) 1601.0-5(a) as "areas within the public lands where special management attention is required (when such areas are developed or used or where no development is required) to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources or other natural systems or processes, or to protect life and safety from natural hazards.". The following analysis and the resultant findings for ACEC relevance and importance criteria has been performed pursuant to FLPMA Section 202(c)(3) (43 United States Code 1712) and BLM implementing regulations 43 CFR 1610.7-2 *Designation of areas of critical environmental concern*. The ACEC regulations were revised as part of the BLM's Public Lands Rule (PLR) in April 2024 and an updated BLM ACEC Manual 1613 was issued in August 2024. Although the Notice of Availability (NOA) for

the GRSG RMP Amendment and EIS was published prior to the effective date of the PLR, and is, therefore, not expected to incorporate all elements of the PLR as per BLM IB 2024-048, the GRSG Proposed RMPA/FEIS is largely consistent with the PLR and the updated ACEC manual.

5.3 ACEC CRITERIA

Nominated ACECs that are found by BLM to meet the relevance and importance criteria identified in 43 CFR 1610.7-2 (d) must be evaluated in at least one alternative in the EIS or EA for the RMP or relevant RMP amendment (where ACECs are within the scope of the amendment). Following are the relevance and importance criteria identified in 43 CFR 1610.7-2:

> ***(1) Relevance.*** *The area contains important historic, cultural, or scenic values; fish or wildlife resources; natural systems or processes; or natural hazards potentially impacting life and safety.*
>
> ***(2) Importance.*** *A historic, cultural, or scenic value; a fish or wildlife resource; a natural system or process; or a natural hazard potentially impacting life and safety has importance if it has qualities of special worth, consequence, meaning, distinctiveness, or cause for concern; national or more than local importance, subsistence value, or regional contribution of a resource, value, system, or process; or contributes to ecosystem resilience, landscape intactness, or habitat connectivity. A natural hazard can be important if it is a significant threat to human life and safety.*

To be designated as an ACEC, an area must meet the relevance and importance criteria and the need for special management attention criterion which is identified in 43 CFR 1610.7-2:

> ***(3) Special management attention.*** *The important historic, cultural, or scenic values; fish or wildlife resources; natural systems or processes; or natural hazards potentially impacting life and safety require special management attention. "Special management attention" means management prescriptions that:*
>
> > ***(i)*** *Protect and prevent irreparable damage to the relevant and important values, or that protect life and safety from natural hazards; and*
> >
> > ***(ii)*** *Would not be prescribed if the relevant and important values were not present. In this context, "irreparable damage" means harm to a value, resource, system, or process that substantially diminishes the relevance or importance of that value, resource, system, or process in such a way that recovery of the value, resource, system, or process to the extent necessary to restore its prior relevance or importance is impossible.*

In this RMP Amendment EIS, in compliance with 43 CFR 1617.7-2 and the updated Areas of Critical Environmental Concern Manual MS 1613, the BLM has evaluated the areas found to have relevance and importance and has proposed them for ACEC designation in Alternatives 3 and 6. The BLM has also analyzed the effects of the management direction to these potential ACEC areas under all of the alternatives, including the Proposed RMP Amendment, in this appendix. This effects analysis provides the State Directors who will be signing the Records of Decision for this RMP Amendment with the information needed to determine if special management attention is needed to protect and prevent irreparable damage to the relevant and important values identified for the areas as required by 43 CFR 1610.7-2(3).

5.4 IDENTIFICATION OF POTENTIAL ACECS

5.4.1 Internally Identified ACECs

In identifying ACECs for consideration in this RMPA, the BLM took into account the entirety of GRSG habitat on BLM-administered lands, with no distinction between habitat management areas, specific nominated areas, or prior identified areas. With all GRSG habitat as the starting point, BLM then considered available data at multiple spatial scales to determine what, if any areas met relevance and importance criteria.

The BLM began this ACEC identification process at the rangewide scale and made refinements to the identification of potential ACECs at the state-specific scale.

In considering the relevance, the BLM considered just two of the components of the relevance criteria: 1) a wildlife resource, and 2) a natural process or system – related to GRSG habitats. No cultural, scenic, values or natural hazards were evaluated. The BLM considered multiple lines of information, never relying on just one data set to conclude a criterion was met. Rangewide models were an important starting point, but incorporation of local information, and considerations of data accuracy and scale of application were carefully reviewed prior to making the preliminary delineations of potential ACECs. The consideration of relevance and importance was conducted in a two-step approach that started with rangewide scientific data and models, followed by a review by staff at the state and field office levels who are more familiar with the local habitat conditions.

Rangewide Review

In conducting the initial rangewide review, BLM did not rely on prior designations such as Priority Areas for Conservation (PACs) and Sagebrush Focal Areas (SFAs) to identify potential ACECs. Rather than using the composite results of prior mapping efforts, which were identified for purposes different than land use planning or ACEC evaluation, this evaluation sought to use primary datasets because previous designations were not developed using the regulatory and policy criteria associated with the BLM ACEC process. Additionally, PACs and SFAs were developed using data that was available at the time of their publication (2013 and 2015, respectively). The PACs were developed by the States and helped inform the BLM's habitat management areas in the 2015 GRSG amendment effort. Since the 2013 COT Report, the BLM has worked with state wildlife agencies to update habitat management area boundaries for this amendment, in particular the BLM worked with all the states to re-evaluate the habitat management areas based on new science and research products that have been completed since 2015. For these reasons, the BLM did not use PACs or SFAs as an automatic delineation of potential ACECs, but instead visually reviewed a series of rangewide spatial layers (see list below) across the entire GRSG range. This preliminary review did not consider SFAs because the intention was to do the SFA review with updated data at the state level during the next step in the evaluation process. The purpose of the review was to identify potential areas where multiple data sources indicated areas of high value or concern related to GRSG use and conservation. The resulting areas were identified as an initial screening for consideration by BLM state and field office staff in their identification of areas that met the relevance and importance criteria and should be identified as potential ACECs in the RMPA. Every layer in the list below was considered but some carried more importance in some areas than others. For example, areas that models indicated as important genetic connectivity may have resulted in that layer receiving more emphasis than others where genetic connectivity was not a factor.

Layers reviewed

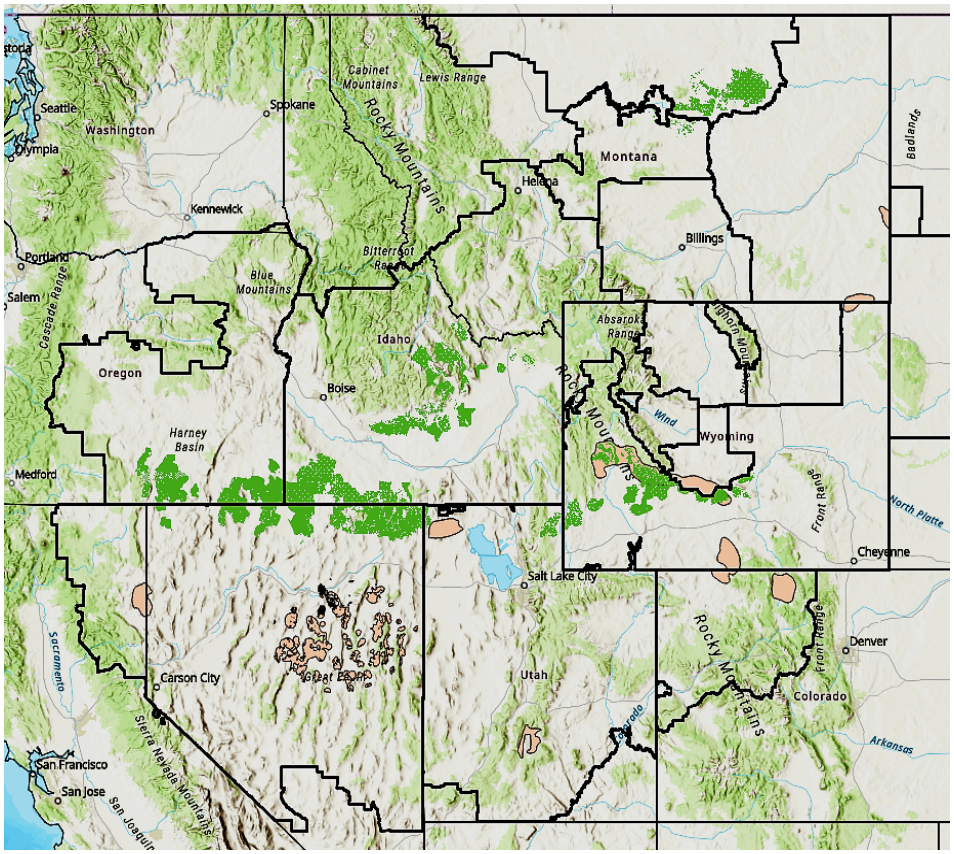
- Coates et al., 2021. Range-wide Greater sage-grouse Hierarchical Monitoring Framework, Implications for Defining Population Boundaries, Trend Estimation, and a Targeted Annual Warning System (https://doi.org/10.3133/ofr20201154);
- Cross et al., 2018. The genetic network of greater sage-grouse: Range-wide identification of keystone hubs of connectivity (https://onlinelibrary.wiley.com/doi/full/10.1002/ece3.4056)
- Doherty et al. 2016. Importance of regional variation in conservation planning: a range-wide example of the Greater Sage-Grouse (https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.1462)

- Oyler-McCance et al., 2022. New strategies for characterizing genetic structure in wide ranging, continuously distributed species: lessons learned from Greater Sage-grouse (https://doi.org/10.1371/journal.pone.0274189)
- Row et al., 2018. Quantifying functional connectivity: the role of breeding habitat, abundance, and landscape features on range-wide gene flow in sage-grouse (https://onlinelibrary.wiley.com/doi/full/10.1111/eva.12627)
- Palmquist et al., 2021. Divergent climate change effects on widespread dryland plant communities driven by climatic and ecohydrological gradients (https://onlinelibrary.wiley.com/doi/full/10.1111/gcb.15776)
- Rigge et al. 2021. Projected change in rangeland fractional component cover across the sagebrush biome under climate change through 2085 (https://esajournals.onlinelibrary.wiley.com/doi/full/10.1002/ecs2.3538)
- Cross et al. 2022. The ties that bind the sagebrush biome: integrating genetic connectivity into range-wide conservation of greater sage-grouse

After initial areas were identified, the size and extent of the polygons were reviewed in context of the presence of BLM-administered lands. Areas where the BLM had marginal or scattered parcels were removed, as the effectiveness of habitat management is such areas is low without cross-ownership coordination. Some areas extend beyond BLM lands simply for consideration of external factors that may influence the conservation value of the areas being considered. For each area, the information supporting the decision to identify that area for further consideration is outlined below in the description of the state evaluations.

Figure 5-1 shows the potential areas that were identified through this rangewide review in relation to the SFAs identified in the 2015 RMP Amendment.

Figure 5-1: Rangewide Review Areas (light orange) and SFAs (dark green areas)



The following list summarizes the areas identified through the rangewide review, organized by state. Bullets that are bolded indicated the most influential considerations in identifying areas for further consideration.

Colorado

- North Park
  - Most of the area is PHMA
  - High relative abundance
  - Entire area is modeled breeding habitats
  - High habitat connectivity for genetics.
  - Climate change models predict 5-25% sagebrush cover into the future, with moderate increase in sagebrush biomass.
  - Area anchored by National Wildlife Refuge
  - **Few current threats**
  - **Appears to be an isolated population on the "edge" of the range**
- Wyoming/Colorado Border
  - Areas within PHMA in Colorado, and mostly PHMA in Wyoming
  - High relative abundance
  - Modeled breeding habitats cover entire area in Colorado, most of the area in Wyoming

  - Many genetic nodes, including an important node in Colorado. **Genetic movement between these areas suggest extensive population movements**
  - **High habitat connectivity for genetics within and between the areas**
  - Climate change models predict 5-25% sagebrush cover into the future and a mix of mostly increasing sagebrush biomass

Montana/Dakotas

- Area bordering North Dakota
  - GHMA in Montana, PHMA in North Dakota
  - High relative abundance
  - Several connected genetic nodes
  - **May provide the only refuge for the North Dakota birds; important for that genetic subpopulation**
  - Future sagebrush cover models suggest 0-4%, but that is not atypical for this area.
  - Future sagebrush biomass to increase
- Area bordering Wyoming
  - RHMA in Montana, mostly GHMA in Wyoming
  - High relative abundance
  - lots of modeled breeding habitat
  - contains an important genetic node (maybe hub?); **may provide a connection with the GRSG in the Dakotas, and Southeast Montana.**
  - Future sagebrush cover models suggest 0-4%, but that is not atypical for this area
  - Future sagebrush biomass to increase in PHMA and RHMA, but decrease in GHMA

Nevada/California

- Central Nevada (Areas that are currently PHMA and high abundance only)
  - **High relative abundance**
  - High modeled breeding habitats
  - **High connectivity within the PHMA areas**
  - Two key genetic nodes and many other genetic nodes
  - Overlaps two genetic subpopulations
  - Climate change models predict 5-25% sagebrush cover, but decreasing biomass in most areas
- East-central California
  - Area is PHMA
  - **High relative abundance – likely the greatest number of males in California**
  - Breeding habitat mimics relative abundance
  - **Few genetic nodes but those indicate connection to the north (Oregon) and Southeast into Nevada**
  - Medium connectivity (combined models)
  - Climate change models predict reduction in sagebrush biomass, but sagebrush cover at 5-25%

Utah

- Northwest Utah
  - Area is PHMA
  - Some areas of high relative abundance

  - Breeding habitat model are in the same area of high relative abundance
  - Habitat connectivity for genetic is high throughout the area
  - **Area has two key genetic nodes and several others. The key nodes are connected with populations in Idaho and eastern Nevada, while other nodes are connected with southern Utah populations and northeastern Utah.**
  - **3 subpopulations overlap this area – may indicate value for maintaining connectivity.**
  - Climate change models predict 5-25% sagebrush cover into the future and increasing sagebrush biomass
  - **Looking at wintering habitat – breeding habitat is on private ground**
- Parker Mountain
  - Area is currently PHMA
  - High relative abundance
  - Area is modeled breeding habitat
  - **Contains one key genetic node and a few other nodes – appears to be connected both to the north and the west**
  - Habitat connectivity high within the outlined area
  - Climate change models predict 5-25% sagebrush cover and increase in sagebrush biomass.
  - **Likely has the largest population of GRSG in the subpopulation**

Wyoming

- Wyoming/Colorado border
  - Areas within PHMA in Colorado, and mostly PHMA in Wyoming
  - High relative abundance
  - Modeled breeding habitats cover entire area in Colorado, most of the area in Wyoming
  - Many genetic nodes, including an important node in Colorado. **Genetic movement between these areas suggest extensive population movements**
  - **High habitat connectivity for genetics within and between the areas**
  - Climate change models predict 5-25% sagebrush cover into the future and a mix of mostly increasing sagebrush biomass

- Wyoming Pinedale and Atlantic City area
  - Most of the area is PHMA, some in original SFA
  - **High relative abundance – likely the largest number of GRSG in the entire range**
  - Entire area modeled breeding habitat
  - Many genetic nodes including two important nodes
  - High habitat genetic connectivity
  - Climate change models project 5-25% sagebrush cover into the future and an increase in sagebrush biomass.
  - **Area of high risk for continued development**
  - Northern end of Green River watershed is mostly private land.
- Area bordering Wyoming – RHMA in Montana, mostly GHMA in Wyoming – Note this area overlaps with the area identified in Montana
  - High relative abundance,

- lots of modeled breeding habitat
- contains an important genetic node (maybe hub?); **may provide a connection with the GRSG in the Dakotas, and southeastern Montana.**
- Future sagebrush cover models suggest 0-4%, but that is not atypical for this area
- Future sagebrush biomass to increase in PHMA and RHMA, but decrease in GHMA

The rangewide review did not identify any areas in Idaho or Oregon outside the SFAs.

State-specific Review

The results of the rangewide review were shared with staff from each applicable BLM state office, with discussions reviewing the rationale behind the identification. The states used the information identified in the rangewide review, their own state-specific information and data, and externally nominated ACECs to identify potential ACECs for consideration. In identifying areas for consideration, the states evaluated potential areas to determine if they met the relevance and importance criteria.

Relevance Criterion

The states applied the relevance criteria described above for the rangewide review and also applied the importance criterion to their evaluations. In their relevance considerations, the states affirmed the presence of GRSG populations or associated sagebrush habitats with multiple data inputs (distribution maps, seasonal habitats, leks, etc.). All areas with GRSG and their habitats were determined to meet the relevance criteria. Areas of split surface and mineral estates, where the BLM manages the mineral estate but not the surface, were not included in the relevance consideration. Areas where the agency administers just the mineral estate would have no wildlife resource within the agency's jurisdiction, and therefore the area would not meet the relevance criterion.

Importance Criterion

Once the presence of GRSG and associated habitats was confirmed, the BLM then evaluated importance criteria. This evaluation effort focused on determining whether a given area of GRSG habitat being considered has characteristics that make it more than locally significant, and the evaluation compared areas of GRSG habitat to determine if any particular area had characteristics that were more than locally important. The importance criteria considerations are not an assessment of biological value of habitat to a given population, but how that habitat and its characteristics compare to other GRSG habitat throughout the species range. Rising to a level of national importance required multiple lines of evidence identifying and area as exemplary for GRSG.

The state-by-state sections below provide a summary of the evaluation process followed in each state and the ACECs that were identified for consideration in this RMPA within that state.

5.4.2 Externally Nominated ACECs

The BLM's Notice of Intent (86 FR 66331) for this greater sage-grouse (GRSG) amendment effort invited the public "to nominate or recommend areas that may be considered for designation as areas of critical environmental concern (ACEC), per 43 CFR 1610.7-2." Because this planning effort is only considering amending resource management plan (RMP) actions related to GRSG and its habitat, the invitation clarified that "nominations or recommendation of potential ACECs should be relevant to the preliminary purpose and need of this planning initiative." In other words, any ACEC nomination (or component thereof) that included values other than GRSG and its habitat were not evaluated or included as part of this planning effort. However, ACEC nominations that included GRSG as one of the nominated values were considered.

Nominations that were not related to GRSG will be considered by BLM during the next RMP or applicable RMP amendment process in the area where the ACEC was nominated.

The nominations received by the BLM during the scoping period are identified in the table below. The ACEC nominations were considered by the BLM states receiving the nomination and the evaluation process conducted in each state is described in the state specific sections below.

Table 5-3. ACEC Nominations Received During Scoping

Nominated ACEC	Location	Acres
Sagebrush Sea Reserve	Oregon, California, Nevada, Idaho, Utah, Wyoming, Washington, Montana, Colorado	48,202,418
Little Sandy	Wyoming	367,362
Red Desert	Wyoming	153,763
McDermitt Caldera	Nevada/Oregon	No specific area delineated
South Valley Phillips	Montana	
Frenchman Breaks Expansion	Montana	45,725
Musselshell Breaks	Montana	122,290
North of the Charles M Russell National Wildlife Refuge	Montana	185,055
Powderville Expansion	Montana	20,053

The 35 nominations received by the BLM during the Draft EIS comment period are identified in the table below. The ACEC nominations were considered by the BLM states receiving the nomination and the evaluation process conducted in each state is described in the state specific sections below.

Table 5-4. ACEC Nominations Received During the Draft EIS Comment Period

Nominated ACEC	Location	Acres
Nevada Department of Wildlife Population Management Units	Nevada	41,110,833
Firestone Basin	Oregon	135,171
Ibex Butte	Oregon	23,912
Packsaddle Draw-Horseshoe Ridge	Oregon	260,134
Coyote Hills	Oregon	110,203
Irish Hill-Big Lake	Oregon	120,375
Catlow Valley	Oregon	841,812
Beatys Butte	Oregon	595,796
Riddle Creek	Oregon	56,650
West Steens	Oregon	110,860
Grassy Ridge	Oregon	186,623
Oregon Canyon Mountains	Oregon	156,242
Hog Creek Ridge	Oregon	260,987
Star Mountain	Oregon	425,305
Willow (analyzed as a potential ACEC in the 2015 RMPA)	Oregon	53,803
Virtue Flat (analyzed 2015 RMPA)	Oregon	21,983
Trout Creek (analyzed in 2015 RMPA)	Oregon	675,218
Star Mountain (analyzed in 2015 RMPA)	Oregon	102,858
Red Hills (analyzed in 2015 RMPA)	Oregon	83,849
Lone Mountain (analyzed in 2015 RMPA)	Oregon	244,797
Jackass (analyzed in 2015 RMPA)	Oregon	428,057
Goose (analyzed in 2015 RMPA)	Oregon	4,785
Frederick Butte (analyzed in 2015 RMPA)	Oregon	527,739
East Warner (analyzed in 2015 RMPA)	Oregon	313,182
Diablo Peak (analyzed in 2015 RMPA)	Oregon	345,250
Cow Creek (analyzed in 2015 RMPA)	Oregon	42,776
Corner (analyzed in 2015 RMPA)	Oregon	355,598
Buck Creek (analyzed in 2015 RMPA)	Oregon	143,151
Beaty Butte (analyzed in 2015 RMPA)	Oregon	507,050
Antelope (analyzed in 2015 RMPA)	Oregon	117,076
Abert Rim (analyzed in 2015 RMPA)	Oregon	18,049
Louse Canyon	Oregon, Nevada	449,854
Table Mountain	Oregon, Idaho, Nevada	139,859
Juniper Ridge	Oregon, Idaho, Nevada	209,814
aa-Tiipi Flat	Oregon, Idaho, Nevada	61,743

Although the state-specific sections below address the nominations received by state, due to the multi-state nature of the Sagebrush Sea Reserve ACEC nomination, the BLM headquarters GRSG planning team evaluated the nomination. The Sagebrush Sea Reserve mirrors, to a large extent, the Priority Areas for Conservation (PACs) from the US Fish and Wildlife Service's (USFWS) 2013 Conservation Objectives Team Report (COT Report). However, in Wyoming the nominated area was expanded beyond the PACs to also include all the 75% breeding density areas from Doherty, et. al 2010[1], as well as new Wyoming Core Area designations from 2015. From all those areas in Wyoming the nominators removed areas with a density of

[1] Doherty, K.E., J.D. Tack, J.S. Evans, J.SN. and D.E. Naugle. 2010. Mapping breeding densities of greater sage-grouse: a tool for range-wide conservation planning. BLM completion report: Agreement # L10PG00911.

active oil and gas wells that exceeded five wells per square mile. For Nevada, the nominated area expanded beyond the PACs "to increase coverage of important seasonal habitats for [GRSG] and ensure connectivity between numerous patches of high-quality habitat that are separated by rocky mountain ranges, playas, and other expanses of marginal quality habitat." In addition to identifying the area for consideration, the proposal also included suggestions for how the nominated ACEC should be managed.

The BLM did not identify the Sagebrush Sea as potential ACEC in the Draft or Final EIS alternatives because the area does not meet the ACEC relevance and importance criteria (1610.7-2 (d)) because the BLM believes the PAC criteria utilized in identifying the Sagebrush Sea nomination no longer reflects the most up to date science on habitat connectivity, populations, effects to habitat from climate change, and genetic information across the range of the species. In this RMP Amendment effort, the BLM is choosing to focus management direction that protects and conserves GRSG in Priority and General GRSG Habitat Management Areas (PHMA, PHMA with limited exceptions, and GHMA). The BLM reviewed new scientific publications since our previous planning efforts on key population (e.g., Doherty et al. 2016, Coates et al., 2021), genetic (e.g., Cross et al., 2018, Oyler-McCance et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021) and coordinated with state authorities (such as wildlife agencies) to identify and update GRSG habitat management areas (HMA). The HMAs are identified using inventory data on habitat use and occupancy and reflect the dynamic nature of the vegetation communities that make-up GRSG habitat. Analyzing the Sagebrush Sea would not meet the BLM's purpose and need to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions based on new scientific information or changes in land use.

COLORADO

BLM Colorado considered the previous ACEC evaluation from the 2015 FEIS and discussed whether there was new information or resource values making any of the populations and subpopulations (Colorado Management Zones) eligible for ACEC nomination. BLM Colorado also considered two areas highlighted by the rangewide ACEC review process. The two highlighted areas were the North Great Divide and Fly Creek portions of the Northwest Colorado GRSG population and the North Park GRSG population. The North Great Divide and Fly Creek areas have contiguous habitat connecting north into the Wyoming Basin in Wyoming. BLM Colorado and BLM Wyoming coordinated during review of these areas, but separate determinations were made by the respective interdisciplinary teams.

BLM Colorado also coordinated with BLM Utah regarding the functional connectivity on the cross-border Blue Mountain habitat area. Row et al. (2018) demonstrates high connectivity between GRSG populations in CO and UT which is supported by bird collar location data (unpublished CPW data). However, Row et al. (2018) does not model a known connectivity area in the Diamond Mountain or Cold Springs Mountain areas to the north. For these reasons, the Blue Mountain connectivity area was not considered to be more than locally significant and was not carried forward for additional evaluation.

North Great Divide and Fly Creek

North Great Divide and Fly Creek are situated within the northeast extent of the Northwest Colorado GRSG population. These areas include high quality sagebrush with relatively low disturbance except for the Highway 13 designated corridor, which bisects the areas. North Great Divide and Fly Creek provide breeding, nesting, brood-rearing, and winter habitat for GRSG and include several active leks.

The North Great Divide and Fly Creek areas were highlighted by the range wide planning team because of the genetic and functional genetic connectivity between the Northwest Colorado population and the Wyoming Basin population (Cross et al. 2018, Row et al. 2018) and high likelihood of lek persistence (Wann et al. 2022). The area contains many genetic nodes, or leks that are important to maintaining gene flow in a population, including an important node in Great Divide (Cross et al. 2018). Important nodes maintain gene flow between populations in the species range (Cross et al. 2018). Genetic movement between these areas suggest that the habitat has previously supported population movements within and between populations. Row et al. (2018) and Cross et al. (2023) modeled high habitat connectivity for genetics between these areas and the Wyoming Basin.

Genetic and functional connectivity between Northwest Colorado and the Wyoming Basin are modeled in other portions of the Northwest Colorado population as well. Row et al. (2018) modeled connectivity areas between Northwest Colorado and the Wyoming Basin occurring in the Sand Wash/Powder Wash area and in the Cold Springs area. Sand Wash also contains a genetically important node (Cross et al. 2018). Strong population genetics between the Northwest Colorado and Wyoming Basin do not indicate that there is a risk of the populations becoming genetically distinct (Oyler-McCance et al. 2022).

The North Great Divide and Fly Creek areas provide valuable GRSG habitat that is well-connected to the Wyoming Basin, but several other areas in the Northwest Colorado Population also demonstrate habitat and genetic connectivity. For this reason, BLM Colorado determined that the area does not have more than local significance and is not recommended to move forward as a potential ACEC.

North Park

North Park is a large basin bounded by Medicine Bow Range on the east and by the Park Range on the west. The Rabbit Ears Range separates North Park from Middle Park to the south. BLM Colorado discussed all

areas of North Park for values important to GRSG. North Park provides well connected lekking, nesting, brood-rearing, and winter habitat for GRSG. A large majority of seasonal habitats for GRSG in North Park are suitable (North Park HAF Site-Scale Report, 2022). North Park has genetic connections to the Middle Park population to the south and a narrow connection north to the Wyoming Basin but is otherwise disjunct from the Northwest Colorado population (Cross et al. 2018; Row et al. 2018; Cross et al. 2023). The BLM Kremmling Field Office is implementing treatments to increase the value of GRSG habitat, particularly the extent of available mesic habitats.

Case Flats

BLM Colorado highlighted the Case Flats area, which is a known winter concentration area. CPW staff discovered the Case Flats winter concentration area while conducting GRSG research in the North Park Basin. For unknown reasons, GRSG from the entire basin congregate in large numbers at this location each year during late winter/early spring prior to lekking (CPW Wildlife Mitigation Plan, 2021). The area has been highlighted in conversations with Colorado Parks and Wildlife and outlined as a resource for concern in the CPW Wildlife Mitigation Plan with the local operator but has not been otherwise recognized for specific management by the BLM.

Case Flats includes unitized fluid mineral leases and is in proximity to active oil & gas development, Highway 14, and ex-urban development. The likelihood of lease development is high, which could have direct and indirect impacts on GRSG and winter concentration in the area.

Due to the unique nature of the winter concentration area, population-wide importance, and likelihood of lease development, BLM Colorado evaluated the area as a potential ACEC. This nominated area meets relevance and importance criteria for wildlife and a natural process or system as presented in the table below.

Importance Evaluations

Colorado GRSG ACEC Importance Evaluation: Case Flats Nominated ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	Yes	The area contains unique GRSG winter concentration areas, providing special worth to the North Park GRSG population.
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened	Yes	Case Flats provides a unique winter concentration area for a BLM sensitive status species. The habitat provides for unique GRSG congregating behavior which may be irreplaceable because it is not known why GRSG concentrate in this area and may not be replicable in other habitats. The area contains several unitized oil and gas leases and could be adversely impacted by development.

Colorado GRSG ACEC Importance Evaluation: Case Flats Nominated ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
• Vulnerable to adverse change		
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	Yes	The area is within Greater Sage-Grouse Priority Habitat Management Areas which have been at the focus of national planning efforts, and state and local land use plans.
Other Items		
Boundaries	South of Walden, bound by Highways 14 and 125, Bordering Arapaho Wildlife Refuge.	
Conclusion		
This internally nominated area meets both relevance and importance criteria for a fish and wildlife resource. Because Case Flats meets the relevance and importance criteria it was identified as a potential ACEC under Alternatives 3 and 6. Refer to BLM Colorado - ACEC Maps for Alternatives 3 and 6 that follow.		

Colorado GRSG ACEC Importance Evaluation: North Great Divide/Fly Creek Nominated ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	No	The areas are modeled as having high genetic and functional genetic connectivity between the Northwest Colorado population and the Wyoming Basin (Cross et al. 2018; Row et al. 2018; Cross et al. 2023) and high likelihood of lek persistence (Wann et al. 2022). The area contains many genetic nodes, including an important node in Great Divide (Cross et al. 2018). However, genetic and functional connectivity between Northwest Colorado and the Wyoming Basin are modeled in other portions of the Northwest Colorado population as well. Row et al. (2018) modeled connectivity areas between Northwest Colorado and the Wyoming Basin occurring in the Sand Wash/Powder Wash area and in the Cold Springs area. Sand Wash also contains a genetically important node (Cross et al. 2018). Strong population genetics between the Northwest Colorado and Wyoming Basin do not indicate that there is a risk of them becoming genetically distinct (Oyler-McCance et al. 2022). Because there are multiple points of connection cross-state between the populations and, this area is not more than locally significant.
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened • Vulnerable to adverse change	No	Because there are multiple points of connection cross-state between the populations, this area is not unique, rare, or irreplaceable.

Colorado GRSG ACEC Importance Evaluation: North Great Divide/Fly Creek Nominated ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	No	The area is within Greater Sage-Grouse Priority Habitat Management Areas which have been at the focus of national planning efforts, and state and local land use plans. However, this area contains only a small portion of the PHMA within Colorado and of the Western US and the area has not been specifically addressed as a national priority.
Other Items		
Boundaries	Great Divide is bound by the Little Snake River to the west and Highway 13 to the east, and the Wyoming border to the north and Highway 40 to the south. Fly Creek is bound by the Elkhead Mountains to the south and connected sagebrush habitat moving north into Wyoming. Highway 13 bisects the areas.	
Conclusion		
The nominated area meets relevance criteria but does not meet importance criteria. Therefore, it is not recommended that the area be considered a potential ACEC for GRSG for analysis in the current range-wide planning effort.		

Effects of the Alternatives on the Potential Case Flats ACEC

In Colorado, the potential Case Flats ACEC, totaling 4,544 acres was the only ACEC identified for potential designation under Alternatives 3 and 6. This area provides a unique wintering habitat that supports the population in North Park, Colorado.

Table 5-5 displays the HMA allocations for this area under each alternative. Under the Proposed RMP Amendment, the entire area would be managed as PHMA with limited exceptions. Under Alternatives 2 the entire area would be managed as PHMA. Under Alternatives 3, the area would be proposed for designation as an ACEC and would receive PHMA management direction except where stronger, ACEC protections are identified related to developing plans of operations for locatable mineral development and major rights of way. Under Alternative 6, the area would be proposed for designation as an ACEC and would receive PHMA management direction identified for Alternative 5 except where stronger, ACEC protections are identified for locatable minerals, fluid minerals, non-energy leasables, saleable minerals, major rights of way, solar, wind, and disturbance cap. Under Alternatives 1, 4, and 5, 88% of the area would be managed as PHMA and 12% would be managed as GHMA.

Table 5-5. 4 HMA Allocations in the Colorado Potential ACEC by Alternative

Potential ACEC	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment[2]
Case Flat							
PHMA with limited exceptions	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	4,547 acres (100%)
PHMA	3,988 acres (88%)	4,547 acres (100%)	4,547 acres (100%)	3,988 acres (88%)	3,988 acres (88%)	4,547 acres (100%)	4,547 acres (100%)
GHMA	559 acres (12%)	0 acres (0%)	0 acres (0%)	559 acres (12%)	559 acres (12%)	0 acres	0 acres (0%)
Total	**4,547 acres**	**4,547 acres**	**4,547 acres**	**4,547 acres**	**4,547 acres**	**4,547 acres**	**4,547 acres**

[2] PHMA with limited exceptions are areas within PHMA where additional protections to support conservation of GRSG habitat would reduce impacts from highly probable resource threats. These acreages are therefore included in both PHMA and PHMA with limited exceptions.

This section details the effects of the alternatives on the potential Case Flats ACEC.

Fluid Mineral Development

Fluid mineral development is considered the primary threat to the Case Flats Potential ACEC. Under the Proposed RMP Amendment the Case Flats potential ACEC would be wholly managed under the PHMA with limited exceptions HMA designation and the No Surface Occupancy (NSO) with no exceptions management direction identified for that designation would protect the potential ACEC from the development threat. The fluid mineral direction protections identified under the Proposed RMP Amendment would be the same as identified under Alternative 3 which also closes the area to fluid mineral development without exception. Under Alternative 6, the area would also be subject to NSO but development could occur if an exception for the entire ACEC area could be met. Under Alternative 1, the PHMA within the potential ACEC would be managed as NSO without waiver or modification and within GHMA, any new leases would include stipulations to protect GRSG and there would be NSO within two miles of active leks. Under Alternative 2, areas would be open to leasing one mile from active leks subject to NSO with exceptions, waivers, and modifications. Under Alternative 1 and 2, in GHMA, new leases would include timing stipulations within four miles of leks during lekking, nesting, and early brood-rearing, and NSO within two miles of active leks, with waivers, exceptions, and modifications. Under Alternative 4, there would be an NSO stipulation within .6 miles of active leks in PHMA unless it could be demonstrated that it meets either a non-habitat, topographic, or co-location exception. Under Alternative 5, the NSO stipulation would be the same as under Alternative 4, but an exception could only be applied within 1 mile of active leks. Alternatives 1 and 2 would manage fluid minerals to avoid, minimize, and compensate for direct disturbance, displacement, or mortality of GRSG, direct loss of habitat and cumulative landscape level impacts and would prioritize fluid mineral development outside of PHMA and GHMA areas in non-habitat areas first and then in the least suitable habitat for GRSG, subject to valid existing rights.

The Proposed RMP Amendment and Alternative 3 provide the greatest amount of protections from fluid mineral development by prohibiting fluid mineral development. The second highest protections would occur under Alternative 6 followed by Alternative 5. Alternative 4 would provide the least amount of protections to the potential ACEC from fluid mineral development followed by Alternatives 1 and 2.

Solar, Wind, Major Rights of Way, Saleable Minerals/Material Management, and Locatable Minerals

The Proposed RMP Amendment and Alternatives 3 and 6 would all provide additional protections to the potential ACEC by excluding solar, wind, and non-energy leasable mineral development. While all three alternatives also exclude major rights of way and close the area to saleable minerals/material management, Alternative 3 provides the greatest protection as Alternative 3 provides no exceptions to the rights of way exclusion or to the saleable closure. In addition, under Alternative 3, the area would be recommended for locatable mineral withdrawal. Under both Alternative 3 and 6, a plan of operations and BLM approval would be required before beginning any locatable mineral operations causing surface disturbance greater than casual use.

Under Alternatives 1, 2, and 4, the area would be exclusion for solar and wind in PHMA and avoidance in GHMA and avoidance for major rights of way in PHMA and GHMA which would provide similar but slightly less protections than afforded under the Proposed RMP Amendment and Alternatives 3 and 6. Under Alternative 5, the area would be avoidance for solar and wind in PHMA and open with minimization measures in GHMA and would be avoidance for major rights-of-way in PHMA and open with minimization measures in GHMA. Therefore, Alternative 5 provides the least amount of protections from solar, wind, and rights of way development. Under Alternatives 1, 2, 4, 5, 6, and the Proposed RMP Amendment the area would be

open to locatable mineral development. Under Alternatives 1, 2, 4, 5, and the Proposed RMP Amendment, notice level exploration would be allowed without a plan of operations.

Disturbance Cap

The Proposed RMP Amendment sets a 3% disturbance cap at the Colorado Management Zone scale with exceptions and conditions. Alternative 6 sets the same disturbance cap for the area but there are no exceptions and Alternative 3 closes the area to new infrastructure projects and sets a 3% disturbance cap for existing developments. Alternatives 1 and 2 set a 3% disturbance cap in PHMA and the cap applies at both BSU-scale and at the project scale. Under Alternatives 4 and 5, in PHMA within area the disturbance cap is 3% at the project and Colorado Management Zone scale and projects would be deferred until disturbance in the areas has been reduced below the cap threshold or the projects could be redesigned to not result in additional surface disturbance or moved outside of PHMA. Alternative 3, followed by Alternative 6, provide the highest degree of protection relative to the disturbance cap.

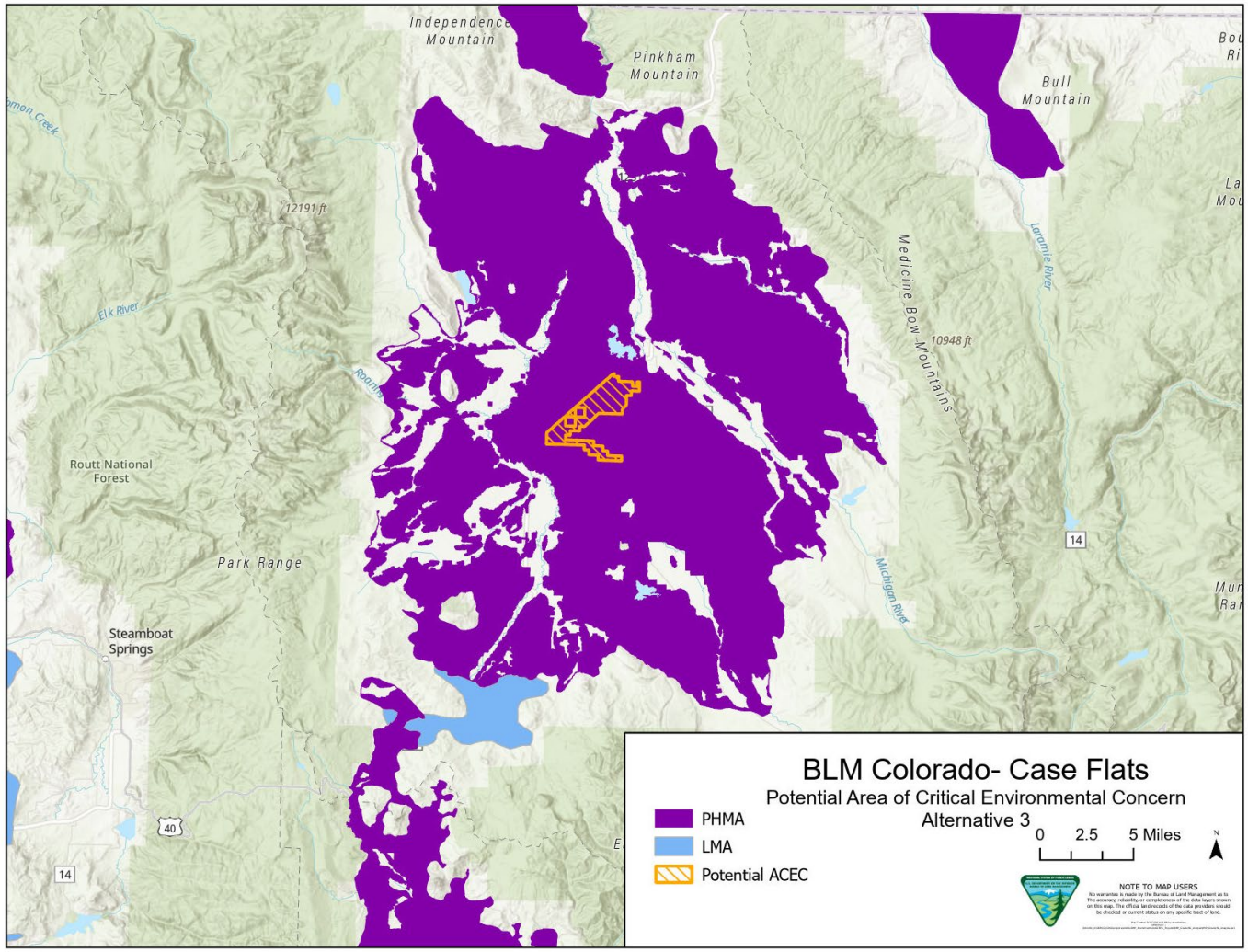
Livestock Grazing

Under Alternative 3, GRSG habitat would be unavailable to livestock grazing. Under Alternatives 1 and 2, in PHMA, thresholds and responses that would allow the authorized officer to make adjustments to livestock grazing as required. Under Alternatives 4, 5, 6, and the Proposed RMP Amendment, thresholds and responses are also addressed but under these alternatives, more comprehensive guidance is provided for addressing areas not meeting the special status species land health standard due to livestock grazing and for addressing livestock improvements and fencing in a manner to reduce impacts to GRSG. Alternative 3 provides the greatest protections to the ACEC by removing any potential disturbance associated with livestock grazing.

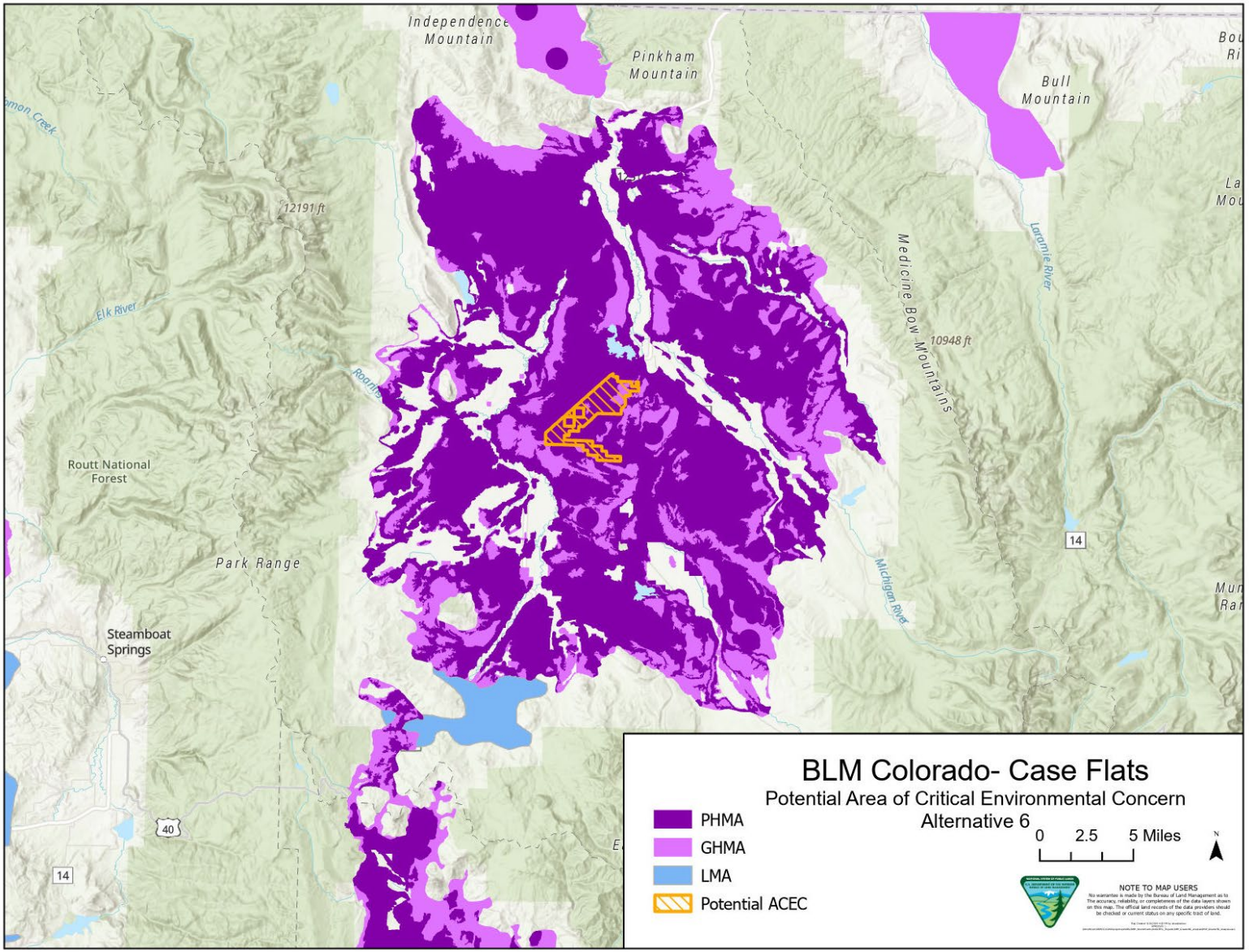
Summary of Effects

Considered comprehensively, the management direction provided under Alternatives 3 and 6 and the Proposed RMP Amendment would protect and prevent irreparable damage to the relevant and important values of the potential Case Flats ACEC; with Alternative 3 providing the highest level of protection. Alternatives 1, 2, 4, and 5 provide a relatively high degree of protection within PHMA within the ACEC; however, fluid mineral development under all of these alternatives could negatively impact the relevant and important values of the potential ACEC.

Map 5.1: Colorado Alternative 3 Potential ACEC



Map 5.2: Colorado Alternative 6 Potential ACEC



IDAHO

The ACEC evaluation in Idaho had several unique aspects. Even though the rangewide evaluation did not identify any additional areas beyond the SFAs, the rangewide evaluation did include areas within the 2015 SFAs. The ACEC evaluation process at the Idaho State Office overlapped with the mapping effort of Idaho's three-tiered system of habitat management areas. At the state level, the Idaho State Office evaluated the following local datasets to help identify and delineate areas that meet the importance criteria:

- **Local scale data:**
    - Idaho BLM developed a Landscape Importance Model (LIM) in 2015 to prioritize areas of Low to Highest Importance related to GRSG. The LIM model incorporates 3 orthogonal datasets related to GRSG: State level Bird Breeding Density (BBD), State level Lek Kernel Density, and Lek Persistence (related to amount of sagebrush within a 5-km window). These datasets are recalculated every year. Individual datasets are scored 1-10 and the resulting combined dataset is Categorized 1 (lowest) to 5 (Highest). For ACEC delineation we used the 2022 LIM – moderate to highest values (3,4,5) to extract a base ACEC polygon, focusing on the top two values.
    - Idaho contains a significant proportion of the estimated GRSG population in the Great Basin (excluding WY); therefore, the current (2022) state-level Bird Breeding Density (BBD) data was used, with the top 25th percentile of the population selected as indicating areas that had high levels of importance. These leks were then buffered 10K and the resulting polygon was added to the ACEC base.
- **Regional scale data:** Recently published regional GRSG data (BBD, Lek Persistence, and Priority Genetic Pathways) was used to inform regional importance. These data were combined (i.e. 25% and 50% BBD; medium or high lek persistence; >90 or >95% Priority Genetic Pathways) to provide an overall score of 0-6, from which a subset was included only using values 4 – 6. The resulting polygon was added to the ACEC base.

In some areas, moderate LIM values or top 50th percentile of the population (from the BBD data) were added to polygons in order to connect the delineated areas identified above.

Between the Draft EIS and Final EIS, Idaho BLM refined the model for identifying and delineating areas that meet importance criteria:

- **Local scale data:**
    - For the Landscape Importance Model (see description above), RCMap (average for 2021-2023) was used for Lek Persistence within a 5-km moving window. In addition, state level BBD and lek kernel density were calculated from 2023 lek data.
    - Habitat Suitability Index (HSI) Models (general, spring, summer, winter; IDFG 2019) were used to identify areas with high habitat suitability.
- **Regional scale data:** same as specified above.

For delineation, larger blocks of land lacking sagebrush cover and areas with existing protections, such as wilderness areas, were excluded. Furthermore, areas that did not meet the regional importance criteria and were removed from further consideration. Three of the reviewed areas were not recommended as potential ACECs in the Draft EIS (Whiskey Mountain, South Mountain, Bear Lake) because they did not meet the criteria, i.e. not in the top 25% BBD rangewide in Idaho. Areas listed in the table below as 'not recommended for potential ACEC' are not included in the **Map 5.3** and **Map 5.4**.

The following table summarizes the areas that were identified for consideration through the state-level modeling effort and whether the areas met the relevance and importance criteria and were identified for consideration in the Draft EIS as potential ACECs in Alternatives 3 and 6. The table also identifies the Triangle, Antelope Valley, Mountain Valley Complex, and Upper Snake Complex areas that were identified as potential ACECs in the Draft EIS in Alternatives 3 and 6 but were removed from the alternatives in the Final EIS due to the refinements discussed above.

Importance Evaluations

Geographic Reference	Importance	Recommendation
Bear Lake	BLM lands not in 25% BBD; No adjacency with ACEC proposals with WY or UT. No important genetic nodes.	Not recommended as potential ACEC.
Whiskey Mountain	N/A. SW Idaho area. Poor habitat on OR side, per discussion with Oregon SO; Medusa, cheatgrass threats. Not in 25% BBD on ID or OR side.	Not recommended as potential ACEC.
South Mountain	N/A. Poor habitat on OR side per discussion with Oregon SO; small proportion high genetic connectivity on east side of polygon; Medusahead, cheatgrass threats. Not in 25% BBD on ID or OR side. Boulder Creek ACEC occupies high value regional genetic pathway.	Not recommended as potential ACEC.
Triangle	Good habitat; high Resistance and Resilience; BBD 25%, but 50% rangewide; High value in Combined model. Genetic hub and keystone. Adjoins Castle Creek Canyon Lands with Wilderness Characteristics. Threats are related to juniper encroachment and wildfire. Lacks importance criteria.	The area was identified as a potential ACEC in Alternatives 3 and 6 in the Draft EIS but was removed in the Final EIS because it did not meet the importance criteria. (Refer to BLM Idaho - ACEC Maps for Alternatives 3 and 6 that follow.)
Owyhee	West of the Jarbidge River of previous Owyhee-Shoshone Basin area. Significant representation of the 25% BBD rangewide and in Idaho (i.e., contains 17 of the 77 leks comprising the 25% BBD in Idaho including several leks in the 10% BBD in Idaho). High amount of genetic connections/nodes; Also represents a large area of contiguous BLM administered lands and large blocks of unfragmented intact sagebrush.	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Idaho - ACEC Maps for Alternatives 3 and 6 that follow.)
Shoshone Basin	East of Jarbidge River of previous Owyhee-Shoshone Basin area. Significant representation of the 25% BBD rangewide and in Idaho (i.e., contains 11 of the 77 leks comprising the 25% BBD in Idaho including several leks in the 10% BBD in Idaho). Several stable or increasing populations. Adjacent to NV Priority and Priority+ HMA; Significant contribution value from new regional datasets; High amount of genetic connections/nodes; Also represents a large area of contiguous BLM administered lands.	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Idaho - ACEC Maps for Alternatives 3 and 6 that follow.)

Geographic Reference	Importance	Recommendation
Camas-Laidlaw	Significant representation of the 25% BBD in Idaho (i.e., contains 6 of the 77 leks comprising the 25% BBD in Idaho); Several genetic nodes constituting linkage to NV and UT; High value priority genetic pathways; In the top 25% of the MZ IV GRSG population; Large area of contiguous BLM administered lands; Adjacent to a major regional genetic node.	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Idaho - ACEC Maps for Alternatives 3 and 6 that follow.)
Big Desert	Significant representation of the 25% BBD rangewide and in Idaho (i.e., contains 6 of the 77 leks comprising the 25% BBD in Idaho); Adjacent to a major regional genetic node; contains several genetic nodes with Sand Creek/Upper Snake, Mountain Valleys/Salmon, Craters Monument, and Utah.	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Idaho - ACEC Maps for Alternatives 3 and 6 that follow.)
Antelope Valley	Smaller, distinct area of 25% BBD in Idaho, but not rangewide; No genetic nodes; Relatively low anthropogenic disturbance; Surrounded by mostly private lands. Lacks importance criteria.	The area was identified as a potential ACEC in Alternatives 3 and 6 in the Draft EIS but was removed in the Final EIS because it did not meet the importance criteria. (Refer to BLM Idaho - ACEC Maps for Alternatives 3 and 6 that follow.)
Mountain Valley Complex	25-50% BBD in Idaho, but not rangewide; Middle section has large existing ACEC (Donkey Hills); High potential as a refugia for future climate change effects; NW polygon, per Arkle et al, shows a lek cluster with increasing Lambda (+ pop growth but other lek clusters declining); Surrounded by private lands. Relatively low anthropogenic disturbance and low threats. Lacks importance criteria.	The area was identified as a potential ACEC in Alternatives 3 and 6 in the Draft EIS but was removed in the Final EIS because it did not meet the importance criteria. (Refer to BLM Idaho - ACEC Maps for Alternatives 3 and 6 that follow.)
Upper Snake Complex	Significant representation of the 25% BBD rangewide and in Idaho (i.e., contains 15 of the 77 leks comprising the 25% BBD in Idaho); Contains a major regional genetic node; contains several genetic nodes with the Mountain Valleys, Snake River Plain and Montana. Good habitat/ high Resistance and Resilience. Captures Table Butte, a known important GRSG winter concentration area; Southern polygon provides significant movement connectivity corridor (based on telemetry) with the proposed Big Desert ACEC. Land ownership is extremely patchy in this area; most large leks are not on BLM lands; therefore, not considered further.	The area was identified as a potential ACEC in Alternatives 3 and 6 in the Draft EIS but was removed in the Final EIS because it did not meet the importance criteria. (Refer to BLM Idaho - ACEC Maps for Alternatives 3 and 6 that follow.)

Consideration of ACECs nominated during the public comment period

During the comment period on the Draft EIS, the BLM received ACEC nominations for the Table Mountain, Juniper Ridge, aa-Tiipi Flat areas that include acreage within Oregon, Idaho, and Nevada. The three states coordinated on the nominated ACECs and the BLM Oregon State Office took the lead on considering the nominations. It was determined that none of these areas warranted consideration as potential ACECs in the Final EIS. Additional details are provided in the **Oregon** section of this appendix.

Effects of the Alternatives on the Potential Shoshone Basin, Owyhee, Camas-Laidlaw, and Big Desert ACECs

In Idaho, the Shoshone Basin and Owyhee areas were identified in the Draft EIS as one potential ACEC in Alternatives 3 and 6 totaling 1,746,745 acres. Between the Draft and Final EIS, the acreage was refined as described above and the areas were considered separately in the Final EIS. In the Final EIS, the Shoshone Basin ACEC totals 244,935 acres and the Owyhee ACEC totals 635,199 acres.

Under the Proposed RMP Amendment, the 244,935-acre Shoshone Basin area would receive PHMA with limited exceptions protections and is proposed for ACEC designation under Alternatives 3 and 6. The Shoshone Basin is contiguous with the North Fork O'Neil Nevada population and is one of the largest intact habitat areas in that state. The area is threatened by rights of way and renewable energy development. The area has a significant representation of the 25% Bird Breeding Density (BBD) rangewide and in Idaho (i.e., contains 11 of the 77 leks comprising the 25% BBD in Idaho including several leks in the 10% BBD in Idaho), has a high amount of genetic connections/nodes and represents a large area of contiguous BLM administered lands. Considering the Shoshone Basin and the North Fork O'Neil areas in tandem allows for seamless conservation across state lines and supports the population of GRSG that use both areas (refer to Nevada section of this appendix for information on the North Fork O'Neil potential ACEC).

The potential Owyhee ACEC totaling 635,199 acres has a high amount of genetic connections/nodes and represents a large area of contiguous BLM administered lands and unfragmented intact sagebrush and is identified for potential ACEC designation under Alternatives 3 and 6. The potential Camas-Laidlaw ACEC was identified in the Draft EIS as a potential ACEC totaling 631,324 acres under Alternatives 3 and 6. Between Draft and Final EIS, the acreage was refined and totals 475,724 acres in the Final EIS. The potential Camas-Laidlaw ACEC has a significant representation of the 25% BBD in Idaho (i.e., contains 6 of the 77 leks comprising the 25% BBD in Idaho) and several genetic nodes constituting linkage to Nevada and Utah. The potential Big Desert ACEC was identified in the Draft EIS as a potential ACEC totaling 333,687 acres under Alternatives 3 and 6. Between Draft and Final EIS, the acreage was refined and totals 333,528 acres.

The potential Big Desert ACEC has a significant representation of the 25% BBD rangewide and in Idaho (i.e., contains 6 of the 77 leks comprising the 25% BBD in Idaho) and is adjacent to a major regional genetic node. Similar to the potential Shoshone Basin ACEC, the development threats to these three potential ACECs are primarily from major rights of way development but the development threat is not considered as high as under the potential Shoshone Basin ACEC. **Table 5-6** displays the HMA allocations for these four areas under each alternative. Under the Proposed RMP Amendment, the areas within the Owyhee, Camas-Laidlaw, and Big Desert potential ACECs would be managed entirely as PHMA and the area within the Shoshone Basin potential ACEC (as well as some surrounding areas) would be managed entirely as PHMA with limited exceptions. Under Alternatives 1, 2, 4, and 5 the areas within the Shoshone Basin, Owyhee, and Camas-Laidlaw potential ACECs would be entirely managed as PHMA. The area within the Big Desert potential ACEC would be managed as 86% PHMA and 14% IHMA in Alternatives 1 and 2. Under Alternative 3 and 6, all four areas would also be designated as ACECs. Under Alternatives 3, the potential ACECs would

receive PHMA management direction except where stronger, ACEC protections are identified related to developing plans of operations for locatable mineral development and major rights of way. Under Alternative 6, the potential ACECs would receive PHMA management direction identified for Alternative 5 except where stronger, ACEC protections are identified for locatable minerals, fluid minerals, non-energy leasables, saleable minerals, major rights of way, solar, wind, the disturbance cap, and the development of plans of operations for locatable mineral development.

Table 5-6. HMA Allocations in the Idaho Potential ACECs by Alternative

Potential ACEC	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment[3,4]
Shoshone Basin							
PHMA with limited exceptions	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	257,472 acres (100%)
PHMA	244,935 acres (100%)	244,935 acres (100%)	244,935 acres (100%)	244,935 acres (100%)	244,935 acres (100%)	244,935 acres (100%)	257,472 acres (100%)
IHMA	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
GHMA	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**244,935 acres**	**244,935 acres**	**244,935 acres**	**244,935 acres**	**244,935 acres**	**244,935 acres**	**257,472 acres**
Owyhee							
PHMA	635,199 acres (100%)	635,199 acres (100%)	635,199 acres (100%)	635,199 acres (100%)	635,199 acres (100%)	635,199 acres (100%)	635,199 acres (100%)
IHMA	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
GHMA	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**635,199 acres**	**635,199 acres**	**635,199 acres**	**635,199 acres**	**635,199 acres**	**635,199 acres**	**635,199 acres**
Camas-Laidlaw							
PHMA	475,724 acres (100%)	475,724 acres (100%)	475,724 acres (100%)	475,724 acres (100%)	475,724 acres (100%)	475,724 acres (100%)	475,724 acres (100%)
IHMA	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
GHMA	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**475,724 acres**	**475,724 acres**	**475,724 acres**	**475,724 acres**	**475,724 acres**	**475,724 acres**	**475,724 acres**

[3] PHMA with limited exceptions are areas within PHMA where additional protections to support conservation of GRSG habitat would reduce impacts from highly probable resource threats. These acreages are therefore included in both PHMA and PHMA with limited exceptions.

[4] In some cases, the Proposed RMP Amendment establishes PHMA with limited exceptions management direction in areas larger than the potential ACECs to ensure adequate protection of GRSG habitat. In these instances, the acreage calculation includes the entirety of the potential ACEC and some adjacent areas.

Potential ACEC	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment[34]
Big Desert							
PHMA	288,056 acres (86%)	288,056 acres (86%)	333,528 acres (100%)	333,528 acres (100%)	333,528 acres (100%)	333,528 acres (100%)	333,528 acres (100%)
IHMA	45,472 acres (14%)	45,472 acres (14%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
GHMA	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**333,528 acres**	**333,528 acres**	**333,528 acres**	**333,528 acres**	**333,528 acres**	**333,528 acres**	**333,528 acres**

This section details the effects of the alternatives on these areas considered for ACEC designation.

Major Rights of Way

All four of the potential ACEC areas in Idaho face threats from major rights of way development. Under the Proposed RMP Amendment, the potential Shoshone Basin ACEC would be wholly managed under the PHMA with limited exceptions HMA designation and, as such, major rights of way would be excluded from development unless a criterion and conditions can be met. A new major right of way could only be considered if the right of way is in an existing RMP designated corridor and is the same category of right of way for which the corridor was designated and co-location of the proposed authorization results in minimal impacts to those already associated with existing major infrastructure. Under the Proposed RMP Amendment, the Owyhee, Camas-Laidlaw, and Big Desert potential ACEC areas are all managed as PHMA, and major rights of way would be avoidance for new major rights of way that require criteria and conditions be met and would be subject to Idaho-specific anthropogenic disturbance screening criteria (MD SS 29).

Under Alternative 3, all of the potential ACEC areas would be managed as avoidance within designated corridors and exclusion outside of designated corridors within PHMA. Under Alternative 4, all four areas would be managed as avoidance for major rights of way and where development could not be avoided, it would not be allowed in breeding and nesting habitats unless habitat and impact criteria could be met. Where impacts could not be avoided, residual direct and indirect impacts would be mitigated through compensatory mitigation. Where major rights of way are collocated withing designated corridors, they would not need to comply with disturbance cap or compensatory mitigation requirements unless required by State regulations. Under Alternatives 1 and 2, all four areas would be managed as avoidance areas for major rights of way (even in the Big Desert area where the IHMA acres receive the same PHMA management direction as described for PHMA). Under Alternative 5, all four areas would also be managed as avoidance areas similar to Alternative 4 but without disturbance cap or compensatory mitigation requirements. Alternative 6, like Alternative 3, would be exclusion for major rights of way but unlike Alternative 3 it would be open for new rights of way in designated corridors with compensatory mitigation required to offset direct and indirect impacts.

Under the Proposed RMP Amendment and Alternative 3, the threats from rights of way development to all four ACECs would be prevented by the management direction provided. The management direction provided under Alternative 6 would also provide a high degree of protection, but to a lesser degree. The avoidance direction under Alternatives 1, 2, 4, and 5 would provide the least amount of protections from major rights of way development and the relevant and important values of the four potential ACEC areas could be impacted under these alternatives.

Solar and Wind

The threats from solar and wind development in these four areas are lower than those from major rights of way. Alternatives 3 and 6 would exclude utility scale solar and wind development in all of the four areas. Under the Proposed RMP Amendment, the Shoshone Basin ACEC would be managed as exclusion for solar and wind development and the other three areas would be managed as exclusion with exceptions.

Under Alternatives 1 and 2, all four potential ACECs would be managed as avoidance areas for wind. Alternatives 1 and 2 do not provide management direction for solar development in PHMA, however, general surface disturbance limits would exclude solar near leks (0.6 miles) and minimize (e.g., disturbance cap, mitigation) effects elsewhere. Under Alternative 4, the four areas would be managed as exclusion areas for wind and solar. Under Alternative 5, the areas would be managed as avoidance for solar and wind with criteria that would need to be met for development to occur.

For solar and wind development, Alternatives 3, 6, and the Proposed RMP Amendment provide the greatest amount of protection followed by Alternatives 4, 1, and 2. Alternative 5 provides the least amount of protection related to solar and wind development.

Non-energy Minerals, Saleable Minerals/Material Management, and Locatable Minerals

For non-energy minerals, under the Proposed RMP Amendment, the Shoshone Basin area would be closed to new leases and the expansion of existing leases. Under the Proposed RMP Amendment, the other three areas would also be closed to new leases but the expansion of existing leasing could occur. Under Alternatives 1 and 2, all four areas would be closed to new leases but the expansion of leasing could occur. Under Alternatives 3, 4, 5, and 6 areas all of the areas would be closed to new leases and expansion of existing. Therefore, the protections are strongest for all of the areas under Alternatives 3, 4, 5, and 6 and equally strong for the Shoshone Basin area under the Proposed RMP Amendment.

For saleable minerals and materials, under Alternative 1 and 2 all of the areas would be closed to saleable mineral and material development but open for free use permits and expansion of existing pits. Under Alternative 3, all of the areas would be closed. Under Alternatives 4, 5, and 6, all of the areas would be closed but open for free use permits and expansion of existing pits if screening and development criteria are met. Under the Proposed RMP Amendment, the Shoshone Basin area would be closed but open for free use permits and expansion of existing pits under stringent criteria and the rest of the areas would be closed but open for new free use permits and open for the expansion of existing pits with a slightly different, but similarly stringent criteria. As a result, Alternative 3 provides the most protections from saleable minerals and materials followed by the Proposed RMP Amendment.

Under Alternative 3, all four potential ACECs would be recommended for locatable mineral withdrawal and operators would be required to submit a plan of operations (refer to 43 CFR Part 3809.11(c)(3)) and obtain BLM approval before beginning any operations causing surface disturbance greater than casual use as defined in 43 CFR Part 3809.5 (refer to 43 CFR Part 3809.11(c)(3)) and obtain BLM approval before beginning any operations causing surface disturbance greater than casual use as defined in 43 CFR Part 3809.5. Under Alternative 1, any portions of the four areas that overlap with SFAs would be proposed for withdrawal. All other portions of these four areas that do not overlap SFAs under Alternative 1 would not be proposed for withdrawal and would be open for development (unless otherwise withdrawn) and there would be no requirement for a plan of operations. Under Alternative 2, 4, 5, and the Proposed RMP Amendment, all four areas would be open for locatable mineral development (unless otherwise withdrawn) and notice level exploration would be allowed without a plan of operations. Under Alternative 6, all of the areas would be

open for locatable mineral development (unless otherwise withdrawn) and, like under Alternative 3, operators would be required to submit a plan of operations (refer to 43 CFR Part 3809.11(c)(3)) and obtain BLM approval before beginning any operations causing surface disturbance greater than casual use as defined in 43 CFR Part 3809.5 (refer to 43 CFR Part 3809.11(c)(3)). As a result, Alternative 3 provides the highest amount of protection from locatable mineral development followed by Alternative 6.

Fluid Mineral Development

Under Alternatives 1 and 2 the four areas would be open to new leasing with no surface occupancy (NSO) stipulations with possible waivers, exceptions, and modifications. Under Alternative 3, all four areas would be closed to fluid mineral leasing. Under Alternatives 4 and 5, similar to Alternatives 1 and 2, the areas would be open to new leasing with NSO stipulations but Alternative 4 and 5 have updated waivers, exceptions, and modifications. Under Alternative 6, all four areas would be open to new leasing with NSO stipulations but under very stringent constraints. Under the Proposed RMP Amendment, the Shoshone Basin would be open to new leasing with NSO but there would be no waivers, exceptions, or modifications. Under the Proposed RMP Amendment, the other three areas would be open to new leasing with NSO with more protective waivers, exceptions, and modifications than under Alternatives 4 and 5. As a result, Alternative 3, 6, the Proposed RMP Amendment and Alternatives 1 and 2 provide the most protective measures from fluid mineral development.

Disturbance Cap

In Idaho, under Alternatives 1 and 2, there is a 3% disturbance cap that does not include fire or agriculture disturbance. This disturbance cap applies at both biologically significant units (BSU) scale and at proposed project analysis area within PHMA and can be exceeded in utility corridors if there is a benefit to GRSG. Under Alternative 3, there would be a 3% disturbance cap for new and pre-existing authorizations in the project analysis area within Habitat Assessment Framework (HAF) fine-scale boundaries and includes infrastructure, fire, and agriculture. Under Alternative 4, there would be a 3% disturbance cap and it only applies to infrastructure at the project analysis area and HAF fine scale. Under Alternative 5, there would be a 3% disturbance cap at the HAF fine-scale and project analysis area and the cap would not include fire or agriculture. Alternative 6 would apply the same management direction for disturbance cap as under Alternative 5, but in these four areas, there would be no allowable exceptions to the disturbance cap. Under the Proposed RMP Amendment, the 3% disturbance cap management direction is similar to that identified under Alternative 5 except that the exceptions align more closely with those identified under Alternative 4 which requires compensatory mitigation be in place when an exception is granted. As a result, Alternative 3, followed by Alternative 6, provide the highest degree of protection relative to disturbance followed by the Proposed RMP Amendment and Alternative 4.

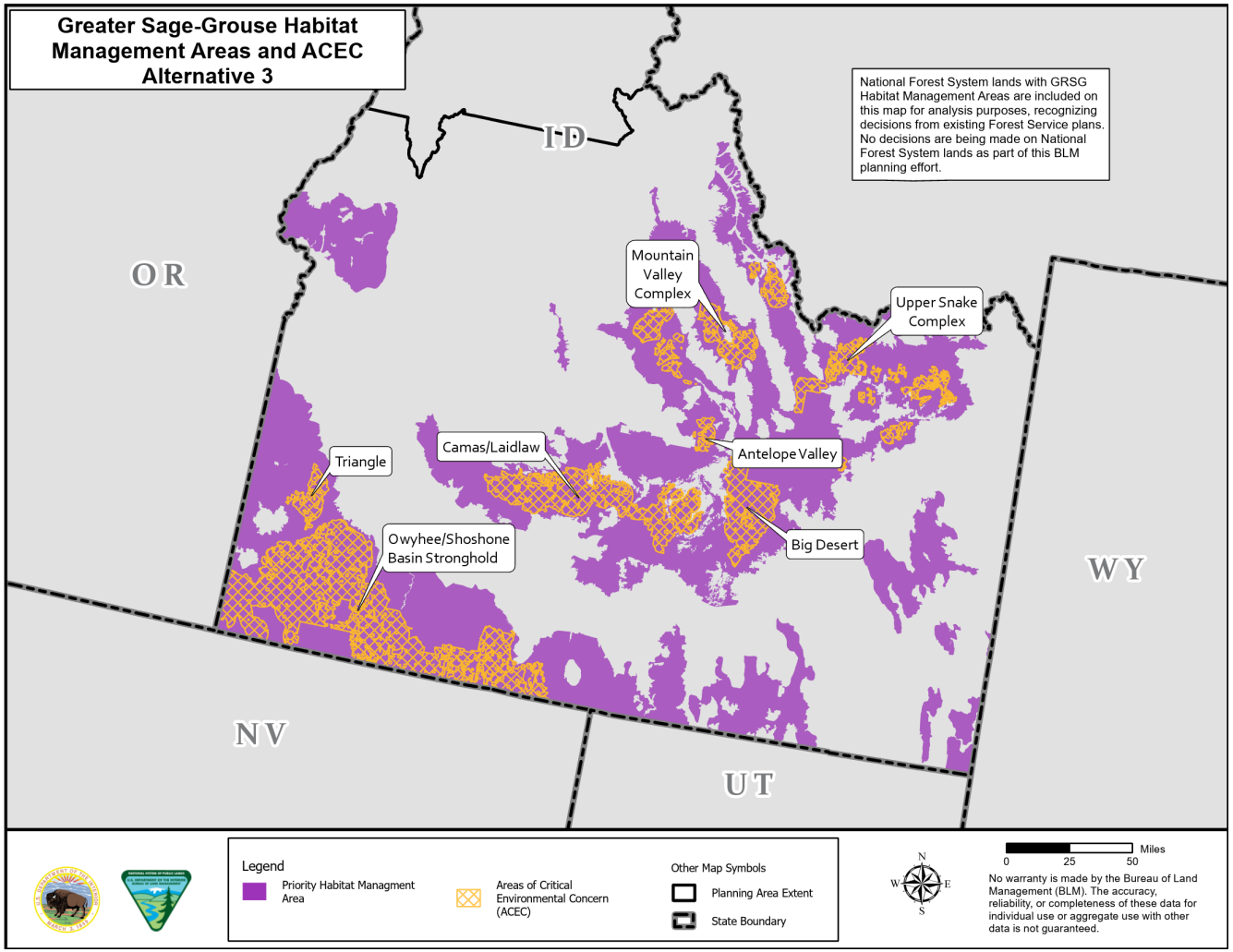
Livestock Grazing

Under Alternative 3, GRSG habitat would be unavailable to livestock grazing. Under Alternatives 1 and 2, in PHMA, thresholds and responses that would allow the authorized officer to make adjustments to livestock grazing as required. Under Alternatives 4, 5, 6, and the Proposed RMP Amendment, thresholds and responses are also addressed but under these alternatives, more comprehensive guidance is provided for addressing areas not meeting the special status species land health standard due to livestock grazing and for addressing livestock improvements and fencing in a manner to reduce impacts to GRSG. Alternative 3 provides the greatest protections to the potential ACECs by removing any potential disturbance associated with livestock grazing.

Summary of Effects

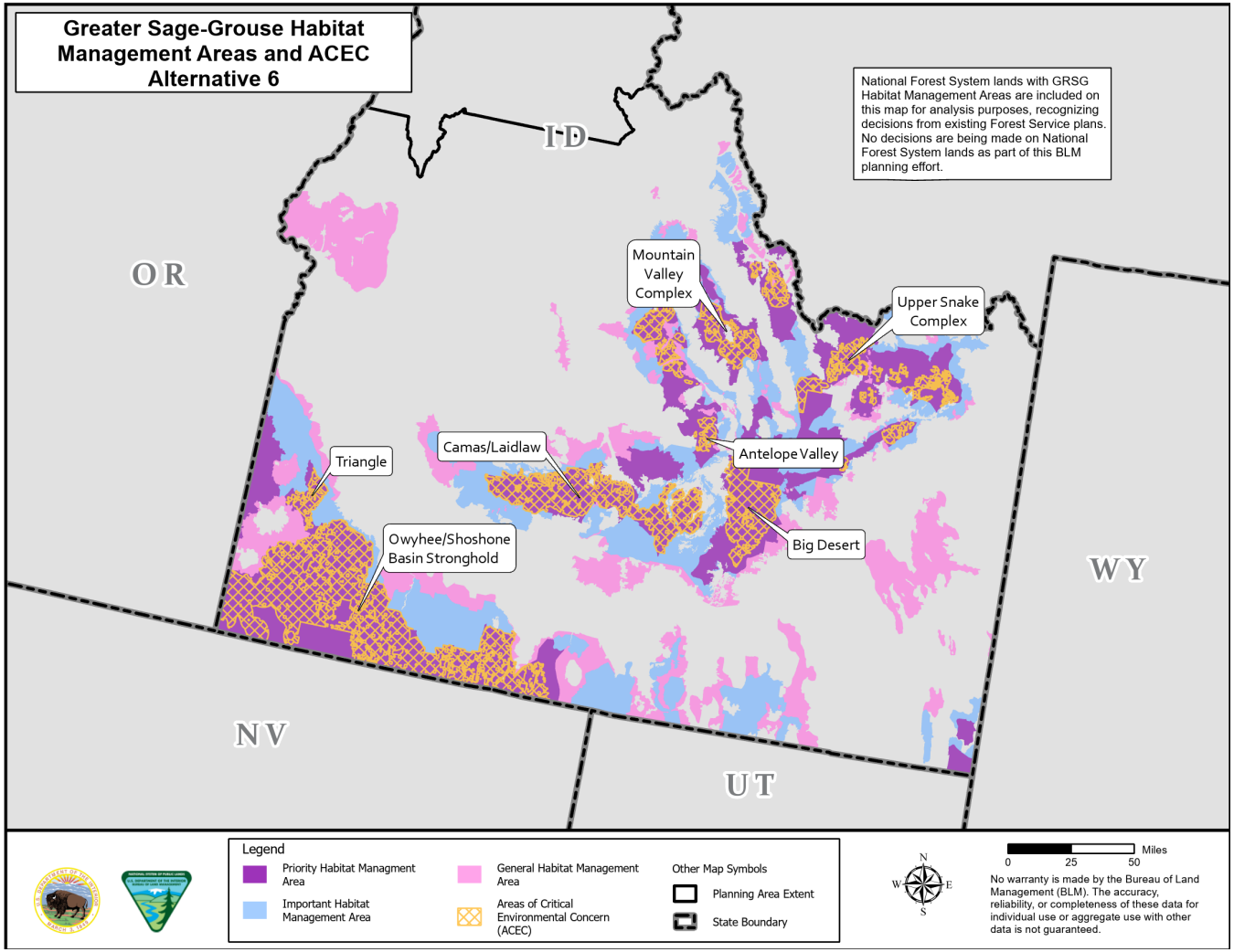
Considered comprehensively, Alternatives 3 and 6 would protect and prevent irreparable damage to the relevant and important values of all four of the potential ACECs. The application of PHMA with limited exceptions management direction under the Proposed RMP Amendment would protect and prevent irreparable damage to the relevant and important values of the Shoshone Basin potential ACEC and the application of the PHMA management direction in the Owyhee, Camas-Laidlaw, and Big Desert potential ACEC areas would protect and prevent irreparable damage to their relevant and important values. Alternative 4 provides a high degree of protection from development and would also protect and prevent irreparable damage to the relevant and important values of all four of the ACECs. Although Alternatives 1, 2, and 5 provide a relatively high degree of protection within these potential ACEC areas; fluid mineral, solar, wind, and major rights of way development under these alternatives is more likely to occur and could negatively impact the relative and important values of all four of the potential ACECs.

Map 5.3: Idaho Alternative 3 Potential ACECs



As described above, the Triangle, Antelope Valley, Mountain Valley Complex, and Upper Snake Complex were considered as potential ACECs in Alternatives 3 and 6 in the Draft EIS but were removed from consideration in the Final EIS.

Map 5.4*: *Idaho Alternative 6 Potential ACECs



As described above, the Triangle, Antelope Valley, Mountain Valley Complex, and Upper Snake Complex were considered as potential ACECs in Alternatives 3 and 6 in the Draft EIS but were removed from consideration in the Final EIS.

MONTANA/DAKOTAS

The Montana/Dakotas State Office considered new information and resource values in identifying habitat areas potentially eligible for ACEC nomination. Montana/Dakotas considered three areas highlighted by the range-wide planning team based on a review of new science and an evaluation of Sagebrush Focal Areas (SFAs) from the 2015 plans. The three areas that were evaluated are the South-Valley-Phillips (Sagebrush Focal Area), Cedar Creek, and Carter-Crook areas. Refer to the evaluations below.

Nominations were evaluated for habitat supporting 25-50% relative abundance and associated seasonal habitats, high lek persistence, key genetic nodes and/or concentration of genetic nodes and existing or potential land uses that would be a concern for persistence of GRSG.

While the scoping period closed on February 8, 2022, on July 21, 2023, BLM received an external ACEC submission for consideration of four additional ACECs in Montana. These nominations included expansion of two existing ACECs, the Powderville Expansion ACEC and the Frenchman Breaks Expansion ACEC. Two new areas were nominated, including the Musselshell Breaks ACEC and the North of Charles M. Russel National Wildlife Refuge ACEC. The nominations contained potential relevant and important values for these four proposed ACECs and suggestions for expanded, existing ACECs.

In addition to values related specifically to GRSG, the nominations contained potentially relevant values for grassland bird/mid-grass prairie habitat, ecological connectivity, intactness, paleontological resources and climate stability that are outside of the purpose and need of this planning effort. and will be considered in considered by the BLM during future planning efforts.

In considering the GRSG components of the four nominations received and the internally identified potential ACECs, the BLM considered multiple lines of evidence to determine if the GRSG habitat values had "more than local significance and special worth, consequence, meaning, distinctiveness, or cause for concern." Those values are present primarily in portions of the North of Charles M. Russel National Wildlife Refuge ACEC, which overlaps the internally developed South Valley-Phillips area, and was evaluated to determine if the area met the importance criteria (refer to importance evaluations below). The Frenchman Breaks Expansion ACEC nomination presents important connectivity values for GRSG, that are locally unique. However, the density of the GRSG population, genetic uniqueness, lek persistence, sagebrush conservation design, and other lines of evidence to identify "substantial significance" were not determined by the BLM to rise to the level of importance needed to move forward for evaluation in the alternatives of this RMP amendment. However, other HMA management direction for PHMA and CHMA is proposed across the alternatives in the EIS that conserve GRSG values in this area. The Musselshell Breaks ACEC and Powderville Expansion ACEC nominations fall primarily outside of GRSG PHMA, with some overlap with GHMA. The BLM determined that while these areas are adjacent to priority GRSG habitat they did not meet the relevance criteria for GRSG (the nominations are primarily for other values) and would not move forward for evaluation in the alternatives of this RMP amendment.

Importance Evaluations

Montana GRSG ACEC Importance Evaluation: Cedar Creek Anticline GRSG Habitat Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	No	Greater sage-grouse are distributed throughout the western United States. The portion of the distribution in Montana, Wyoming, North Dakota, South Dakota, Alberta, and Saskatchewan are designated as Management Zone I (Stiver et al. 2006). Management zones are delineations of greater sage-grouse populations and subpopulations within floristic zones with similar management issues. Within Management Zone I Montana, Wyoming, North Dakota, and South Dakota have designated core areas, and in 2015 BLM designated Priority, General, and Restoration Habitats. Since the 2015 BLM plans, new science addressing GRSG density and habitats has provided additional information about the locations of areas that may contain special worth, consequence, or distinctiveness. While higher density areas and genetic connectivity are considered important to greater sage-grouse conservation, areas with similar characteristics to the Cedar Creek area are dispersed throughout the region and are not significantly unique to a specific region or planning unit. In addition, greater sage-grouse habitat in the Cedar Creek area is owned by a number of different entities and habitat on BLM-administered lands is not distinct from habitat managed by other ownerships. While a portion of the area contains high relative abundance (Doherty et al. 2016), the size of the area is not distinct compared to other areas. Most leks have seen decreased counts since the 2010-14 period used to calculate relative density (e.g., FA-38: 34 males in 2010, now 0; FA-004A: 14 males in 2010 to 9 now; FA-013: 24 in 2011 to 6 now. In addition, this area is close to the small fringe population in North Dakota, However the Cedar Creek Anticline represents only a small portion of the lager population as defined by recent genetic work (Oyler-McCance 2022). Therefore, this area is not particularly distinct or critical to maintaining unique genetics for the SE Montana and Dakotas area relative to other PHMA. The Cedar Creek Anticline is a unitized oil and gas field that is predominantly leased, mostly developed, with a high level of anthropogenic activity. Additional substantial activity or development relative to current level is unlikely.
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened • Vulnerable to adverse change	No	The area is not particularly fragile or sensitive to change as compared to other sites in the Montana-Dakotas region. The area does not contain key or cluster of genetic nodes and represents a fringe population with genetic nodes as terminal sites (Cross et al 2018). Ongoing disturbance is high, including a high density of O&G wells, and is predominantly already leased. The area is found to have only a small area of core sagebrush as identified in Doherty (2022) Sagebrush Conservation Design and has only a small proportion as core relative to other areas in the region. Similarly, the MT GRSG Conservation Program's Habitat Quantification Tool identifies much of the area as low habitat value, with only a small portion providing high modeled habitat quality values.

Montana GRSG ACEC Importance Evaluation: Cedar Creek Anticline GRSG Habitat Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	No	The BLM 2015, 2019, and current initiatives to conserve, enhance, and restore greater sage-grouse habitat is the result of the March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse (Centrocercus urophasianus) as Threatened or Endangered. In that finding, the USFWS concluded that greater sage grouse was "warranted, but precluded" for listing as a threatened or endangered species. However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species. Without multiple lines of evidence, including reasonably foreseeable development, valid existing rights, land ownership, crucial GRSG habitat characteristics from multiple science-based models, on-the-ground conditions/evidence this area does not have protection requirements beyond the standard approaches to implemented FLPMA and national priorities.

Other Items	
Boundaries	No proposed changes to the boundary.
Additional Notes	This area is a unitized oil and gas field, largely leased and developed, and with limited ability for the BLM to enhance GRSG habitat in the short term. The delineation as a RHMA is reflective of these challenges, the focus here is on longer-term objectives of the BLM to manage the area to maintain GRSG habitat and conduct restoration to provide for higher quality habitat (to support past bird density) in the future.

Conclusion
Due to current habitat conditions and limited evidence for the Cedar Creek Anticline to qualify as more distinct or critical than other HMAs, the BLM MT-Dak does not find the Cedar Creek anticline to meet relevance and importance for an ACEC nomination. While the area is part of a larger population with ND (and beyond) there are other areas within the population that are more likely to maintain any local genetics and be a source population for North Dakota. We do not recommend moving this area forward to identify and consider unique management.

Montana GRSG ACEC Importance Evaluation: Carter Crook GRSG Connectivity Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	Yes	Greater sage-grouse are distributed throughout the western United States. The portion of the distribution in Montana, Wyoming, North Dakota, South Dakota, Alberta, and Saskatchewan are designated as Management Zone I (Stiver et al. 2006). Management zones are delineations of greater sage-grouse populations and subpopulations within floristic zones with similar management issues. Within Management Zone I Montana, Wyoming, North Dakota, and South Dakota have designated core areas, and in 2015 BLM designated Priority, General, and Restoration Habitats. Since the 2015 BLM plans, new science addressing GRSG density and habitats has provided additional information about the locations of areas that may contain special worth, consequence, or distinctiveness. A portion of the area contains high relative abundance (Doherty et al. 2016), a factor considered important to greater sage-grouse conservation. However these higher density areas in the Carter-Crook area are similar to other areas dispersed throughout the region and are not significantly unique to this unit. Greater sage-grouse habitat in the Carter-Crook area is owned by a number of different entities and habitat on BLM-administered lands is not distinct from habitat managed by other ownerships. While a limited portion of the Carter-Crook boundary contains high relative abundance (Doherty et al. 2016), the area has evidence it is a consequential genetic connection. Chiefly, it encompasses a keystone genetic node (Cross et al. 2018), and a potential corridor where genetic connections between the northern and southern portions of management Zone 1 are constricted (Row et al 2018, Cross et al. 2023). This area of genetic connectivity may provide the most likely link between GRSG in Montana-Dakotas and Wyoming.
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened • Vulnerable to adverse change	Yes	The area is not particularly fragile or sensitive to change as compared to other sites in the Montana-Dakotas region. However, due to the key genetic node (Cross et al 2018), and constricted habitat, this area is the primary connectivity link between populations in northern portions of MZ1 with populations throughout the rest of the species' range. As such, loss of this area could isolate populations in the NE from populations in the rest of the range, which could have relatively dramatic impacts on populations in MT and the Dakotas. Ongoing disturbance in isolated portions nearby (see boundary discussion below) the area are high, primarily in a unitized oil and gas field in Wyoming and on Bentonite producing areas in Montana. Much of the area is core sagebrush as identified in Doherty (2022) Sagebrush Conservation Design with proportionally large core relative to other areas in the region. Similarly, the MT GRSG Conservation Program's Habitat Quantification Tool identifies much of the area in Montana as higher habitat value, with only a small portion providing low modeled habitat quality values due to development.

Montana GRSG ACEC Importance Evaluation: Carter Crook GRSG Connectivity Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	Yes	The BLM 2015, 2019, and current initiatives to conserve, enhance, and restore greater sage-grouse habitat is the result of the March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse (Centrocercus urophasianus) as Threatened or Endangered. In that finding, the USFWS concluded that greater sage grouse was "warranted, but precluded" for listing as a threatened or endangered species. However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species, therefore, areas that meet national priority concerns or specific FLPMA mandates require multiple lines of evidence supporting more than local priorities and conservation value. The proposed Carter-Crook ACEC includes multiple lines of evidence, identifying the area as highly valuable GRSG habitat, especially for genetic connectivity. Therefore, this area likely provides a key connection between GRSG populations in multiple states. In addition, conserving habitat connectivity is a national priority for managing bureau sensitive status species (Manual 6840 and IM 2023-005).
Other Items		
Boundaries	The boundary for this ACEC began by considering the HQ proposal. To better reflect local information and concentrate on where the most likely, high-value, GRSG corridor falls, the boundaries were adjusted. In Montana this focused on removing active areas of bentonite development and adjusting the boundary to the north to capture key GRSG leks that would "supply" birds that would migrate through the corridor to Wyoming leks. In addition, the ID Team considered GRSG relative density models, the MT HCP Habitat Quantification Tool, Sagebrush Conservation Design Core Areas, and other models along with on-the-ground experiences and conditions. Adjustments to the WY portion of the ACEC included analysis of cheatgrass and other habitat conditions (wee Wyoming analysis). To avoid inconsistencies across jurisdictional boundaries, the MT-Dak and WY BLM State Offices met to edge map the revised boundaries produced by each state in cooperation with Cooperating Agencies and Field Offices. The ACEC boundary reflects an area focused on the area with the highest likelihood of facilitating long-distance (e.g., lek moving) GRSG dispersal and the and high-quality sagebrush habitat supporting leks in the area of the corridor.	
Additional Notes	Part of this original area is identified in an area that is one of the larger bentonite producing areas in the US. There are active claims, proposed additional projects, and a large amount of existing proven claims.	
Conclusion		
Due to meeting the relevance and importance criteria, this area, with a revised boundary from original proposal, was identified as a potential ACEC in Alternatives 3 and 6. Refer to BLM Montana/Dakotas – ACEC Maps for Alternatives 3 and 6 that follow.		

Montana GRSG ACEC Importance Evaluation: South Valley Phillips GRSG Habitat Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	Yes	Greater sage-grouse are distributed throughout the western United States. The portion of the distribution in Montana, Wyoming, North Dakota, South Dakota, Alberta, and Saskatchewan are designated as Management Zone I (Stiver et al. 2006). Management zones are delineations of greater sage-grouse populations and subpopulations within floristic zones with similar management issues. Within Management Zone I Montana, Wyoming, North Dakota, and South Dakota have designated core areas, and in 2015 BLM designated Priority, General, and Restoration Habitats. Since the 2015 BLM plans, new science addressing GRSG density and habitats has provided additional information about the locations areas that may contain special worth, consequence, or distinctiveness. Higher density areas and genetic connectivity are considered important to greater sage-grouse conservation, and small areas or lek clusters with limited connectivity are dispersed throughout the region. However, the greater sage-grouse habitat in the South-Valley Phillips area is owned predominantly by BLM and the state of Montana. The majority of the area contains high relative abundance, representing the largest high-density area in Management Zone I (Doherty et al. 2016). There are well connected genetic nodes (Cross et al. 2018) within the area, and to surrounding areas.
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened • Vulnerable to adverse change	Yes	The area is not particularly fragile or sensitive to change as compared to other sites in the Montana-Dakotas region. Ongoing disturbance in the area is limited to a few Bentonite mined area. The area is mostly core sagebrush as identified in Doherty (2022) Sagebrush Conservation Design with proportionally large core relative to other areas in the region. Similarly, the MT GRSG Conservation Program's Habitat Quantification Tool identifies much of the area as higher habitat value. Furthermore, this area contains the wintering area for a unique GRSG population that exhibits long distance migration in the spring and fall (Newton et al. 2017, Tack et al. 2019)
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	Yes	The BLM 2015, 2019, and current initiatives to conserve, enhance, and restore greater sage-grouse habitat is the result of the March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse (Centrocercus urophasianus) as Threatened or Endangered. In that finding, the USFWS concluded that greater sage grouse was "warranted, but precluded" for listing as a threatened or endangered species. However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species. With multiple lines of evidence, including land ownership, highly valuable GRSG habitat characteristics from multiple science based models, and supporting on-the-ground conditions and evidence, this area may provide habitat key to meeting national GRSG conservation goals.

Other Items	
Boundaries	The boundary for this ACEC began by considering the SFA in the area from the 2015 GRSG Planning Effort. To better reflect new information and GRSG habitat with the highest conservation value, the boundaries were adjusted. For example, isolated BLM parcels that fall in predominantly agricultural areas and lower value GRSG habitat were removed (e.g., areas south of the Missouri River). In addition, the ID Team considered GRSG relative density models, the MT HCP Habitat Quantification Tool, Sagebrush Conservation Design Core Areas, and other models along with on-the-ground experiences and conditions. Finally, a portion of this area is already designated as the Mountain Plover ACEC. To avoid duplicative, conflicting, or overlapping management, this existing ACEC was removed from the boundary. The ACEC boundary reflects an area focused on the highest density of GRSG, contiguous BLM lands, and high-quality sagebrush habitat.
Additional Notes	None.
Conclusion	
Due to meeting relevance and importance criteria, the area was identified as a potential ACEC in Alternatives 3 and 6. Refer to BLM Montana/Dakotas – ACEC Maps for Alternatives 3 and 6 that follow.	

Effects of the Alternatives on the Potential South Valley Phillips and Carter Crook ACECs

As described above, the 615,888-acre South Valley Phillips potential ACEC area is mostly core sagebrush as identified in Doherty (2022) Sagebrush Conservation Design with proportionally large core relative to other areas in the region. Similarly, the Montana GRSG Conservation Program's Habitat Quantification Tool identifies much of the area as higher habitat value. The majority of the area contains high relative abundance, representing the largest high-density area in Management Zone I (Doherty et al. 2016). There are well connected genetic nodes (Cross et al. 2018) within the area, and to surrounding areas, which include other protected federal lands (notably Charles M. Russell National Wildlife Refuge). This area also contains the wintering area for a unique GRSG population that exhibits long distance migration in the spring and fall (Newton et al. 2017, Tack et al. 2019), maintaining the persistence of those birds, which are listed as endangered in Canada (refer to **Appendix 5** for more information).

The 110,162-acre Carter Crook potential ACEC area encompasses a keystone genetic node (Cross et al. 2018), and a potential corridor where genetic connections between the northern and southern portions of management Zone I are constricted (Row et al 2018, Cross et al. 2023). This area of genetic connectivity may provide the most likely link between GRSG in Montana-Dakotas and Wyoming.

Table 5-7 displays the HMA allocations for these two areas under each alternative. Under the Proposed RMP Amendment, the South Valley Phillips area would be managed as PHMA with limited exceptions. Under the Proposed RMP Amendment, the Carter Crook area would be managed as 92% PHMA, 8% SCHMA, with a small amount managed as GHMA. Under Alternatives 1 and 2, the areas would be managed mostly as PHMA, with about 30% of the Carter Crook area as RHMA and 0.4% of the South Valley Phillips area managed as GHMA. Under Alternatives 4 and5 nearly all of these two areas would be managed as PHMA.

Under Alternative 3 and 6, both areas would also be designated as ACECs. Under Alternatives 3, the potential ACECs would receive PHMA management direction except where stronger, ACEC protections are identified related to developing plans of operations for locatable mineral development and major rights of way. Under Alternative 6, the potential ACECs would receive PHMA management direction identified for Alternative 5 except where stronger, ACEC protections are identified for locatable minerals, fluid minerals, non-energy leasables, saleable minerals, major rights of way, solar, wind, the disturbance cap, and the development of plans of operations for locatable mineral development.

Table 5-7. HMA Allocations in the Montana Potential ACECs by Alternative

Potential ACEC	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment[5]
South Valley Phillips							
PHMA with limited exceptions	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	615,888 acres (100%)
PHMA	613,332 acres (99.6%)	613,332 acres (99.6%)	615,888 acres (100%)	615,888 acres (100%)	615,888 acres (100%)	615,888 acres (100%)	615,888 acres (100%)
GHMA	2,556 acres (0.4%)	2,556 acres (0.4%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**615,888 acres**	**615,888 acres**	**615,888 acres**	**615,888 acres**	**615,888 acres**	**615,888 acres**	**615,888 acres**
Carter Crook							
PHMA	77,108 acres (70%)	77,108 acres (70%)	110,162 acres (100%)	110,115 acres (100%)	110,115 acres (100%)	110,162 acres (100%)	101,444 acres (92%)
GHMA	47 acres (0%)	47 acres (0%)	0 acres (0%)	47 acres (0%)	47 acres (0%)	(0%)	47 acres (0%)
RHMA	33,007 acres (30%)	33,007 acres (30%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
SCHMA	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	8,674 acres (8%)
Total	**110,162 acres**	**110,162 acres**	**110,162 acres**	**110,162 acres**	**110,162 acres**	**110,162 acres**	**110,162 acres**

This section details the effects of the alternatives on these areas considered for ACEC designation.

Solar, Wind, and Major Rights of Way

Under the Proposed RMP Amendment, as PHMA and SCHMA, the Carter Crook potential ACEC would be managed as exclusion for utility-scale solar and wind development with exceptions. For ROWs, the Carter Crook potential ACEC area would be managed as exclusion for surface disturbing or disruptive activities within 1 km (0.6 miles) of active leks or crucial winter range, and avoidance in existing corridors or ROWs. As PHMA with limited exceptions, the potential South Valley Phillips ACEC would be managed as exclusion for utility-scale solar and wind development and exclusion for major rights of way with no exceptions, providing additional protections to GRSG habitat.

Under Alternatives 1 and 2, both potential ACECs would be managed as avoidance areas for wind in PHMA and SCHMA. Alternatives 1 and 2 do not provide management direction for solar development in PHMA, general surface disturbance limits would exclude solar near leks (0.6 miles) and minimize (e.g., disturbance cap, mitigation) elsewhere in PHMA. The minor portions of the potential South Valley Phillips and Carter Crooks ACECs managed as GHMA under Alternatives 1 and 2 would be open for wind and solar. Under Alternative 4, the two areas would be managed as exclusion areas for wind and solar as PHMA. Under Alternative 5, in PHMA and SCHMA, the areas would be managed as avoidance for solar and wind with criteria that would need to be met for development to occur. Under Alternative 4, the areas would be

[5] PHMA with limited exceptions are areas within PHMA where additional protections to support conservation of GRSG habitat would reduce impacts from highly probable resource threats. These acreages are therefore included in both PHMA and PHMA with limited exceptions.

avoidance areas for major rights of way and under Alternative 5, these areas would be avoidance for major rights of way in PHMA.

Alternative 3 and the Proposed RMP Amendment provide the greatest protection to GRSG habitat and protect and prevent irreparable damage to the relevant and important values of the South Valley Phillips ACEC by managing the area as exclusion for utility-scale solar, utility-scale wind, and major rights of way, with no exceptions. Alternative 3 also protects and prevents irreparable damage to the relevant and important values of the potential Carter Crook ACEC for the same reason. The Proposed RMP Amendment also provides strong protection to the relevant and important values, but some impacts could occur from utility-scale solar, utility-scale wind, or major rights of way developed under the exceptions. Alternative 4 provides the next highest level of protection by managing as exclusion areas for wind and solar and avoidance areas for major rights of way. Alternatives 1, 2, and 5 would provide the least protection to the potential ACECs from potential development given the allocation of avoidance for wind and solar.

Saleable Minerals/Material Management and Locatable Minerals

Under the Proposed RMPA, as PHMA and SCHMA, the potential Carter Crook ACEC would be closed to new non-energy leasable mineral development but allow expansion of existing operations and would be closed to saleable minerals/mineral materials but open for new free use permits and open for the expansion of existing pits. As PHMA with limited exceptions, the potential South Valley Phillips ACEC would be closed to new non-energy leasable mineral development leases, including fringe acreage leasing, and closed to saleable minerals/mineral materials but open for new free use permits and expansion of existing pits.

Under Alternative 3 and Alternative 6, both areas would be designated as ACECs. Under both these alternatives, a plan of operations and BLM approval would be required before beginning any locatable mineral operations causing surface disturbance greater than casual use in these areas. Under Alternative 3, the South Valley Phillips and Carter Crook potential ACEC areas would be closed to saleable minerals/mineral materials and non-energy leasable minerals, with no exceptions, and both potential ACECs would be recommended for locatable mineral withdrawal. Under Alternative 6, the areas would be closed to non-energy leasable minerals and closed to saleable minerals/material management for new operations for all sale types except for free-use pits in order to support maintenance needs for existing local roads to ensure public safety, with restrictions.

Under Alternatives 1, 2, 4, 5, and the Proposed RMP Amendment, these potential ACEC areas would be open to locatable mineral development and notice level exploration would be allowed without a plan of operation. For the 30% of the Carter Crook potential ACEC managed as RHMA in Alternatives 1 and 2, management direction varies, and some stipulations apply for saleable minerals/material management and for non-energy leasable minerals.

Alternative 3 would provide the greatest protection to GRSG habitat, protecting and preventing irreparable damage to the relevant and important values of the potential South Valley Phillips and Carter Crook ACECs from mineral development by closing the areas to saleable minerals/mineral materials and non-energy leasable minerals, with no exceptions, and by recommending locatable mineral withdrawal. The Proposed RMP Amendment and Alternative 6 also provide a high level of protection to the relevant and important values of the potential ACECs by closing the areas to these types of mineral development, with some exceptions. Alternatives 1, 2, 4 and 5 would provide the least protection to the potential ACECs from potential development.

Fluid Mineral Development

Under the Proposed RMP Amendment the South Valley Phillips potential ACEC would be managed under the PHMA with limited exceptions designation and the No Surface Occupancy (NSO) with no exceptions management direction identified would protect the potential ACEC from the threat of fluid mineral development. Under the Proposed RMP Amendment, as PHMA, the Carter Crook potential ACEC area would be managed as NSO for fluid mineral development within .6 miles of leks and season limitations (breeding, nesting, early brood-rearing and winter habitat) and Controlled Surface Use (CSU) (density and disturbance) outside of the 0.6-mi NSO buffer with exceptions.

Under Alternative 3, the South Valley Phillips and the Carter Crook potential ACECs would be closed to fluid mineral development without exception. Under Alternative 6, both areas would also be subject to NSO but development could occur if an exception for the entire ACEC area could be met.

Under Alternatives 1, 2, and 5, in PHMA, which includes the majority of areas within these potential ACECs, NSO would be allowed within .6 miles of leks. PHMA outside .6 miles has season limitations (breeding, nesting, early brood-rearing and winter habitat) and CSU (density and disturbance). Under Alternative 4 there would be NSO in the potential ACEC areas. The 30% of the Carter Crook potential ACEC managed as RHMA, in Alternatives 1 and 2, would be open with variable stipulations (Open with Major stipulations/NSO in the West Decker and South Carter RMP planning areas, open with Major stipulations/0.6 m NSO from leks in Billings RMP planning area, open with moderate/CSU in the Billings and Cedar Creek RMP planning areas, but language varies, and open with Minor/TL w/in 3 miles of a lek in the Billings RMP planning area).

In the South Valley Phillips potential ACEC area, Alternative 3 provides the greatest protection from fluid mineral development by prohibiting fluid mineral development followed by the Proposed RMP Amendment that restricts fluid mineral development to NSO with no exceptions. In the Carter Crook potential ACEC area, Alternative 3 provides the greatest protections from fluid mineral development by prohibiting fluid mineral development, and the Proposed RMP Amendment and Alternative 6 both provide a high level of protection by establishing NSO with major constraints. Alternative 1, 2, and 4 would provide the least protections to the potential ACECs from fluid mineral development.

Disturbance Cap

In these areas managed as PHMA, the Proposed RMP Amendment utilizes two approaches/caps at the project scale, with specific modifications. These are a disturbance cap at 3% cap, following the rangewide approach, and a 5% cap, including fire and agriculture. The 3% fine scale HAF cap will also apply. Alternative 6 sets the same disturbance cap for the area but there are no exceptions and Alternative 3 closes the area to new infrastructure projects and sets a 3% disturbance cap for existing developments. Similar to the Proposed RMP Amendment, Alternatives 1 and 2 set a 5% disturbance cap in PHMA in MT/DKs, and with a 3% disturbance cap in PHMA for specific on specific anthropogenic activities such as development of minerals and renewable energy, as well as ROWs in the Dakotas. Under Alternatives 4 and 5, in PHMA the disturbance cap is 3% the project scale or 3% at the HAF Fine Scale selection area and projects would be deferred until disturbance in the areas has been reduced below the cap threshold or the projects could be redesigned to not result in additional surface disturbance or moved outside of PHMA. Alternative 3, followed by Alternative 6, provide the highest degree of protection relative to disturbance.

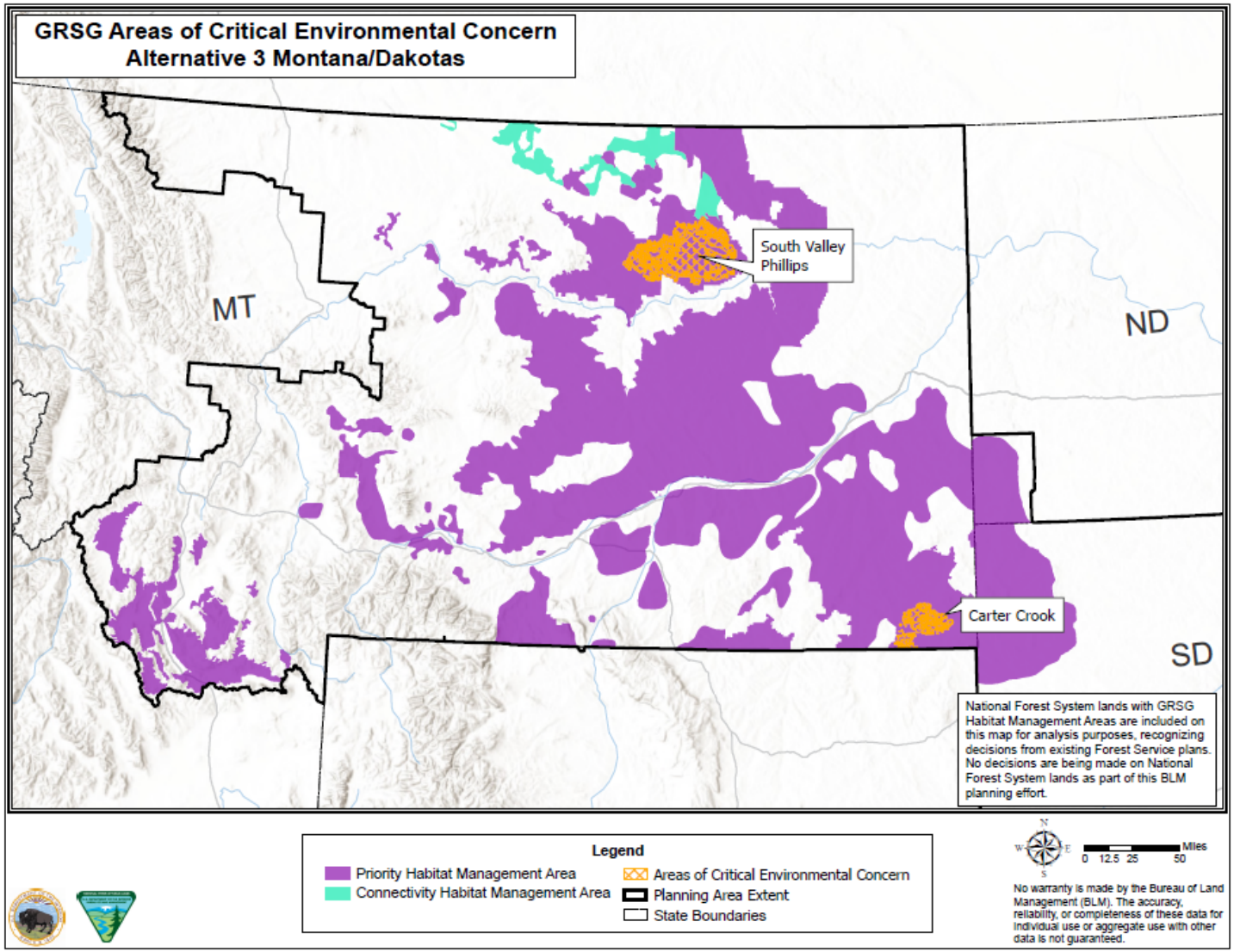
Livestock Grazing

Under Alternative 3, GRSG habitat would be unavailable to livestock grazing. Under Alternatives 1 and 2, in PHMA, thresholds and responses that would allow the authorized officer to make adjustments to livestock grazing are required. For the 30% of the Carter Crook potential ACEC managed as RHMA in Alternatives 1 and 2, management direction varies. Under Alternatives 4, 5, 6, and the Proposed RMP Amendment, thresholds and responses are also addressed but under these alternatives, more comprehensive guidance is provided for addressing areas not meeting the special status species land health standard due to livestock grazing and for addressing livestock improvements and fencing in a manner to reduce impacts to GRSG. Alternative 3 provides the greatest protections to the potential ACECs by removing any potential disturbance associated with livestock grazing.

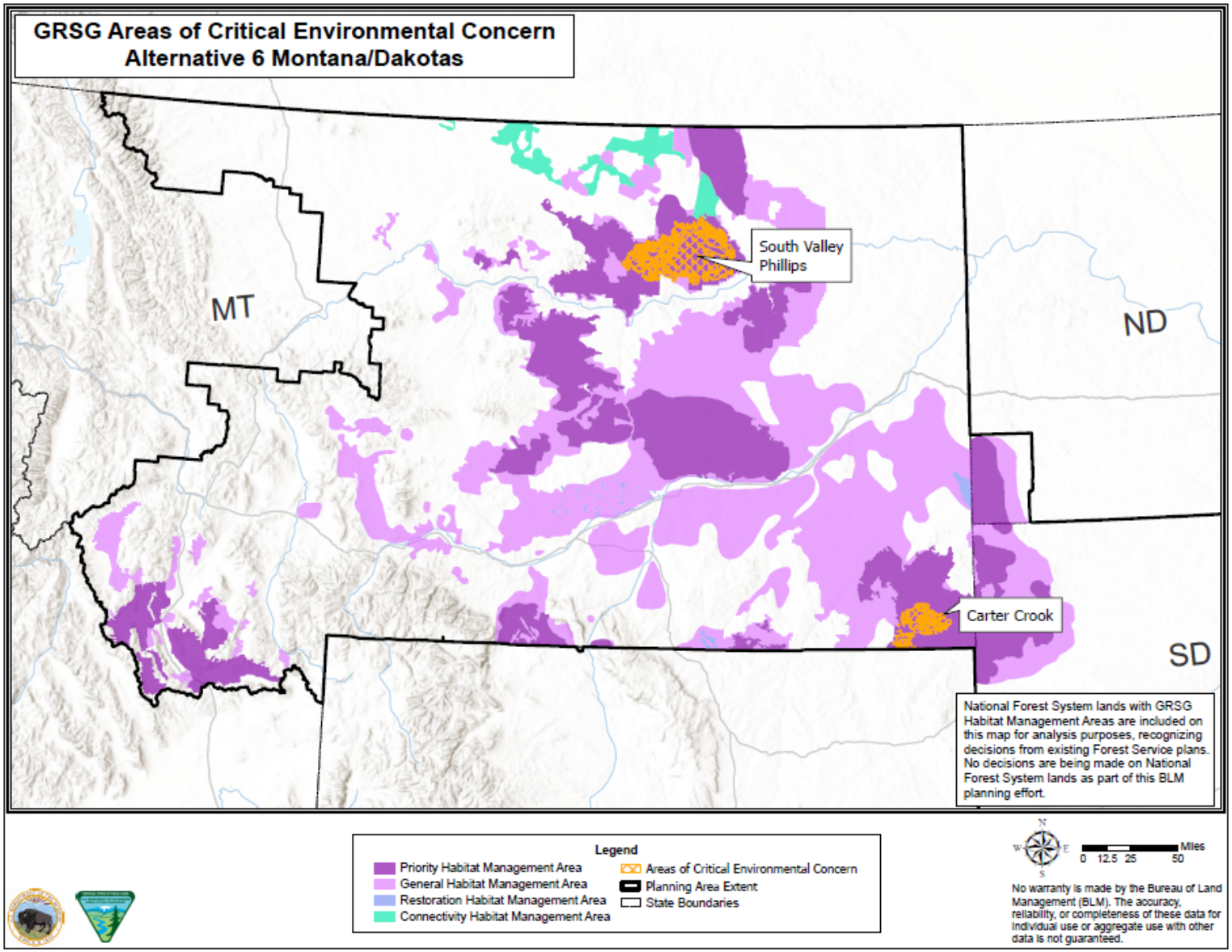
Summary of Effects

Considered comprehensively, Alternatives 3 and 6 would protect and prevent irreparable damage to the relevant and important values of both potential ACECs. The application of PHMA with limited exceptions management direction under the Proposed RMP Amendment would protect and prevent irreparable damage to the relevant and important values of the South Valley Phillips potential ACEC and the application of the PHMA management direction in the Proposed RMP Amendment would protect and prevent irreparable damage to the relevant and important values of the Carter Crook potential ACEC. Although Alternatives 1, 2, 4, and 5 provide a relatively high degree of protection within PHMA management direction in most of these potential ACEC areas, disturbance from mineral, fluid mineral, solar, wind, and major rights of way development under these alternatives is more likely to occur and could negatively impact the relative and important values of the potential ACECs.

Map 5.5: Montana Alternative 3 Potential ACECs



Map 5.6: Montana Alternative 6 Potential ACECs



NEVADA/CALIFORNIA

Areas for consideration as potential ACECs in Nevada were identified through the rangewide preliminary evaluation and from input from the Nevada Department of Wildlife. The draft polygons were reviewed and refined in coordination with preliminary input from federal, state, and county cooperating agencies. The relevance and importance determinations were informed by the evaluation of both State- and Regional-level information.

The following datasets were used to help delineate the draft ACECs.

- **Local scale data:** Draft Nevada/California Habitat Management Area Map (USGS in preparation) –that provided updates to abundance and space use indices and provided an example of combining space use, habitat selection, and survival.
- **Regional scale data:** Recently published regional GRSG data (BBD, Lek Persistence, Priority Genetic Pathways, genetic nodes, R&R, probability of breeding habitat, TAWS) was used to inform regional importance.

The BLM updated the ACEC evaluations following public review of the Draft RMP Amendment/EIS, both in response to public comments and consistent with updates to Habitat Management Areas, as described in **Appendix 3**. The ACEC boundaries were adjusted and refined to comport with the updated habitat data. In some instances, this led to increases in acres in some of the potential ACECs and decreases in others.

Importance Evaluations

Geographic Reference	Importance	Recommendation
Warm Springs	Greater than 60% core habitat, remainder is growth; low to medium Resistance and Resilience; ~50% of area in 50% to 25% BBD; 1 neighborhood cluster with declining population (<0.95) and active pop warning; About 90% PHMA with some PHMA+; High to Medium lek persistence; Includes Warm Springs LWC; Partially includes and adjoins East Fork High Rock Canyon Wilderness; adjoins North Black Rock Range Wilderness; Low genetic connectivity; no nodes. Solid habitat that includes LWC and Wilderness. Population center but warning triggered for NC and population is in decline.	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.)
Montana Mountains	Strong representation of the 25% BBD in NV; Connects with OR population; High lek persistence; intersects three neighborhood clusters, primary neighborhood cluster shows population growth (lambda > 1.03), adjacent NCs nearly stable to declining (lambda = 0.99-0.95); Low R&R; mostly Growth area for sagebrush; about 10% of area includes Disaster Peak WSA. Source population likely supporting connection between OR/NV and ID/NV populations. Includes Disaster Peak WSA.	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.)

Geographic Reference	Importance	Recommendation
Owyhee West	Supports two separate population centers; provides regionally important genetic connectivity with eastern NV and ID to OR populations; Several genetic nodes including a Keystone node; Large area of contiguous BLM administered lands; includes North Fork Little Humboldt River and Little Humboldt River WSA; High value area for LCT. Regionally important genetic connectivity, includes two WSA, and provides important LCT habitat.	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.)
Owyhee East	Concentration of active leks and high lek persistence; near stable to growing population trend; provides regionally important genetic connectivity between ID and northeast NV to the remainder of NV populations; five genetic nodes; ~ 40% of the area is Core sagebrush and ~ 50% sagebrush Growth; Medium R&R Regionally important genetic connectivity, supports population centers and large tract of Core sagebrush.	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.)
North Fork O'Neil	Adjoins ID proposed ACEC; provides regionally important genetic connectivity between ID and NV; population center with stable to growing trend; large area of contiguous BLM administered lands that is mostly Core and Growth sagebrush, PHMA and PHMA +; Medium R&R; includes Bad Lands WSA; Bisected by Proposed Designated Utility Corridor (possibly split ACEC into two separated by corridor).	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.)
South Fork Dixie Flats	Stepping-stone population between northern and southern NV; medium to high regional genetic connectivity; comprised of 25% and 50% BBD; high to medium lek persistence; about 40% of area in checkerboard private ownership or BLM administration; important high elevation brood rearing habitat (PHMA+); population declining (lambda = 0.97-0.99) but no warnings; L-M R&R; adjacent to Cedar Ridge and Red Spring WSA; proposed designated corridor bisects northeast corner.	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.)
Butte Long Valley	Provides regionally important genetic connectivity between northern and southeastern NV; adjacent to a keystone lek; supports three population centers; supports 5 NCs – 1 with increasing population trend and remaining 4 declining; H-M lek persistence; proposed designated utility corridor bisects southeastern quarter; adjacent to Goshute Canyon and Bristlecone Wilderness.	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.)
Little Butte Long Valley	Includes keystone genetic node; medium genetic connectivity; mostly 75% BBD; bisected by Hwy 93; 75% of area in proposed designated utility corridor. Between Draft and Final EIS, it was determined that due to the bisection of the area by Highway 93 and the presence of a major right of way that crosses a portion of the area that the area did not meet the importance criteria.	Identified as a potential ACEC in Alternatives 3 and 6 in the Draft EIS but not carried forward in the Final EIS. (Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.)

Geographic Reference	Importance	Recommendation
Eureka North and South	High genetic connectivity between northern and southern NV; high elevation brood-rearing habitat; ~30% of northern area in PHMA+; 6 miles east of genetic node that is both a keystone and hub; northern area bisected by large proposed designated corridor and HWY 50 runs between north and south; supports three population centers across the entire area.	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.)
Grass-Kobeh Valley	Regionally important genetic connectivity between north and central NV; 4 genetic nodes; supports three 25% population centers and four 50% population centers; about 20% of area is PHMA+; H-M lek persistence; includes 5 NCs – 2 NCs have positive growth trend, remaining in decline; 2 NCs (about 15% of area) with active warnings; bounded on three sides by HWYs 305 (western side), 50 (south side), and 278 (eastern side); eastern side includes large proposed designated energy corridor; includes Simpson Park and Roberts Mountain WSA.	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.)
Monitor Valley	Supports three population centers (25-50% BBD) that are important to the southern portion of range in NV; provides genetic connectivity to central and northern NV; includes two genetic nodes; primarily core and growth sagebrush and PHMA; bordered by and supporting USFS GRSG populations/habitat; bisected by proposed designated utility corridor.	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.)
Reese River	Supports two population centers (25-50% BBD) that are important to the southern portion of range in NV; provides genetic connectivity to central and northern NV; includes two genetic nodes; primarily core and growth sagebrush and PHMA; bordered by and supporting USFS GRSG populations/habitat.	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.)
Hays Canyon	Stepping-stone population connecting the northern portion of MZ V (OR & NV) to the southern portion (CA); about 70% of area in 25%-50% BBD; one NC that is declining and has tripped an active warning; most of area is PHMA with about 25% of total area being PHMA+; primarily Growth with some Core sagebrush; M-H lek persistence; M-L R&R; bisected by proposed designated corridor (that includes an existing transmission line)	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.)
Idaho Border	Provides continuity of habitat and population connectivity with neighboring states that have proposed ACEC areas. The Idaho Border area borders the potential Shoshone Basin ACEC identified in Idaho.	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.)
Utah Border	Provides continuity of habitat and population connectivity with neighboring states that have proposed ACEC areas. The "Utah Border" area is made up of two areas that border the potential Box Elder ACEC identified in Utah.	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.)
Vya-Massacre	See description in the "California GRSG ACEC Evaluation: Importance Criteria" below.	Identified as a potential ACEC in Alternatives 3 and 6. (Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.)

California GRSG ACEC Importance Evaluation: Buffalo Skedaddle Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	Yes	BLM CA included designated GRSG Priority, General, and Other Habitat Management Areas in the 2015 GRSG Plan Amendment. In 2022, updates to the GRSG Habitat Management Areas were initiated based on the best available science. These updates identified Priority Plus areas. Priority Plus are areas that are most productive to GRSG populations within Priority Habitat Management Areas (PHMA). PHMA plus includes modeled population performance, specifically survival of nests and broods and is informed by selection models and areas of increased survival. PHMA plus are considered "source" habitats. In addition to PHMA plus, other new science has emerged since the 2015 plans related to GRSG density, habitats, population trends, and genetic exchange among populations which has provided information on areas that may contain special worth, consequence, or distinctiveness within CA BLM managed lands.
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened • Vulnerable to adverse change	Yes	The area is not particularly fragile or sensitive to change as compared to other areas on CA BLM managed lands. However, the area has been undergoing intensive restoration efforts due to the Rush Fire over 10 years ago. In addition, this area is on the western fringe of GRSG populations in California with documented genetic exchange with populations in Nevada.
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	Yes	The March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse as Threatened or Endangered concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species. However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species, therefore, areas that meet national priority concerns or specific FLPMA mandates require multiple lines of evidence supporting more than local priorities and conservation value. The proposed Buffalo Skedaddle ACEC identifies the area as highly valuable for GRSG habitat and population persistence in northeastern California.

Other Items	
Boundaries	The boundary for this ACEC was initially delineated using the Population Management Unit (PMU) for the Buffalo Skedaddle PMU. The boundary was then refined to focus on the revised GRSG Habitat Management Area delineations, areas that have been successful in habitat restoration efforts since the Rush Fire and genetic exchange between CA and NV GRSG populations based on new science.
Additional Notes	—

Conclusion
Due to meeting the Relevance and Importance criteria, this area was identified as a potential ACEC under Alternatives 3 and 6. Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.

California GRSG ACEC Importance Evaluation: Vya/Massacre GRSG Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	Yes	BLM CA and NV included designated GRSG Priority, General, and Other Habitat Management Areas in the 2015 GRSG Plan Amendment. In 2022, updates to the GRSG Habitat Management Areas were initiated based on the best available science. These updates identified Priority Plus areas. Priority Plus are areas that are most productive to GRSG populations within Priority Habitat Management Areas (PHMA). PHMA plus includes modeled population performance, specifically survival of nests and broods and are informed by selection models and areas of increased survival. PHMA plus are considered "source" habitats. In addition to PHMA plus, other new science has emerged since the 2015 plans related to GRSG density, habitats, population trends, and genetic exchange among populations which has provided information on areas that may contain special worth, consequence, or distinctiveness within CA BLM managed lands.
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened • Vulnerable to adverse change	Yes	The area is not particularly fragile or sensitive to change as compared to other areas on CA BLM managed lands. However, Bitner Ranch provides key brood-rearing habitat to GRSG in CA and connectivity between populations in NV, including the Sheldon Hart Refuge.

California GRSG ACEC Importance Evaluation: Vya/Massacre GRSG Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	Yes	The March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse as Threatened or Endangered concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species. However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species, therefore, areas that meet national priority concerns or specific FLPMA mandates require multiple lines of evidence supporting more than local priorities and conservation value. The proposed Vya-Massacre ACEC includes multiple lines of evidence, identifying the area as highly valuable GRSG habitat providing key brood-rearing habitat and connectivity among multiple states. In addition, conserving habitat connectivity is a national priority for managing bureau sensitive status species (Manual 6840 and IM 2023-005).
Other Items		
Boundaries	The boundary for this ACEC was initially delineated combining the Population Management Units (PMU) for Vya and Massacre PMUs. The boundaries were then refined to focus on the revised GRSG Habitat Area delineations, key brood-rearing habitat and additional new science.	
Additional Notes	—	
Conclusion		
Due to meeting the Relevance and Importance criteria, this area was identified as a potential ACEC under Alternatives 3 and 6. Refer to BLM Nevada/California - ACEC Maps for Alternatives 3 and 6 that follow.		

Consideration of ACECs nominated during the public comment period

BLM received nominations for the Table Mountain, Juniper Ridge, aa-Tiipi Flat areas that includes acreage within Oregon, Idaho, and Nevada. The three states coordinated on the nominated ACECs and the BLM Oregon State Office took the lead on considering the nominations. It was determined that none of these areas warranted consideration as potential ACECs in the Final EIS. Additional details are provided in the **Oregon** section of this appendix.

The BLM Nevada also received a nomination for the Nevada Department of Wildlife Population Management Units (PMU). The 59 PMUs totaling 41,110,833 acres include all habitat management areas as well as areas of non-habitat within the Nevada and northeastern California sub-region. The BLM evaluated the PMUs for consistency with ACEC policy and concluded that these areas generally meet the relevance criteria for fish and wildlife resource (specific to GRSG) but did not meet the importance criteria (more than locally significant). Because the nominated areas did not meet both relevance and importance criteria, and because GRSG habitat within the PMUs are already identified for GRSG-specific management, BLM did not identify the PMUs as a potential ACEC in the Final EIS.

Effects of the Alternatives on the Potential Warm Springs, North Fork O'Neil, Grass-Kobeh Valley, South Fork Dixie Flats, Idaho Border, Hays Canyon, Vya Massacre, and Buffalo Skedaddle ACECs

Nine areas identified as potential ACECs under Alternatives 3 and 6 would be managed as PHMA with limited exceptions under the Proposed RMP Amendment[6]. These are:

- Warm Springs: 89,539 acres, reduced from 92,727 acres in Draft RMPA/EIS
- North Fork O'Neil: 937,512 acres, increased from 894,940 acres in Draft RMPA/EIS
- Owyhee East: 487,122 acres
- Grass-Kobeh Valley: 852,979 acres, increased from 823,831 acres in Draft RMPA/EIS
- South Fork Dixie Flats: 122,395 acres, reduced from 138,060 acres in Draft RMPA/EIS
- Idaho Border: 49,019 acres, reduced from 74,971 acres in Draft RMPA/EIS
- Hays Canyon: 340,850 acres, reduced from 352,873 acres in Draft RMPA/EIS,
- Vya-Massacre: 293,677 acres, reduced from 307,495 acres in Draft RMPA/EIS, and
- Buffalo Skedaddle: 182,213 acres, reduced from 182,219 acres in Draft RMPA/EIS

These areas represent remaining intact sagebrush habitat with minimal anthropogenic disturbance, providing important regional genetic connectivity, high-quality brood-rearing habitat, and/or identified as highly valuable for GRSG habitat and population persistence, as detailed in the above evaluations. Given Nevada's basin and range ecology, GRSG habitat is naturally fragmented and GRSG have experienced significant habitat losses due to wildfire. Restoration is challenging due to the low elevation and dry climate, making conserving these remaining intact landscapes a conservation priority. These areas are primarily subject to threats from major rights of way, renewable energy, and mineral development.

Table 5-8 displays the HMA allocations for these nine areas under each alternative. Under the Proposed RMP Amendment, the areas within the Warm Springs, North Fork O'Neil, Grass-Kobeh Valley, South Fork Dixie Flats, Idaho Border, Hays Canyon, Vya Massacre, and Buffalo Skedaddle potential ACECs (as well as some surrounding areas) would be managed entirely as PHMA with limited exceptions. The Grass-Kobeh Valley potential ACEC areas would be managed mostly as PHMA with limited exceptions, with 40% of the area managed as PHMA.

Under Alternative 3 and 6, all nine areas would also be designated as ACECs and would be managed entirely as PHMA, with direction varying consistent with PHMA and ACEC direction in each alternative.

Under Alternatives 1, 2, 4, and 5 these areas would all be managed mostly as PHMA, with relatively small portions managed as GHMA, OHMA, and non-habitat. In Alternatives 1 and 2, these nine areas would be managed as 90% or more PHMA, with minor areas managed as other HMAs except for the Grass Kobeh potential ACEC, which would be managed as 87% PHMA, 10% GHMA, 2% OHMA, and 2% non-habitat and the Idaho Border potential ACEC, which would be managed as 76% PHMA, 23% GHMA, and 1% OHMA. Under Alternatives 4, and 5, these nine areas would be managed mostly as PHMA, with some GHMA, with under 5% as OHMA or non-habitat. In Alternatives 4 and 5, the Idaho Border potential ACEC would have the highest percentages of other HMA management, managed as 68% PHMA, 27% GHMA, and 5% OHMA.

[6] As the two areas are adjacent, the Owyhee East potential ACEC area was incorporated into the North Fork O'Neil PHMA with limited exceptions area in the Proposed RMP Amendment.

Table 5-8. HMA Allocations in the Nevada Potential ACECs by Alternative[7][8]

Potential ACEC	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment[9][10]
Warm Spring							
PHMA with limited exceptions	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	89,539 acres (100%)
PHMA	87,742 acres (98%)	87,742 acres (98%)	89,539 acres (100%)	88,270 acres (99%)	88,275 acres (99%)	89,539 acres (100%)	89,539 acres (100%)
GHMA	0 acres (0%)	0 acres (0%)	0 acres (0%)	1,269 (1%)	1,264 (1%)	0 acres (0%)	0 acres (0%)
OHMA	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Non-habitat	1,797 acres (2%)	1,797 acres (2%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**89,539 acres**	**89,539 acres**	**89,539 acres**	**89,539 acres**	**89,539 acres**	**89,539 acres**	**89,539 acres**
North Fork O'Neil							
PHMA with limited exceptions	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	1,546,044 acres[11] (100%)
PHMA	846,562 acres (90%)	846,562 acres (90%)	937,512 acres (100%)	888,405 acres (95%)	888,405 acres (95%)	937,512 acres (100%)	1,546,044 acres (100%)
GHMA	49,766 acres (5%)	49,766 acres (5%)	0 acres (0%)	42,799 acres (5%)	42,799 acres (5%)	0 acres (0%)	0 acres (0%)
OHMA	24,894 acres (3%)	24,894 acres (3%)	0 acres (0%)	6,308 acres (1%)	6,308 acres (1%)	0 acres (0%)	0 acres (0%)
Non-habitat	16,290 acres (2%)	16,290 acres (2%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**937,512 acres**	**937,512 acres**	**937,512 acres**	**937,512 acres**	**937,512 acres**	**937,512 acres**	**(see above)**

[7] The areas identified in this table were identified as PHMA with limited exception areas in the Proposed RMP Amendment.
[8] Acreage calculated utilizing the USGS HMA model for NV/CA (Milligan et al. 2024) (Refer to Appendix 3).
[9] PHMA with limited exceptions are areas within PHMA where additional protections to support conservation of GRSG habitat would reduce impacts from highly probable resource threats. These acreages are therefore included in both PHMA and PHMA with limited exceptions.
[10] In some cases, the Proposed RMP Amendment establishes PHMA with limited exceptions management direction in areas larger than the potential ACECs to ensure adequate protection of GRSG habitat. In these instances, the acreage calculation includes the entirety of the potential ACEC and some adjacent areas.
[11] As the two areas are adjacent, the Owyhee East potential ACEC area was incorporated into the North Fork O'Neil PHMA with limited exceptions area in the Proposed RMP Amendment.

Potential ACEC	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment[9][10]
Owyhee East							
PHMA with limited exceptions	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	(incorporated into North Fork O'Neil PHMA with limited exceptions- see above)
PHMA	475,417 acres (98%)	475,417 acres (98%)	487,122 acres (100%)	486,040 acres (100%)	486,040 acres (100%)	487,122 acres (100%)	0 acres (0%)
GHMA	8,042 acres (2%)	8,042 acres (2%)	0 acres (0%)	383 acres (0%)	383 acres (0%)	0 acres (0%)	0 acres (0%)
OHMA	1,943 acres (0%)	1,943 acres (0%)	0 acres (0%)	699 acres (0%)	699 acres (0%)	0 acres (0%)	0 acres (0%)
Non-habitat	1,720 acres (0%)	1,720 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**487,122 acres**	**487,122 acres**	**487,122 acres**	**487,122 acres**	**487,122 acres**	**487,122 acres**	**(see above)**
Grass-Kobeh Valley							
PHMA with limited exceptions	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	488,972 acres (57%)
PHMA	739,032 acres (87%)	739,032 acres (87%)	852,979 acres (100%)	797,108 acres (93%)	797,108 acres (93%)	852,979 acres (100%)	826,122 acres (97%)
GHMA	86,792 acres (10%)	86,792 acres (10%)	0 acres (0%)	39,808 acres (5%)	39,808 acres (5%)	0 acres (0%)	19,835 acres (2%)
OHMA	13,150 acres (2%)	13,150 acres (2%)	0 acres (0%)	16,063 acres (2%)	16,063 acres (2%)	0 acres (0%)	7,022 acres (1%)
Non-habitat	14,005 acres (2%)	14,005 acres (2%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**852,979 acres**	**852,979 acres**	**852,979 acres**	**852,979 acres**	**852,979 acres**	**852,979 acres**	**852,979 acres**
South Fork Dixie Flats							
PHMA with limited exceptions	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	133,406 acres (100%)
PHMA	112,983 acres (92%)	112,983 acres (92%)	122,395 acres (100%)	117,500 acres (96%)	117,500 acres (96%)	122,395 acres (100%)	133,406 acres (100%)
GHMA	7,537 acres (6%)	7,537 acres (6%)	0 acres (0%)	4,837 acres (4%)	4,837 acres (4%)	0 acres (0%)	0 acres (0%)
OHMA	1,873 acres (2%)	1,873 acres (2%)	0 acres (0%)	58 acres (0%)	58 acres (0%)	0 acres (0%)	0 acres (0%)
Non-habitat	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**122,395 acres**	**122,395 acres**	**122,395 acres**	**122,395 acres**	**122,395 acres**	**122,395 acres**	**133,406 acres**

Potential ACEC	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment[9][10]
Idaho Border							
PHMA with limited exceptions	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	49,140 acres (100%)
PHMA	37,075 acres (76%)	37,075 acres (76%)	49,019 acres (100%)	33,154 acres (68%)	33,154 acres (68%)	49,019 acres (100%)	49,140 acres (100%)
GHMA	11,443 acres (23%)	11,443 acres (23%)	0 acres (0%)	13,244 acres (27%)	13,244 acres (27%)	0 acres (0%)	0 acres (0%)
OHMA	372 acres (1%)	372 acres (1%)	0 acres (0%)	2,621 acres (5%)	2,621 acres (5%)	0 acres (0%)	0 acres (0%)
Non-habitat	129 acres (0%)	129 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**49,019 acres**	**49,019 acres**	**49,019 acres**	**49,019 acres**	**49,019 acres**	**49,019 acres**	**49,140 acres**
Hays Canyon							
PHMA with limited exceptions	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	350,502 acres (100%)
PHMA	330,326 acres (97%)	330,326 acres (97%)	340,850 acres (100%)	330,952 acres (97%)	330,952 acres (97%)	340,850 acres (100%)	350,502 acres (100%)
GHMA	9,194 acres (3%)	9,194 acres (3%)	0 acres (0%)	9,632 acres (3%)	9,632 acres (3%)	0 acres (0%)	0 acres (0%)
OHMA	836 acres (0%)	836 acres (0%)	0 acres (0%)	266 acres (0%)	266 acres (0%)	0 acres (0%)	0 acres (0%)
Non-habitat	494 acres (0%)	494 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**340,850 acres**	**340,850 acres**	**340,850 acres**	**340,850 acres**	**340,850 acres**	**340,850 acres**	**350,502 acres**
Vya-Massacre							
PHMA with limited exceptions	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	305,529 acres (100%)
PHMA	288,393 acres (98%)	288,393 acres (98%)	293,677 acres (100%)	259,093 acres (88%)	259,093 acres (88%)	293,677 acres (100%)	305,529 acres (100%)
GHMA	2,427 acres (1%)	2,427 acres (1%)	0 acres (0%)	26,733 acres (9%)	26,733 acres (9%)	0 acres (0%)	0 acres (0%)
OHMA	463 acres (0%)	463 acres (0%)	0 acres (0%)	7,851 acres (3%)	7,851 acres (3%)	0 acres (0%)	0 acres (0%)
Non-habitat	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**293,677 acres**	**293,677 acres**	**293,677 acres**	**293,677 acres**	**293,677 acres**	**293,677 acres**	**305,529 acres**

Potential ACEC	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment[9][10]
Buffalo Skedaddle							
PHMA with limited exceptions	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	190,800 acres (100%)
PHMA	180,865 acres (99%)	180,865 acres (99%)	182,213 acres (100%)	177,221 acres (97%)	177,221 acres (97%)	182,213 acres (100%)	190,800 acres (100%)
GHMA	986 acres (1%)	986 acres (1%)	0 acres (0%)	2,899 acres (2%)	2,899 acres (2%)	0 acres (0%)	0 acres (0%)
OHMA	168 acres (0%)	168 acres (0%)	0 acres (0%)	2,093 acres (1%)	2,093 acres (1%)	0 acres (0%)	0 acres (0%)
Non-habitat	194 acres (0%)	194 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**182,213 acres**	**182,213 acres**	**182,213 acres**	**182,213 acres**	**182,213 acres**	**182,213 acres**	**190,800 acres**

This section details the effects of the alternatives on these areas considered for ACEC designation.

Solar, Wind, Major Rights of Way, Saleable Minerals/Material Management, and Locatable Minerals

The Proposed RMP Amendment and Alternatives 3 and 6 would all provide additional protections to the potential ACECs by excluding solar, wind, and non-energy leasable mineral development. While all three alternatives also exclude major rights of way and close the area to saleable minerals/material management, Alternative 3 provides the greatest protection as Alternative 3 provides no exceptions to the rights of way exclusion or to the saleable closure. In addition, under Alternative 3, the areas would be recommended for locatable mineral withdrawal. Under both Alternative 3 and 6, a plan of operations and BLM approval would be required before beginning any locatable mineral operations causing surface disturbance greater than casual use. Under the Proposed RMP Amendment, as PHMA with limited exceptions, these nine areas would be managed as exclusion for utility-scale solar and wind development and exclusion for major rights of way with no exceptions, providing additional protections to GRSG habitat.

Under Alternatives 1, 2, and 4, the areas would be exclusion for solar and wind in PHMA and avoidance in GHMA and avoidance for major rights of way in PHMA and GHMA, which would provide similar but slightly less protections than afforded under the Proposed RMP Amendment and Alternatives 3 and 6. The portions of these potential ACEC areas that would be managed as OHMA and non-habitat would be open for utility-scale solar and utility-scale wind testing and development, with applicable minimization measures and compensatory mitigation. Under Alternative 5, the areas would be avoidance for solar and wind in PHMA and open with minimization measures in GHMA and would be avoidance for major rights-of-way in PHMA and open with minimization measures in GHMA. Therefore, Alternative 5 provides the least amount of protections from solar and wind development and Alternatives 1, 2, 4, and 5 would provide the least amount of protections from rights of way development. Under Alternatives 1, 2, 4, 5, and the Proposed RMP Amendment, the areas would be open to locatable mineral development and notice level exploration would be allowed without a plan of operations.

Fluid Mineral Development

Under the Proposed RMP Amendment these nine potential ACECs would be managed under the PHMA with limited exceptions, and the No Surface Occupancy (NSO) with no exceptions management direction identified for that designation would protect the potential ACECs from potential fluid mineral development.

Under Alternative 6, the area would also be subject to NSO but development could occur if an exception for the entire ACEC area could be met. Alternative 3 would close the areas to fluid mineral development without exception.

Alternatives 1 and 2 would manage fluid minerals to avoid, minimize, and compensate for direct disturbance, displacement, or mortality of GRSG, direct loss of habitat and cumulative landscape level impacts and would prioritize fluid mineral development outside of PHMA and GHMA areas in non-habitat areas first and then in the least suitable habitat for GRSG, subject to valid existing rights. Under Alternative 1, the PHMA within the potential ACECs would be managed as NSO without waiver or modification and within GHMA, any new leases would include stipulations to protect GRSG. Alternative 2 would be the same as Alternative 1, but additional exceptions to stipulations may be granted. Under Alternative 4, there would be an NSO stipulation within .6 miles of active leks in PHMA unless it could be demonstrated that it meets either a non-habitat, topographic, or co-location exception. Under Alternative 5, the NSO stipulation would be the same as under Alternative 4, but an exception could only be applied within 1 mile of active leks.

Alternative 3 provide the greatest protections from fluid mineral development by prohibiting fluid mineral development. The second highest protections would occur under the Proposed RMP Amendment and Alternative 6 followed by Alternative 5. Alternative 4 would provide the least protections to the potential ACEC from fluid mineral development.

Disturbance Cap

In these areas managed as PHMA, the Proposed RMP Amendment sets a disturbance cap if direct habitat disturbance from existing and proposed infrastructure developments exceeds either 3% the project scale or 3% at the HAF Fine Scale selection area, with exceptions and conditions. In Nevada, the Authorized Officer may grant an exception to the disturbance cap at the HAF fine scale if the project meets criteria associated with the project-scale assessment (including requirements for exceptions and conditions), is in compliance with the Nevada Greater Sage-grouse Conservation Plan and Conservation Credit System (CCS) as required by Nevada regulation (Nevada Revised Statutes (NRS) Chapter 232.16 and Nevada Administrative Code (NAC) 232.162-232.480), and the offsetting compensatory mitigation (or credits per the Nevada CCS Manual) occur within the HAF fine scale where the project occurs. Alternative 6 sets the same disturbance cap for the area but there are no exceptions and Alternative 3 closes the area to new infrastructure projects and sets a 3% disturbance cap for existing developments. Alternatives 1 and 2 set a 3% disturbance cap in PHMA and the cap applies at both BSU-scale and at the project scale. Under Alternatives 4 and 5, in PHMA the disturbance cap is 3% the project scale or 3% at the HAF Fine Scale selection area and projects would be deferred until disturbance in the areas has been reduced below the cap threshold or the projects could be redesigned to not result in additional surface disturbance or moved outside of PHMA. Alternative 3, followed by Alternative 6, provide the highest degree of protection relative to disturbance.

Livestock Grazing

Under Alternative 3, GRSG habitat would be unavailable to livestock grazing. Under Alternatives 1 and 2, in PHMA, thresholds and responses that would allow the authorized officer to make adjustments to livestock grazing are required. Under Alternatives 4, 5, 6, and the Proposed RMP Amendment, thresholds and responses are also addressed but under these alternatives, more comprehensive guidance is provided for addressing areas not meeting the special status species land health standard due to livestock grazing and for addressing livestock improvements and fencing in a manner to reduce impacts to GRSG. Alternative 3 provides the greatest protections to the ACEC by removing any potential disturbance associated with livestock grazing.

Summary of Effects

Considered comprehensively, the management direction provided under Alternatives 3 and the Proposed RMP Amendment would protect and prevent irreparable damage to the relevant and important values of the potential Warm Springs, North Fork O'Neil, Owyhee East, Grass-Kobeh Valley, South Fork Dixie Flats, Idaho Border, Hays Canyon, Vya Massacre, and Buffalo Skedaddle ACECs. Alternative 3 provides the greatest amount of protection, as these areas would be closed to utility-scale solar, utility-scale wind, saleable minerals/materials management, non-energy leasable minerals, and major rights of way, with no exemptions. The Proposed RMP Amendment would protect and prevent irreparable damage to GRSG habitat in these areas by excluding utility scale solar and wind, and removing exceptions to the NSO occupancy requirement for fluid mineral development. The Proposed RMP also provides minimal exceptions to the major rights of way exclusion, prohibits non-energy mineral leasing, and provides only limited allowances for saleable mineral/material management. Alternative 6 provides the next highest level of protection, with slightly more exceptions to closures to mineral development and major rights of way and would also protect and prevent irreparable damage to the relevant and important values of the potential ACEC areas.

Alternatives 1, 2, 4, and 5 provide a relatively high degree of protection with PHMA management direction, which guides management of the majority of these potential ACECs. However, as major rights of way, renewable energy, and mineral development are more likely to occur under these alternatives, associated disturbances could negatively impact the relevant and important values of the potential ACECs.

Effects of the Alternatives on the Potential Montana Mountain, Butte Long Valley, Eureka North and South, Monitor Valley, Reese River, Utah Border, and Owyhee West Potential ACECs

Seven areas that are proposed for ACEC designation under Alternative 3 and 6 would be managed consistent with applicable HMA direction (and not as PHMA with limited exceptions) under the Proposed RMP Amendment. These are:

- Montana Mountain: 314,370 acres, increased from 92,727 acres in Draft RMPA/EIS
- Butte Long Valley: 606,239 acres, reduced 793,353 acres in Draft RMPA/EIS
- Eureka North and South: 66,905 acres, increased from 66,904 acres in Draft RMPA/EIS
- Monitor Valley: 173,507 acres, reduced from 267,325 acres in Draft RMPA/EIS
- Reese River: 85,000 acres, increased from 81,193 acres in Draft RMPA/EIS
- Utah Border: 58,659 acres, unchanged from Draft RMPA/EIS
- Owyhee West: 704,650 acres

These areas provide important regional genetic connectivity, high-quality brood-rearing habitat, and/or are highly valuable for GRSG habitat and population persistence, as detailed in the above evaluations.

Table 5-9 displays the HMA allocations for these seven areas under each alternative. Under the Proposed RMP Amendment, the areas within the potential Montana Mountain, Butte Long Valley, Eureka North and South, Monitor Valley, Reese River, Utah Border, and Owyhee West ACECs would be managed mostly as PHMA, with smaller percentages managed as GHMA, OHMA, and non-habitat.

Under Alternative 3 and 6, all seven areas would also be designated as ACECs. Under Alternatives 3 and 6, these seven areas would be managed entirely as PHMA, with direction varying consistent with PHMA direction in each alternative including the additional protections that are identified under each of these alternatives for ACECs. Under Alternatives 1, 2, 4, and 5 these areas would all be managed mostly as PHMA, with relatively small portions managed as GHMA, OHMA, and non-habitat, with the exception of Butte Long

Valley potential ACEC area (which is managed as 47% PHMA, 38% GHMA, 6% OHMA, and 9% non-habitat in Alternatives 1 and 2 and as 79% PHMA, 19% GHMA, 2% OHMA in Alternatives 4 and 5), Alternatives 4 and 5 have higher percents managed as PHMA in the Montana Mountain, Eureka North and South, Reese River, Utah Border potential ACEC areas. Alternative 1 and 2 have more acreage managed as PHMA in the Monitor Valley potential ACEC area. The Owyhee West potential ACEC area would receive96% PHMA management under Alternatives 1, 2, 4, and 5.

Table 5-9. HMA Allocations in the Nevada Potential ACECs by Alternative[12,13]

Potential ACEC	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment[14]
Montana Mountain							
PHMA	288,005 acres (92%)	288,005 acres (92%)	314,370 acres (100%)	295,742 acres (94%)	303,711 acres (97%)	314,370 acres (100%)	278,660 acres (89%)
GHMA	3,626 acres (1%)	3,626 acres (1%)	0 acres (0%)	18,528 acres (6%)	10,565 acres (3%)	0 acres (0%)	10,565 acres (3%)
OHMA	14,737 acres (5%)	14,737 acres (5%)	0 acres (0%)	100 acres (0%)	94 acres (0%)	0 acres (0%)	94 acres (0%)
Non-habitat	8,002 acres (3%)	8,002 acres (3%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	25,051 acres (8%)
Total	**314,370 acres**	**314,370 acres**	**314,370 acres**	**314,370 acres**	**314,370 acres**	**314,370 acres**	**314,370 acres**
Butte Long Valley							
PHMA	284,728 acres (47%)	284,728 acres (47%)	606,293 acres (100%)	478,214 acres (79%)	478,501 acres (79%)	606,293 acres (100%)	478,531 acres (79%)
GHMA	230,096 acres (38%)	230,096 acres (38%)	0 acres (0%)	113,018 acres (19%)	112,845 acres (19%)	0 acres (0%)	112,845 acres (19%)
OHMA	38,884 acres (6%)	38,884 acres (6%)	0 acres (0%)	15,061 acres (2%)	14,917 acres (2%)	0 acres (0%)	14,917 acres (2%)
Non-habitat	52,585 acres (9%)	52,585 acres (9%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres
Total	**606,293 acres**	**606,293 acres**	**606,293 acres**	**606,293 acres**	**606,293 acres**	**606,293 acres**	**606,293 acres**
Eureka North and South							
PHMA	47,109 acres (70%)	47,109 acres (70%)	66,905 acres (100%)	59,035 acres (88%)	59,035 acres (88%)	66,905 acres (100%)	59,035 acres (88%)
GHMA	13,871 acres (21%)	13,871 acres (21%)	0 acres (0%)	5,606 acres (8%)	5,606 acres (8%)	0 acres (0%)	5,606 acres (8%)
OHMA	4,867 acres (7%)	4,867 acres (7%)	0 acres (0%)	2,264 acres (3%)	2,264 acres (3%)	0 acres (0%)	2,264 acres (3%)
Non-habitat	1,058 acres (2%)	1,058 acres (2%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**66,905 acres**	**66,905 acres**	**66,905 acres**	**66,905 acres**	**66,905 acres**	**66,905 acres**	**66,905 acres**

[12] Unlike the areas identified in **Table 5-8**, these areas were not identified as PHMA with limited exception areas in the Proposed RMP Amendment.

[13] Acreage calculated utilizing the USGS HMA model for NV/CA (Milligan et al. 2024) (refer to Appendix 3).

[14] HMA with limited exceptions are areas within PHMA where additional protections to support conservation of GRSG habitat would reduce impacts from highly probable resource threats. These acreages are therefore included in both PHMA and PHMA with limited exceptions.

Potential ACEC	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment[14]
Monitor Valley							
PHMA	168,404 acres (97%)	168,404 acres (97%)	173,507 acres (100%)	152,676 acres (88%)	162,582 acres (94%)	173,507 acres (100%)	162,582 acres (94%)
GHMA	3,553 acres (2%)	3,553 acres (2%)	0 acres (0%)	10,831 acres (6%)	10,831 acres (6%)	0 acres (0%)	10,831 acres (6%)
OHMA	0 acres (0%)	0 acres (0%)	0 acres (0%)	10,000 acres (6%)	94 acres (0%)	0 acres (0%)	94 acres (0%)
Non-habitat	1,550 acres (1%)	1,550 acres (1%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**173,507 acres**	**173,507 acres**	**173,507 acres**	**173,507 acres**	**173,507 acres**	**173,507 acres**	**173,507 acres**
Reese River							
PHMA	76,577 acres (90%)	76,577 acres (90%)	85,000 acres (100%)	84,005 acres (99%)	84,005 acres (99%)	85,000 acres (100%)	84,005 acres (99%)
GHMA	7,671 acres (9%)	7,671 acres (9%)	0 acres (0%)	938 acres (1%)	938 acres (1%)	0 acres (0%)	938 acres (1%)
OHMA	0 acres (0%)	0 acres (0%)	0 acres (0%)	57 acres (0%)	57 acres (0%)	0 acres (0%)	57 acres (0%)
Non-habitat	752 acres (1%)	752 acres (1%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**85,000 acres**	**85,000 acres**	**85,000 acres**	**85,000 acres**	**85,000 acres**	**85,000 acres**	**85,000 acres**
Utah Border							
PHMA	35,029 acres (60%)	35,029 acres (60%)	58,650 acres (100%)	46,645 acres (80%)	46,645 acres (80%)	58,650 acres (100%)	46,645 acres (80%)
GHMA	17,454 acres (30%)	17,454 acres (30%)	0 acres (0%)	4,041 acres (7%)	4,041 acres (7%)	0 acres (0%)	4,041 acres (7%)
OHMA	5,916 acres (10%)	5,916 acres (10%)	0 acres (0%)	1,161 acres (2%)	1,161 acres (2%)	0 acres (0%)	1,161 acres (2%)
Non-habitat	251 acres (0%)	251 acres (0%)	0 acres (0%)	6,803 acres (12%)	6,803 acres (12%)	0 acres (0%)	6,803 acres (12%)
Total	**58,650 acres**	**58,650 acres**	**58,650 acres**	**58,650 acres**	**58,650 acres**	**58,650 acres**	**58,650 acres**
Owyhee West							
PHMA	677,552 acres (96%)	677,552 acres (96%)	704,650 acres (100%)	676,814 acres (96%)	676,833 acres (96%)	704,650 acres (100%)	676,833 acres (96%)
GHMA	25,303 acres (4%)	25,303 acres (4%)	0 acres (0%)	13,492 acres (2%)	13,485 acres (2%)	0 acres (0%)	13,485 acres (2%)
OHMA	605 acres (0%)	605 acres (0%)	0 acres (0%)	14,344 acres (2%)	14,332 acres (2%)	0 acres (0%)	14,332 acres (2%)
Non-habitat	1,190 acres (0%)	1,190 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**704,650 acres**	**704,650 acres**	**704,650 acres**	**704,650 acres**	**704,650 acres**	**704,650 acres**	**704,650 acres**

This section details the effects of the alternatives on these areas considered for ACEC designation.

Solar, Wind, Major Rights of Way, Saleable Minerals/Material Management, and Locatable Minerals

The Proposed RMP Amendment and Alternatives 3 and 6 would all provide additional protections to GRSG habitat in the potential ACECs by excluding solar, wind, and non-energy leasable mineral development. While all three alternatives also exclude major rights of way and close the area to saleable minerals/material management, Alternative 3 provides the greatest protection as Alternative 3 provides no exceptions to the rights of way exclusion or to the saleable closure. In addition, under Alternative 3, the area would be recommended for locatable mineral withdrawal. Under both Alternative 3 and 6, a plan of operations and BLM approval would be required before beginning any locatable mineral operations causing surface disturbance greater than casual use.

Under Alternatives 1, 2, and 4, the area would be exclusion for solar and wind in PHMA and avoidance in GHMA and avoidance for major rights of way in PHMA and GHMA, which would provide similar but slightly less protections than afforded under the Proposed RMP Amendment and Alternatives 3 and 6. The portions of these potential ACEC areas that would be managed as OHMA and non-habitat would be open for utility-scale solar and utility-scale wind testing and development, with applicable minimization measures and compensatory mitigation. Under Alternative 5, the area would be avoidance for solar and wind in PHMA and open with minimization measures in GHMA and would be avoidance for major rights-of-way in PHMA and open with minimization measures in GHMA. Therefore, Alternative 5 provides the least amount of protections from solar, wind, and rights of way development. Under Alternatives 1, 2, 4, 5, and the Proposed RMP Amendment, the areas would be open to locatable mineral development and notice level exploration would be allowed without a plan of operations.

Fluid Mineral Development

Fluid mineral development and associated potential impacts to GRSG habitat is least likely under Alternative 3, which closes the areas to fluid mineral development with no exception. Under the Proposed RMP Amendment and Alternative 6, PHMA management direction applies in most of these areas. Under the Proposed RMP Amendment, as PHMA, the majority of these ACEC areas would be managed as NSO for fluid mineral development within .6 miles of leks and season limitations (breeding, nesting, early brood-rearing and winter habitat) and Controlled Surface Use (CSU) (density and disturbance) outside of the 0.6-mi NSO buffer with exceptions. In the smaller portions managed as GHMA, OHMA, and non-habitat in the Proposed RMP Amendment, these areas would be open to fluid minerals development, with minor stipulations (including CSU for lek buffers and seasonal limitations). Under Alternative 6, the area would also be subject to NSO but development could occur if an exception for the entire ACEC area could be met.

Alternatives 1 and 2 would management fluid minerals to avoid, minimize, and compensate for direct disturbance, displacement, or mortality of GRSG, direct loss of habitat and cumulative landscape level impacts and would prioritize fluid mineral development outside of PHMA and GHMA areas in non-habitat areas first and then in the least suitable habitat for GRSG, subject to valid existing rights. Under Alternative 1, the PHMA within the potential ACEC would be managed as NSO without waiver or modification and within GHMA, any new leases would include TL stipulations to protect GRSG. Alternative 2 would be the same as Alternative 1, but additional exceptions to stipulations may be granted. Under Alternative 4, there would be an NSO stipulation within .6 miles of active leks in PHMA unless it could be demonstrated that it meets either a non-habitat, topographic, or co-location exception. Under Alternative 5, the NSO stipulation would be the same as under Alternative 4, but an exception could only be applied within 1 mile of active leks.

Alternative 3 provide the greatest protections from fluid mineral development by prohibiting fluid mineral development. The next highest protections would occur under the Proposed RMP Amendment and Alternative 6, followed by Alternative 5. Alternative 4 would provide the least protections to the potential ACEC from fluid mineral development.

Disturbance Cap

In these areas managed as PHMA, the Proposed RMP Amendment sets a disturbance cap if direct habitat disturbance from existing and proposed infrastructure developments exceeds either 3% the project scale or 3% at the HAF Fine Scale selection area, with exceptions and conditions. In Nevada, the Authorized Officer may grant an exception to the disturbance cap at the HAF fine scale if the project meets criteria associated with the project-scale assessment (including requirements for exceptions and conditions), is in compliance with the Nevada Greater Sage-grouse Conservation Plan and Conservation Credit System (CCS) as required by Nevada regulation (Nevada Revised Statutes (NRS) Chapter 232.16 and Nevada Administrative Code (NAC) 232.162-232.480), and the offsetting compensatory mitigation (or credits per the Nevada CCS Manual) occur within the HAF fine scale where the project occurs. Alternative 6 sets the same disturbance cap for the areas but there are no exceptions and Alternative 3 closes the areas to new infrastructure projects and sets a 3% disturbance cap for existing developments. Alternatives 1 and 2 set a 3% disturbance cap in PHMA and the cap applies at both BSU-scale and at the project scale. Under Alternatives 4 and 5, in PHMA the disturbance cap is 3% the project scale or 3% at the HAF Fine Scale selection area and projects would be deferred until disturbance in the areas has been reduced below the cap threshold or the projects could be redesigned to not result in additional surface disturbance or moved outside of PHMA. Alternative 3, followed by Alternative 6, provide the highest degree of protection relative to disturbance.

Areas under GHMA, OHMA, and non-habitat would not be subject to the disturbance cap, potentially allowing more development and associated impacts to GRSG habitat. Overall, Alternative 3, followed by Alternative 6, provide the highest degree of protection relative to disturbance.

Livestock Grazing

Under Alternative 3, GRSG habitat would be unavailable to livestock grazing. Under Alternatives 1 and 2, in PHMA, thresholds and responses that would allow the authorized officer to make adjustments to livestock grazing are required. Under Alternatives 4, 5, 6, and the Proposed RMP Amendment, thresholds and responses are also addressed but under these alternatives, more comprehensive guidance is provided for addressing areas not meeting the special status species land health standard due to livestock grazing and for addressing livestock improvements and fencing in a manner to reduce impacts to GRSG. In the portions of the Proposed RMP Amendment managed as GHMA, management direction is the same as in PHMA, except RM-3, which requires evaluation of all livestock management range improvement projects during the grazing renewal process, does not apply.

Alternative 3 provides the greatest protections to the ACEC by removing any potential disturbance associated with livestock grazing.

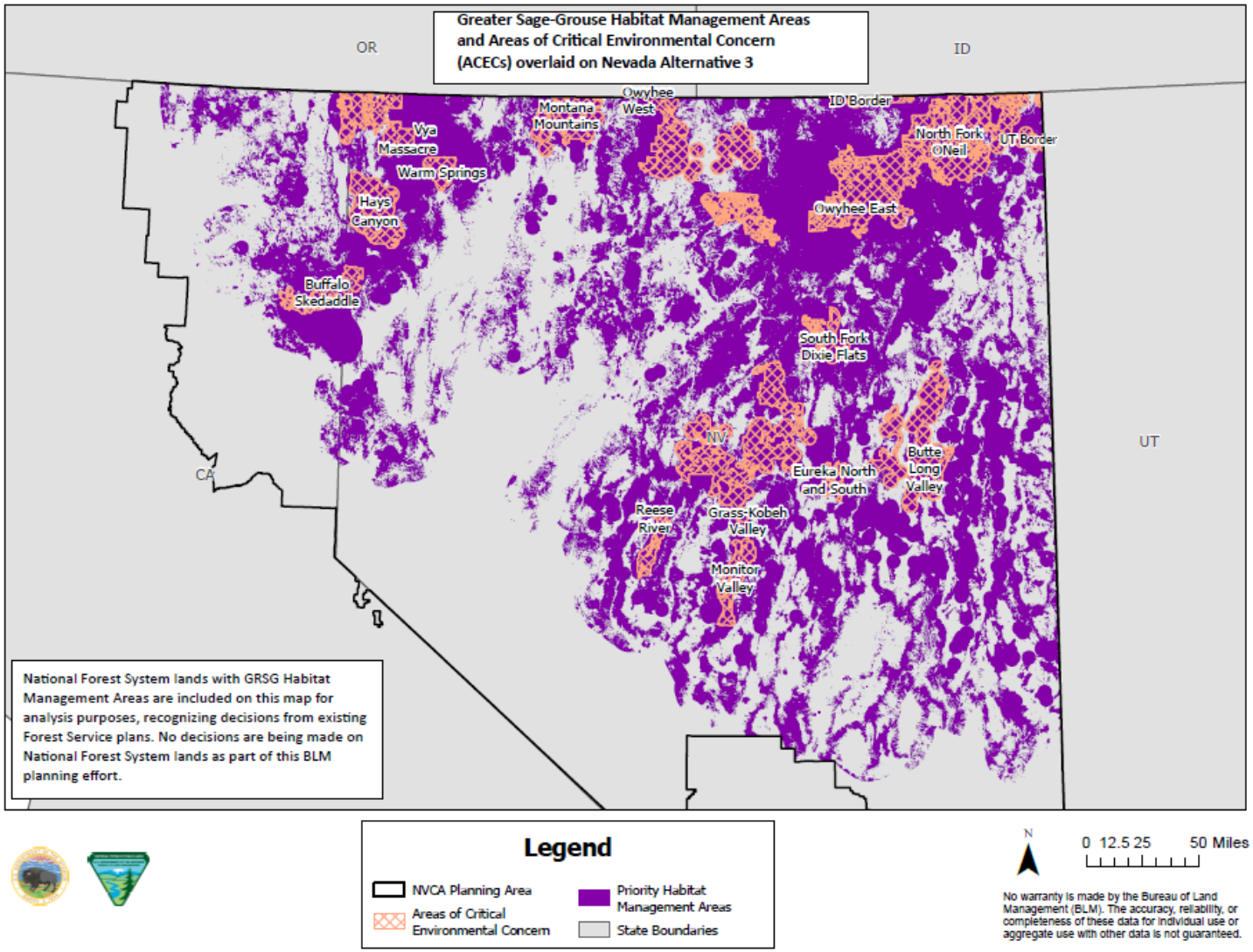
Summary of Effects

Considered comprehensively, Alternative 3 provides the greatest protection to the Potential Montana Mountain, Butte Long Valley, Eureka North and South, Monitor Valley, Reese River, Utah Border, Owyhee West ACECs by prohibiting utility-scale solar, utility-scale wind, major rights of way, non-energy leasable minerals leasing, saleable minerals/ material management, and fluid mineral development with no exceptions. The Proposed RMP Amendment and Alternative 6 would also protect and prevent irreparable damage to

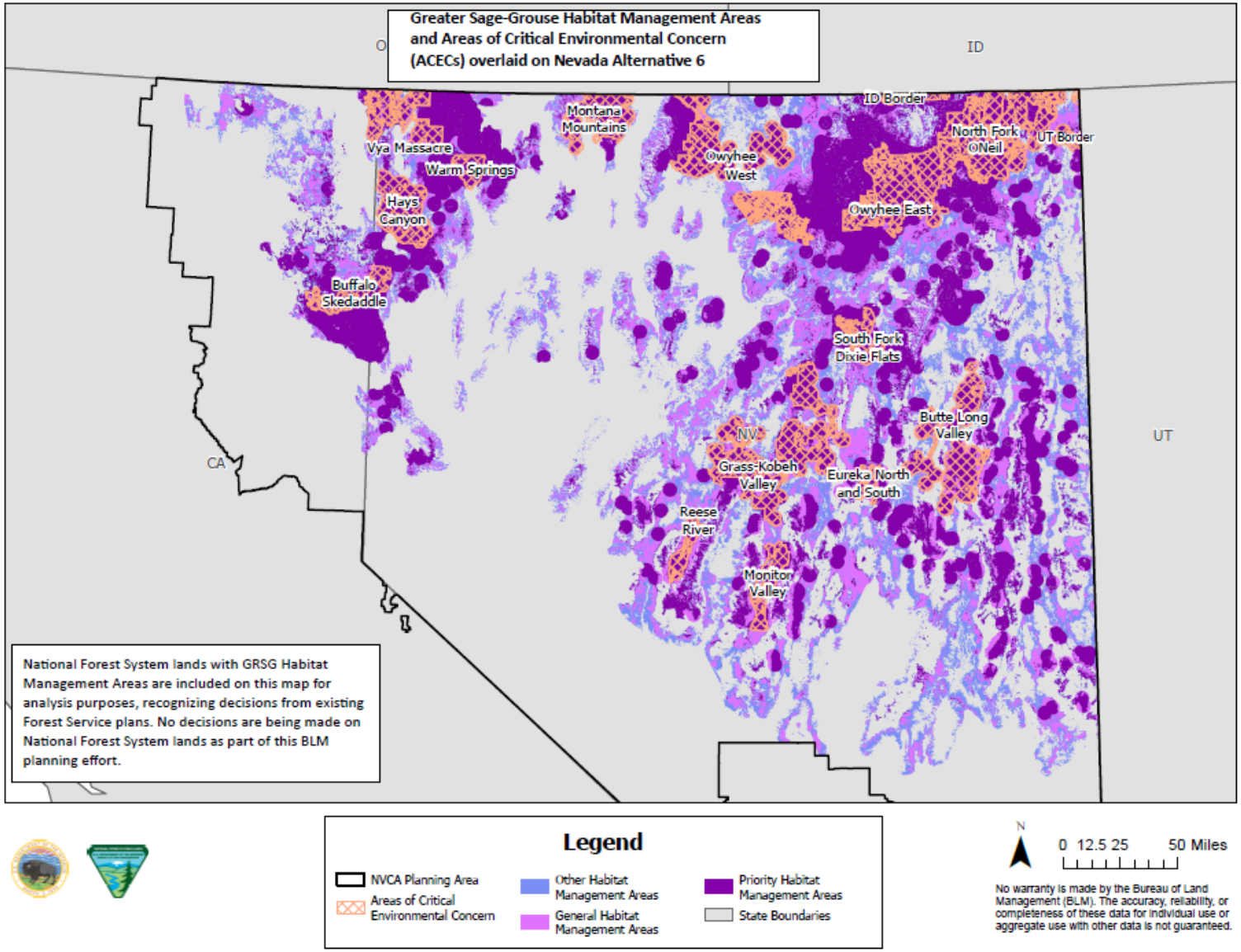
the relevant and important values of the potential ACEC areas with protective PHMA management direction in most of these areas, limiting the risk of from the threats of major rights of way, renewable energy development, and mineral development.

Alternatives 1, 2, 4, and 5 provide a relatively high degree of protection with these alternatives' PHMA management direction, which guides management of the majority of these potential ACECs. However, as major rights of way, renewable energy, and mineral development are more likely to occur under these alternatives, and associated disturbances could negatively impact the relevant and important values of the potential ACECs.

Map 5.7: Nevada Alternative 3 Potential ACECs



Map 5.8: Nevada Alternative 6 Potential ACECs



OREGON

The BLM's evaluation of rangewide datasets in Oregon did not result in the identification of any areas that met the ACEC importance criteria. Oregon is unique compared to the other states in that there are several existing ACECs and Research Natural Area/ACECs (RNAs) that are already designated (through previous BLM RMP efforts) inside the 2013 PACs and 2015 SFAs. These areas were designated in RMPs that pre-dated the 2015 and 2019 GRSG amendment efforts. These previously designated areas, with GRSG and GRSG plant community relevant and important values, include the following two ACECs and five RNAs:

- High Lakes ACEC,
- Red Knoll ACEC,
- Lake Ridge RNA,
- North Ridge Bully Creek RNA,
- Rahilly-Gravelly RNA,
- South Ridge Bully Creek RNA, and
- Toppin Creek Butte RNA.

In addition, the 2015 GRSG ARMPA added special management considerations for several ACECs/RNAs relative to livestock grazing (refer to **Appendix 17**, Proposed RMP Amendment and Analysis for Key Research Natural Areas in Oregon).

Beyond considering the existing ACECs and RNAs, the BLM Oregon State Office staff examined areas identified as PHMA in Oregon as well previously identified Sagebrush Focal Areas (SFAs) and Priority Areas of Conservation (PACs) in order to determine if any areas within Oregon that were either newly nominated or previously nominated and evaluated in the 2015 RMP Amendment met the relevance and importance criteria. BLM Oregon's ACEC review, assessment, and evaluation process focused on the new GRSG scientific information on key population (e.g., Doherty et al. 2016, Coates et al., 2021), genetic (e.g., Cross et al., 2018, Oyler-McCance et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021). Oregon BLM also coordinated with state wildlife authorities to identify and update GRSG habitat management areas (HMA) and consider potential ACEC areas.

The majority of the SFAs were determined to not contain multiple lines of evidence supporting a conclusion that the habitat was of more than local significance. The BLM state and district staff coordinated with the Oregon Department of Fish and Wildlife staff to identify characteristics that may meet the importance criteria and to identify potential ACEC locations/areas using their population and habitat criteria. An assessment of existing and proposed PHMA, new genetic information, and lek density clusters were all important components of the evaluation. The BLM Oregon also reviewed the McDermitt Caldera ACEC nomination received during the scoping period.

As a result of their comprehensive assessment, BLM Oregon found two areas that could potentially meet both the ACEC relevance and importance criteria for greater sage-grouse: Louse Canyon and Soldier Creek. After evaluating the two areas, the team concluded that both areas met the relevance criteria for fish and wildlife resource (specific to GRSG and the new science), but that neither area met the importance criteria (more than locally significant). Because none of the internally considered or externally nominated areas were identified as having relevance and importance, the BLM did not identify any new ACECs in Oregon in the Draft EIS or in the Final EIS.

The BLM Oregon ACEC review, assessment, and evaluation process did not consider or consider in detail potential historic, cultural, scenic, or non-GRSG fish and wildlife values in accordance with the purpose and need for this planning effort. ACEC nominations that addressed resource values beyond greater sage-grouse will be considered by the BLM during future planning efforts.

Importance Evaluations

Oregon GRSG ACEC Importance Evaluation: Soldier Creek Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	No	Greater sage-grouse are distributed throughout appropriate habitat in the western United States. This portion of the distribution located in Oregon (and Idaho) is designated as Management Zone IV (Stiver et al. 2006). Management zones are delineations of greater sage-grouse populations and subpopulations within floristic zones. Within Management Zone IV, Oregon has designated core areas, and in 2015 BLM designated Priority and General Habitat Management Areas. Since the 2015 BLM plans, new science addressing GRSG genetics, density, and habitats has provided additional information about areas that may contain special worth, consequence, or distinctiveness. OSO staff examined the genetic pathways data and connectivity (i.e., >80% cumulative connectivity) with GRSG priority areas for conservation in Idaho and that overlap with the very high lek density areas. In the Soldier Creek area south of Jordan Valley/Hwy 95, the Ecostate GIS shows fairly intact habitat and there are multiple areas of overlapping lek density. It's approximately 15 miles to a >95% genetic cumulative connectivity pathway in Idaho. The Soldier Creek area is mostly in the 80 to 85% cumulative connectivity genetic pathway range (Cross et al., 2023) and is similar to cumulative connectivity of the surrounding area (e.g. Cow Lakes) in Oregon. While high density lek/population areas and genetic connectivity are considered important to greater sage-grouse conservation, the connectivity areas are dispersed throughout Oregon and are not substantially unique to one specific region or planning unit. Greater sage-grouse habitat in the Soldier Creek area is not substantially distinct from habitat managed by other nearby BLM lands that have similar cumulative genetic connectivity values. Although a portion of the area contains medium relative abundance (Doherty et al. 2016), the size of the area is smaller than and not substantially distinct compared to other areas in Management Zone IV (e.g. Cow Lakes). There is a much larger, higher relative lek abundance area south and east (in Idaho) of the Soldier Creek area. See background notes and maps below.

Oregon GRSG ACEC Importance Evaluation: Soldier Creek Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened • Vulnerable to adverse change	No	The area is not particularly fragile or sensitive to change when compared to other similar sites in the Oregon-Idaho region. The habitat is not rare, irreplaceable, exemplary, or unique. The area is vulnerable to adverse change, particularly wildfire and invasive annual grasses, but not more so than the surrounding habitat. The habitat is neither threatened or endangered. Cumulative connectivity pathways mapped in the Soldier Creek potential ACEC are thresholded below 85%, indicating low impedances to sage-grouse movements (Cross et al., 2023). Higher connectivity pathways are mapped >10 miles east of the Oregon border. The area does not contain key or clusters of genetic nodes,.
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	No	The BLM 2015, 2019, and current initiatives to conserve, enhance, and restore greater sage-grouse habitat is the result of the March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse (Centrocercus urophasianus) as Threatened or Endangered. In that 2010 finding, the USFWS concluded that greater sage grouse was "warranted, but precluded" for listing as a threatened or endangered species. However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species. Without multiple lines of evidence, including reasonably foreseeable development, valid existing rights, land ownership, and crucial GRSG habitat characteristics from multiple science-based models, on-the-ground conditions/evidence for this area does not currently need protection requirements beyond the standard approaches to implemented FLPMA and national priorities. In addition, the area currently has Priority Habitat Management Area designation and management under the 2015 ARMPA. Habitat loss and degradation due to wildfires and invasive annual grasses are primary threats to sage-grouse in this area. Significant amounts of high quality habitat in Oregon and Idaho has burned near this area.

Other Items	
Boundaries	Nomination boundaries have been provided to the NOC (see also notes below).
Additional Notes	We reviewed and then ruled out the Cow Lakes PAC area due to the high proportion of private lands mixed in with BLM lands, low amount of suitable habitat, and degraded seasonal habitat, as shown in the 2019-2021 Ecostate spatial data provided by SageCon/INR and reported in the Cow Lakes Habitat Assessment Framework Summary.

Conclusion
This potential ACEC provides important lekking, nesting, and early brood-rearing habitat for a high abundance of sage-grouse. However, the habitat, density of birds, and connectivity to sage-grouse priority habitat is not unique. Multiple pathways of potential gene flow connecting sage-grouse priority areas for conservation in southeast Oregon and southwest Idaho coalesce approximately 10 miles east of the Oregon border to form the high concentration gene flow pathway depicted in Cross et al. (2023 figure 4). Cumulative connectivity pathways coalesce here due to cultivation and tree cover impeding sage-grouse movements (Cross et al 2013 figure 7b).

Conclusion
These impendences decrease approaching the Oregon state border, and once inside Oregon, the cumulative connectivity pathways are more diffuse and non-distinct. In other words, the proposed ACEC does not appear to be vital to maintenance of range-wide connectivity. Moreover, the habitat is not unique, rare, irreplaceable, or exemplary. There are many areas of similar sage-grouse habitat in SE Oregon with similar genetic pathways depicted in Cross et al. 2023 intersecting areas of high lek density. BLM is actively managing juniper encroachment and other threats to GRSG in Oregon (e.g., fire, and invasive annual grasses). Thus, the Soldier Creek potential ACEC does not meet the criteria for special worth or importance with more than locally significant qualities of consequence, meaning, distinctiveness, or cause for concern due to its similarity, proximity, and connectedness with similar habitat, lek density areas, and modeled genetic pathways. References Cross TB, Schwartz MK, Naugle DE, Fedy BC, Row JR, Oyler-McCance SJ. 2018 The genetic network of greater sage-grouse: range-wide identification of keystone hubs of connectivity. Ecol. Evol. 8, 5394–5412. Cross TB, Tack JD, Naugle DE, Schwartz MK, Doherty KE, Oyler-McCance SJ, Pritchert RD, Fedy BC. 2023 The ties that bind the sagebrush biome: integrating genetic connectivity into range-wide conservation of greater sage-grouse. R. Soc. Open Sci. 10:220437.

Oregon GRSG ACEC Importance Evaluation: Upper West Little Owyhee Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	No	Greater sage-grouse are distributed throughout the western United States. This portion of the distribution located in Oregon (and Idaho) is designated as Management Zone IV (Stiver et al. 2006). Management zones are delineations of greater sage-grouse populations and subpopulations within floristic zones with similar management issues. Within Management Zone IV, Oregon has designated core areas, and in 2015 BLM designated Priority and General Habitat Management Areas. Since the 2015 BLM plans, new science addressing GRSG genetics, density, and habitats has provided additional information about the locations that may contain special worth, consequence, or distinctiveness. OSO staff examined the genetic pathways data and connectivity (i.e., >80% cumulative connectivity) with GRSG populations in Nevada and that overlap with the high lek density areas. Greater sage-grouse habitat in the Upper West Little Owyhee area is not substantially distinct from habitat managed by other nearby BLM lands that have similar cumulative connectivity pathway values (Cross et al. 2013). Although a portion of the area contains medium relative abundance (Doherty et al. 2016), the area is not substantially distinct compared to other areas in Management Zone IV and does not show strong nodes/networks to other areas (Cross 2018). In addition, the area shows a "very low" relative abundance (Doherty 2015, T25) breeding population index. While higher density areas and genetic connectivity are considered important to greater sage-grouse conservation, the areas are dispersed throughout the region and are not significantly unique to a specific region or planning unit; not to this potential ACEC nomination area.

Oregon GRSG ACEC Importance Evaluation: Upper West Little Owyhee Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened • Vulnerable to adverse change	No	The area is no more fragile or sensitive to change than other sites in southeast Oregon. The area does not contain a key genetic node nor strong networks (Cross et al 2018). Similarly the area does not show substantially important cumulative connectivity pathways to other PHMA areas in Oregon and Nevada. The area is similar to much of the intact GRSG habitat in the area and has the same vulnerability to change as the surrounding area. The habitat is not irreplaceable, exemplary, unique, rare, endangered, threatened, nor vulnerable to adverse change when compared to other intact GRSG habitat in southeast Oregon.
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	No	The BLM 2015, 2019, and current initiatives to conserve, enhance, and restore greater sage-grouse habitat is the result of the March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse (Centrocercus urophasianus) as Threatened or Endangered. In that 2010 finding, the USFWS concluded that greater sage grouse was "warranted, but precluded" for listing as a threatened or endangered species. However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species. Without multiple lines of evidence, including reasonably foreseeable development, valid existing rights, land ownership, and crucial GRSG habitat characteristics from multiple science based models, on-the-ground conditions/evidence this area has not been identified for protection to implement FLPMA and national priorities.

Other Items	
Boundaries	Contiguous with a Nevada potential ACEC. An area of genetic connectivity to the north is disconnected from the Upper West Little Owyhee potential ACEC by lower quality habitat and that the southern area, contiguous with Nevada to the south, had more connectivity, although threshold cumulative values are moderate.
Additional Notes	—

Conclusion

This potential ACEC provides important lekking, nesting, and early brood-rearing habitat for a high abundance of GRSG. However, the habitat, bird density, and connectivity to GRSG priority areas of conservation are not unique in Oregon. The thresholded cumulative connectivity pathways in the potential ACEC are between 75 and 80 percent (Cross et al. 2013). GRSG movements are not impeded by tree cover or cultivation within the potential ACEC and in the surrounding landscape. There are no distinctive cumulative connectivity pathways intersecting areas of high lek density in this area. In other words, the proposed ACEC does not appear to be vital to maintenance of range-wide connectivity. Thus, the Upper West Little Owyhee potential ACEC does not meet the criteria for special worth or importance with more than locally significant qualities of consequence, meaning, distinctiveness, or cause for concern due to its similarity, proximity, and connectedness with similar habitat, lek density areas, and genetic considerations.

References

Cross TB, Schwartz MK, Naugle DE, Fedy BC, Row JR, Oyler-McCance SJ. 2018 The genetic network of greater sage-grouse: range-wide identification of keystone hubs of connectivity. Ecol. Evol. 8, 5394–5412.

Conclusion
Cross TB, Tack JD, Naugle DE, Schwartz MK, Doherty KE, Oyler-McCance SJ, Pritchert RD, Fedy BC. 2023 The ties that bind the sagebrush biome: integrating genetic connectivity into range-wide conservation of greater sage-grouse. R. Soc. Open Sci. 10:220437.

Consideration of ACECs nominated during the public comment period

During the comment period on the Draft EIS, 33 ACEC nominations were received in Oregon. BLM Oregon reviewed the nominations using the same criteria as described above during the development of the Draft EIS and discussed and coordinated cross border issues and locations with the BLM Nevada and the BLM Idaho, including discussions regarding three ACEC nominations that share acreage with those states: Table Mountain, Juniper Ridge, aa-Tiipi Flat areas. As a result of these reviews the BLM did not identify any of the nominated ACECs as having relevant and important values and did not identify them for inclusion in the Final EIS.

During the comment period on the Draft EIS, the BLM also received a comment that called for 23 existing ACECs in Oregon to receive additional GRSG protections. BLM Oregon, in reviewing potential areas for nomination as ACECs in the Draft EIS, had already considered whether existing ACECs should receive additional levels of protection than already afforded by their existing RMP decisions. As described above, two of the existing ACECs and five of the existing RNAs have relevant and important values that are specific to GRSG and GRSG plant communities (High Lakes ACEC, Red Knoll ACEC, Lake Ridge RNA, North Ridge Bully Creek RNA, Rahilly-Gravelly RNA, South Ridge Bully Creek RNA, and Toppin Creek Butte RNA.

During the assessment process for this EIS the team noted that the existing ACECs and the potential ACECs evaluated in the 2015 ARMPA ACECs/RNAs are in appropriate locations relative to the new science data. Through this evaluation process the BLM did not identify any increased level of protections needed for any of the identified ACECs due to the protections provided by the Priority Habitat Management Areas they are within. The only exception was in the High Lakes ACEC. Between the Draft and Final EIS, the BLM determined that the High Lakes ACEC warranted additional protections and the RMP Amendment identifies the area as receiving PHMA with limited exceptions management direction (refer to analysis that follows).

Effects of the Alternatives on the Existing High Lakes ACEC

The existing 38,952-acre High Lakes ACEC, which was designated as an ACEC in the 2003 Lakeview Resource Management Plan and Record of Decision, was, between Draft and Final EIS, identified as requiring PHMA with limited exception direction. The area was identified as requiring the additional PHMA with limited exceptions direction due primarily to the threats from major rights of way and renewable energy development. The effects of the alternatives on this area would be the same as the effects described throughout **Chapter 4** regarding the effects of the PHMA with limited protections but are also summarized below.

The additional restrictions in the High Lakes ACEC for GRSG that are provided by the PHMA with limited exceptions designation will help maintain the sagebrush landscape integrity in that area which supports dense populations of GRSG and other sagebrush associates such as pronghorn elk. Under the Proposed RMP Amendment, the PHMA with limited exceptions management direction:

- closes the area to utility-scale solar and utility-scale wind development;
- provides no exceptions to the no surface occupancy fluid mineral development (including geothermal) direction;

- closes the area to saleable minerals/materials management but are open to free use permits and the expansion of existing active pits only if the activity is with the Oregon PAC and project are disturbance cap and all applicable design features are applied in accordance with SSS13 from the 2015 GRSG RMPA for Oregon;
- excludes major rights of way with stringent exceptions; and
- closes the area to new leases including fringe acreage leasing (i.e., no expansion of existing leases).

The additional protections afforded by PHMA in the Proposed RMP Amendment in that area for the adaptive management, disturbance cap, predation, livestock grazing, wild horse and burro, and mitigation will, in combination with the PHMA with limited exceptions management direction, protect and prevent the irreparable damage to the relevant and important values of the High Lakes ACEC. The protective management direction provided under Alternatives 3 would also protect and prevent irreparable damage to the relevant and important values of the High Lakes ACEC. The lower levels of protection provided under Alternatives 1,2, 4, and 5, particularly as it relates to major rights of way and solar and wind development could result in could result in negative impacts to the relevant and important values of the High Lakes ACEC.

For additional information and a map of the High Lakes ACEC please refer to the Lakeview RMP and Record of Decision that can be accessed on the BLM National NEPA Register: https://eplanning.blm.gov/public_projects/lup/36322/174268/211780/Lakeview_RMP_Map_Packet.pdf.

UTAH

The 2015 GRSG ARMPA designated two Sagebrush Focal Areas (SFAs) in northern Utah, one on the eastern side of the state in Rich County bordering Wyoming and one on the western side of the state in Box Elder County, bordering Nevada. Both areas were evaluated by the Utah State office to determine if they met the ACEC relevance and importance criteria. In addition, the rangewide evaluation identified Parker Mountain as an area with characteristics that could result in meeting the importance criteria.

The Rich County area provides habitat for GRSG, a BLM sensitive species, and the area has also been identified as a Sage-Grouse Management Area (SGMA) in the State of Utah's state plan. The Rich population area is one of the strongholds for GRSG populations in Utah and is one of the largest populations in Utah connecting with larger populations in Idaho and Wyoming. The area also meets the criterion for a natural system or process because of the sagebrush habitat conditions in the area. The majority of intact sagebrush habitat is within a core area (Doherty et al. 2022). The Rich population area includes some of the largest core sagebrush habitat in Utah, which is why this area was identified as a focal landscape area.

The area in Box Elder County has also been identified as an SGMA by the State of Utah. The Box Elder population area is one of the largest of the GRSG populations in Utah connecting with larger populations in Idaho and Nevada. It is part of the Northern Great Basin sub-population (Utah, Idaho, and Nevada).

The Parker Mountain area is in Central Utah and provides one of the strongholds for GRSG populations in Utah and is one of the largest populations in the Great Basin. The area has also been identified as a SGMA by the State of Utah. The majority of the area is intact sagebrush habitat within a core area (USGS SEI) with minimal development.

Importance Evaluations

Utah GRSG ACEC Importance Evaluation: Rich GRSG Habitat Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	Yes	Since the 2015 GRSG ARMPA, new science addressing GRSG density and habitats has provided additional information about the locations areas that may contain special worth, consequence, or distinctiveness. The area is not particularly fragile or sensitive to change as compared to other sites in the State of Utah. It consists of a largely intact contiguous mid to high elevation sagebrush habitat with large mesic meadow complexes. The area is largely undeveloped and threats from development are low. Oil and gas development is low, as well as other minor infrastructure for roads, pipelines, and transmission lines. Primary land uses are livestock grazing, agriculture, and recreation. Mechanical sagebrush treatments that have occurred to promote livestock grazing have reduced the quantity of winter sagebrush habitat. The area is mostly core and growth opportunity areas within the sagebrush (Doherty 2022) Sagebrush Conservation Design with a significantly large core relative to other areas in the state. Much of the core habitat including diverse mesic habitat occurs on private lands with a mix of BLM jurisdiction. Similarly, the USU seasonal habitat model identifies much of the area as summer, winter, and nesting habitat. There are two key genetic nodes and other nodes (Cross et al. 2018), and the area covers an area where genetic connections exist between the northern (into Idaho) and western (into Wyoming) portions of management Zone II (Stiver et al 2006). There is a key genetic node to the south of the Rich population area in Morgan-Summit; however, no detailed telemetry studies are available in the Morgan-Summit area to understand sage-grouse movements and connectivity in this area. Climate change models (Palmquist 2021) show that the Rich population area has the highest value for retention of sagebrush biomass.
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened • Vulnerable to adverse change	Yes	The Upper Bear River Watershed has been identified as a focal landscape area in Utah with a goal of improving the ecological health in the region. Bear Lake and the Bear River are large contributors to the Great Salt Lake. The area is largely undeveloped and threats from development are low, including oil and gas. The area is mostly core sagebrush (Doherty 2022) with a proportionally large core relative to other areas in the state. Much of the core habitat occurs on private lands and BLM jurisdiction within the core is fairly limited to the periphery. Similarly, the USU seasonal habitat model identifies much of the area as summer, winter, and nesting habitat. Climate change models (Palmquist 2021) show that the Rich population area has the highest value for retention of sagebrush biomass.

Utah GRSG ACEC Importance Evaluation: Rich GRSG Habitat Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	Yes	The Upper Bear River Watershed has been identified as a focal landscape area in Utah with a goal of improving the ecological health in the region. Bear Lake and the Bear River are large contributors to the Great Salt Lake. The BLM 2015, 2019, and current land use planning initiatives to conserve, enhance, and restore GRSG habitat is the result of the March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse (Centrocercus urophasianus) as Threatened or Endangered. In that finding, the USFWS concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species. However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species. The identification of the Upper Bear River Watershed as a focal landscape area acknowledges at least in part the importance of this area and recognition as a national priority.

Other Items	
Boundaries	Focus boundaries on the core, connectivity, genetic nodes, climate in relation to the BLM jurisdiction. Consider the Dingell Act Exchange and transfer of BLM lands. Also considered the existing Laketown ACEC in the boundary.
Additional Notes	Connectivity is with the larger subpopulations within Wyoming and Idaho. Since the 2015 GRSG ARMPA Utah BLM's PHMA has not lined up with PHMA in Wyoming as their populations are generally GHMA along the border as these areas are not part of their core. The Sagebrush Focal Area (SFA) boundary in the Rich population area included portions of the relevant and important values; consider the potential for an ACEC to include portions of this area which overlaps with the new science. Boundary adjustments would need to remove large portions of non-habitat on Monte Cristo. Other genetic nodes in checkerboarded land jurisdiction in the southern portion (south of Neponset Reservoir) were excluded from the boundary. This area is highly checkerboarded (BLM/private land jurisdictions) and the majority of the BLM parcels have authorized leases and were part of the Dingell Act Exchange.

Conclusion
Due to meeting the relevance and importance criteria, this area, with a revised boundary, was identified as a potential ACEC in Alternatives 3 and 6. Refer to Utah - ACEC Maps for Alternatives 3 and 6 that follow. Focusing boundaries on BLM jurisdiction, core, probability of breeding habitat, and climate sagebrush biomass. Items listed above provide multiple lines of evidence that these areas are more than locally significant to Utah and may provide importance to Management Zone II. Data most influential justifying the consideration as an ACEC and having more than local significance: high density breeding (Doherty et al. 2016); genetic connectivity (Cross et al. 2023); and genetic mixing (i.e., important area for connectivity well beyond the region being considered; Oyler-McCance et al. 2022).

Utah GRSG ACEC Importance Evaluation: Box Elder GRSG Habitat Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	Yes	Since the 2015 GRSG ARMPA, new science addressing GRSG density and habitats has provided additional information about the locations areas that may contain special worth, consequence, or distinctiveness. The area has experienced a relatively large wildfire since the 2015 ARMPA (Goose Creek Fire, 2018) increasing cheatgrass risk and sagebrush loss within the sagebrush habitat making it somewhat fragile or sensitive to change as compared to other sites in the State of Utah. Fire within management zone IV has been a significant threat in Idaho and Nevada. It boasts a relatively large diverse low elevation salt desert shrub to high elevation mountain sagebrush, mountain mahogany and aspen habitat. The Box Elder Population Area supports the southeastern extent of a larger population that extends beyond state boundaries into Nevada and Idaho and is primarily influenced by fire risk, especially in dry, dense juniper areas or in areas dominated by nonnatives. The area is largely undeveloped and threats from development are low. Oil and gas development is low, as well as other minor infrastructure for rock quarries, roads and transmission lines. Primary land uses are livestock grazing, agriculture, and recreation. The area largely contains core sagebrush with growth opportunity areas as identified in Doherty (2022) Sagebrush Conservation Design. Much of the core habitat occurs on private lands with a mix of BLM jurisdiction. Similarly, the USU seasonal habitat model identifies much of the area as summer, winter, and nesting habitat. There are two key genetic nodes and other minor nodes (Cross et al. 2018), and the area covers an area where genetic connections exist between the northern and western portions of management zone IV connecting to populations to the west in Nevada and north into Idaho. Climate change models (Palmquist 2021) show that the Box Elder population area has the highest value for retention of sagebrush biomass especially in the higher elevations. Box Elder has been a source population for greater sage-grouse translocations within the state and neighboring states. This source population may be attributing to some of the importance that shows up in the genetic connectivity models based on the new science.
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened • Vulnerable to adverse change	Yes	The area is largely undeveloped and threats from development are low. Ongoing disturbance in portions of the area are primarily due to livestock grazing infrastructure for wells and pipelines, rock quarries, and railroads. Similarly, the USU seasonal habitat model identifies much of the area as summer, winter, and nesting. Climate change models (Palmquist 2021) show that the population area has the highest value for retention of sagebrush biomass. Area has two key genetic nodes and several others. The key nodes are connected with populations in Idaho and eastern NV, while other nodes are connected with southern UT populations and NE UT.

Utah GRSG ACEC Importance Evaluation: Box Elder GRSG Habitat Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	No	The BLM 2015, 2019, and current land use planning initiatives to conserve, enhance, and restore GRSG habitat is the result of the March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse (Centrocercus urophasianus) as Threatened or Endangered. In that finding, the USFWS concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species. However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species. Without multiple lines of evidence, including reasonably foreseeable development, valid existing rights, land ownership, crucial GRSG habitat characteristics from multiple science-based models, and on-the-ground conditions provide evidence this area has not been identified as warranting protection beyond the standard approaches to implemented FLPMA and national priorities.

Other Items	
Boundaries	Focus boundaries on the core, connectivity, genetic nodes, climate in relation to the BLM jurisdiction.
Additional Notes	Connectivity is with the larger subpopulations within Nevada and Idaho. Utah since the 2015 GRSG ARMPA has not lined up with PHMA in Nevada as their populations are generally Other Habitat Management Area (OHMA)/GHMA along the border as these areas are not part of their core. PHMA in Utah lines up fairly well with PHMA in Idaho. The SFA boundary in the Box Elder population area included portions of the relevant and important values; consider the potential for an ACEC to include portions of this area which overlaps with the new science. Boundary adjustments would need to include other relevant/important values based on the new science within BLM jurisdiction.

Conclusion
Due to meeting the relevance and importance criteria, this area, with a revised boundary, was identified as a potential ACEC in Alternatives 3 and 6. Refer to BLM Utah - ACEC Maps for Alternatives 3 and 6 that follow. Focusing boundaries on BLM jurisdiction, genetic nodes, core, probability of breeding habitat, and climate sagebrush biomass. Items listed above provide multiple lines of evidence that these areas are important in review of the new science/data sets. From BLM Headquarters' proposed boundary, consider larger tracts of BLM land jurisdiction within the northwestern portion of the PHMA area largely lining up with the 2015 SFA boundaries. Items listed above provide multiple lines of evidence that these areas are more than locally significant to Utah and may provide importance to Management Zone IV. Data most influential justifying the consideration as an ACEC and having more than local significance: high density breeding (Doherty et al. 2016); genetic connectivity (Cross et al. 2023); and genetic mixing (i.e., important area for connectivity well beyond the region being considered; Oyler-McCance et al. 2022).

Utah GRSG ACEC Importance Evaluation: Parker Mountain Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	No	Since the 2015 GRSG ARMPA, new science addressing GRSG density and habitats has provided additional information about the locations areas that may contain special worth, consequence, or distinctiveness. A portion of the area contains high relative abundance (Doherty et al. 2016), there is a key genetic node (Cross et al. 2018), and the area covers an area where genetic connections between the northern and western portions of management Zone III may be constricted (Row et al 2018, Cross et al. 2023). Based on further coordination and review of the new science, the Parker Mountain Population has been a source population for translocations throughout Utah; therefore, the genetic connectivity may not demonstrate that this population is more than locally significant and that these are natural dispersals. Per conversations with the State of Utah, they have indicated that natural dispersal may be limited based on the nature of the habitat in the area and that the genetic connectivity may be more likely attributed to the translocations.
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened • Vulnerable to adverse change	No	The area is not particularly fragile or sensitive to change and threats from land uses/authorizations are low as compared to other sites in the State of Utah, providing opportunity for retention of a relatively large expanse of intact sagebrush habitat. The area is largely undeveloped and threats from development are low. Oil and gas potential is low. Ongoing disturbance in the area is limited to a few minor rights-of-way (i.e., roads and small transmission lines), livestock grazing, and recreation. The area is mostly core sagebrush as identified in Doherty (2022) Sagebrush Conservation Design with a proportionally large core relative to other areas in the state. Much of the core habitat occurs on School and Institutional Trust Lands Administration (SITLA) lands and BLM jurisdiction within the core is fairly limited to the periphery. Similarly, the USU seasonal habitat model identifies much of the area as summer, winter, and nesting habitat. The core has a high probability of lek persistence; however, the majority of occupied leks are on SITLA administered lands. Uncertainty on SITLA administered lands could make the population vulnerable to adverse changes should SITLA management priorities change. Parker Mountain has been a source population for GRSG translocations within the state. This source population may be attributing to some of the importance that shows up in the genetic connectivity models based on the new science. The nature of the habitat in the area may limit natural dispersal to the north and west of the area. This area contains one of the largest populations of GRSG within the southernmost extent of the GRSG range and although it provides importance to those smaller populations that surround it, its importance to the larger overall range of GRSG within Management Zone III is relatively minor and therefore not more than locally significant.

Utah GRSG ACEC Importance Evaluation: Parker Mountain Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	No	The BLM 2015, 2019, and current land use planning initiatives to conserve, enhance, and restore GRSG habitat is the result of the March 2010, US Fish and Wildlife Service (USFWS) 12 Month Finding for Petitions to List the Greater Sage-grouse (Centrocercus urophasianus) as Threatened or Endangered. In that finding, the USFWS concluded that GRSG was "warranted, but precluded" for listing as a threatened or endangered species. However, in the 2015 listing decision, the USFWS concluded in part that existing regulatory mechanisms, (i.e., "specific direction regarding sage grouse habitat, conservation, or management") in the BLM's Land Use Plans, were adequate to protect the species. Without multiple lines of evidence, including reasonably foreseeable development, valid existing rights, land ownership, crucial GRSG habitat characteristics from multiple science-based models, on-the-ground conditions/evidence this area has not been identified for protection beyond those implemented through FLPMA and national priorities.
Other Items		
Boundaries	No proposed changes to boundaries.	
Additional Notes	No maps provided due to no ACEC boundary identified.	
Conclusion		
The area meets relevance criteria but does not meet importance criteria. Items in bold listed above provide some lines of evidence that warranted a closer review of these areas to determine if Parker Mountain may be important and more than locally significant. In our review of the new science/data sets and coordination with the State of Utah, the lack of information particularly with the genetic connectivity suggests this area is not more than locally significant and does not have greater than local importance to the greater sage-grouse population within Management Zone III.		

Effects of the Alternatives on the Potential Rich and Box Elder ACECs

BLM identified two potential ACECs in Utah: the 132,924-acre Rich ACEC and the 232,258-acre Box Elder ACEC. The Rich population area is a stronghold for GRSG populations in Utah and connects larger populations in Idaho and Wyoming. Here, the majority of intact sagebrush habitat is within a core area; the Rich population area also includes some of the largest core sagebrush habitat in Utah. The Box Elder population area, part of the Northern Great Basin sub-population (Utah, Idaho, and Nevada), is one of the largest of the GRSG populations in Utah and connects larger populations in Idaho and Nevada. Box Elder has been a source population for greater sage-grouse translocations within the state and neighboring states. The areas were both determined to have more than local significance given their high-density breeding, genetic connectivity, and genetic mixing considerations in Rich County and Box Elder County, respectively.

Table 5-10 displays the HMA allocation for these areas under each alternative. Under Alternatives 1 through 6 and the Proposed RMP Amendment, these two areas would be managed as PHMA. Under Alternative 3 and 6, the areas would also be designated as ACECs.

Table 5-10. HMA Allocations in the Utah Potential ACECs by Alternative

Potential ACEC	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Rich							
PHMA	132,924 acres (100%)	132,924 acres (100%)	132,924 acres (100%)	132,924 acres (100%)	132,924 acres (100%)	132,924 acres (100%)	132,924 acres (100%)
GHMA	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Total	132,924 acres	132,924 acres	132,924 acres	132,924 acres	132,924 acres	132,924 acres	132,924 acres
Box Elder							
PHMA	232,258 acres (100%)	232,258 acres (100%)	232,258 acres (100%)	232,258 acres (100%)	232,258 acres (100%)	232,258 acres (100%)	232,258 acres (100%)
GHMA	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Total	232,258 acres	232,258 acres	232,258 acres	232,258 acres	232,258 acres	232,258 acres	232,258 acres

This section details the effects of the alternatives on these areas considered for ACEC designation.

Solar, Wind, Major Rights of Way, Saleable Minerals/Material Management, and Locatable Minerals

The Proposed RMP Amendment and Alternatives 3 and 6 would all provide additional protections to the potential ACEC by excluding solar, wind, and non-energy leasable mineral development, with exceptions. While all three alternatives also exclude major rights of way and close the area to saleable minerals/material management, Alternative 3 provides the greatest protection as Alternative 3 provides no exceptions to the rights of way exclusion or to the saleable closure. In addition, under Alternative 3, the area would be recommended for locatable mineral withdrawal. Under both Alternative 3 and 6, a plan of operations and BLM approval would be required before beginning any locatable mineral operations causing surface disturbance greater than casual use.

Under Alternatives 1, 2, and 4, as PHMA, the area would be exclusion for solar and wind and avoidance for major rights of way in PHMA, both with exceptions, which would provide similar but slightly less protections than afforded under the Proposed RMP Amendment and Alternatives 3 and 6. Under Alternative 5, as PHMA, the areas would be avoidance for solar and wind and avoidance for major rights-of-way. Therefore, alternative 5 provides the least amount of protections from solar, wind, and rights of way development. Under Alternatives 1, 2, 4, and 5 the area would be open to locatable mineral development and notice level exploration would be allowed without a plan of operation which is the same as under the Proposed RMP Amendment.

Fluid Mineral Development

Under the Proposed RMP Amendment, these two potential ACEC area would be managed as PHMA. As PHMA, under the Proposed RMP Amendment and Alternatives 4, 5, and 6, these areas would be open to new fluid mineral leasing subject to NSO with Waivers, Exceptions, and Modifications. Under Alternative 4, a revised objective specified, "Manage fluid mineral leasing and development (including geothermal) in GRSG habitat management areas to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction.". Alternatives 5 and 6 do not specify any objectives or specific leasing prioritization language or a leasing strategy but maintain the desired condition to manage public lands to provide suitable GRSG habitat at the HAF mid-, fine- and site-scales. Under Alternative 3, all PHMA would be closed to new leasing. Under Alternatives 1 and 2, these areas would be managed as open

to new leasing, with NSO stipulations w/ Waivers, Exceptions, and Modifications. Alternative 1 additionally establishes an objective of "Priority will be given to leasing and development outside of PHMAs and GHMAs, or within the least impactful areas within PHMA and GHMA if avoidance is not possible.".

By closing all PHMA to new leasing, Alternative 3 would provide the greatest amount of protections from fluid mineral development.

Disturbance Cap

In these areas managed as PHMA, the Proposed RMP Amendment sets a disturbance cap if direct habitat disturbance from existing and proposed infrastructure developments exceeds either 3% the project scale or 3% at the HAF Fine Scale selection area, with exceptions and conditions, Alternative 6 sets the same disturbance cap for the area but there are no exceptions and Alternative 3 closes the area to new infrastructure projects and sets a 3% disturbance cap for existing developments. Alternatives 1 and 2 set a 3% disturbance cap in PHMA and the cap applies at both BSU-scale and at the project scale. Under Alternative 2, the cap can be exceeded in Utah if it will benefit GRSG. Under Alternatives 4 and 5, in PHMA the disturbance cap is 3% the project scale or 3% at the HAF Fine Scale selection area and projects would be deferred until disturbance in the areas has been reduced below the cap threshold or the projects could be redesigned to not result in additional surface disturbance or moved outside of PHMA. Alternative 3, followed by Alternative 6, provide the highest degree of protection relative to disturbance.

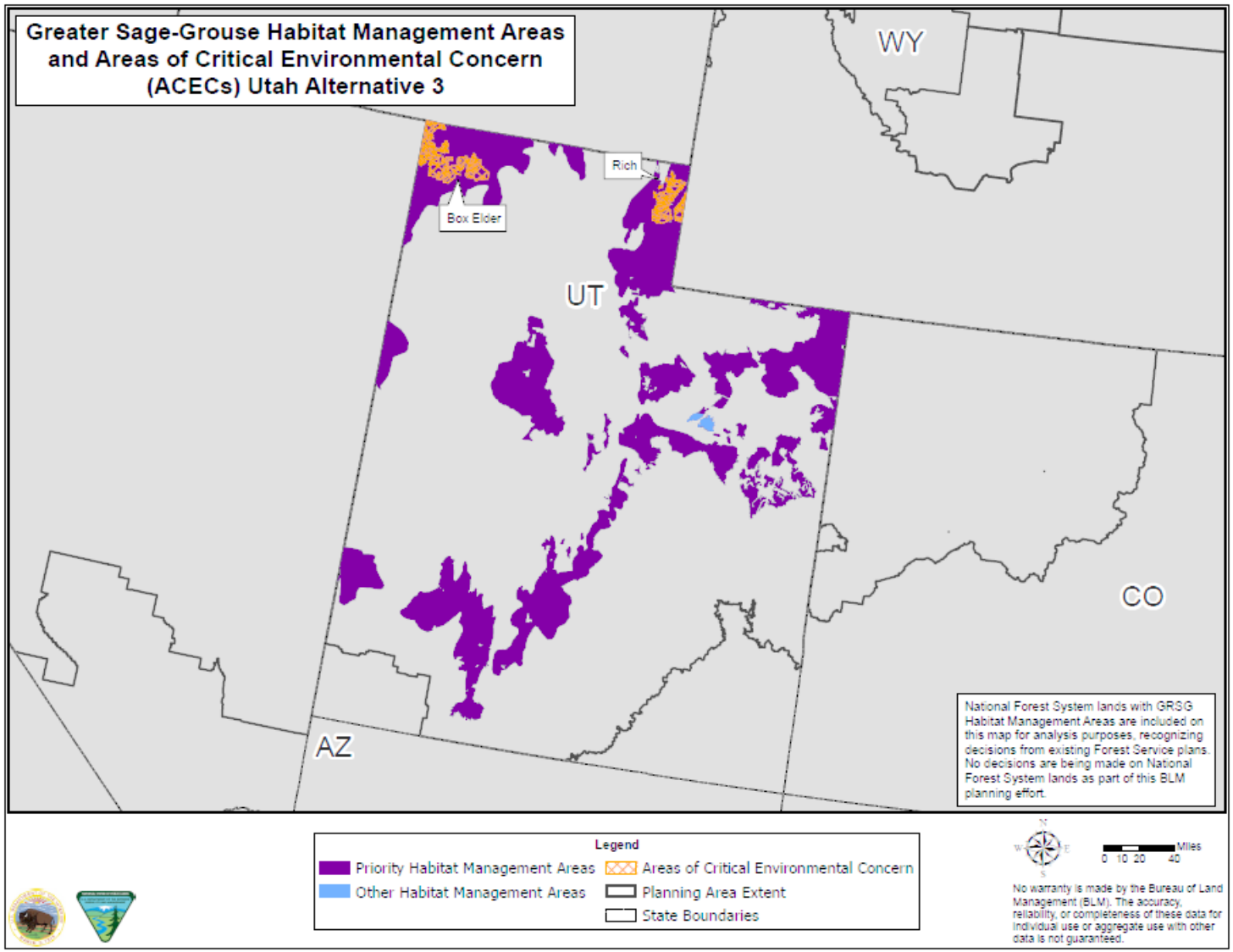
Livestock Grazing

Under Alternative 3, GRSG habitat would be unavailable to livestock grazing. Under Alternatives 1 and 2, in PHMA, thresholds and responses that would allow the authorized officer to make adjustments to livestock grazing are required. Under Alternatives 4, 5, 6, and the Proposed RMP Amendment, thresholds and responses are also addressed but under these alternatives, more comprehensive guidance is provided for addressing areas not meeting the special status species land health standard due to livestock grazing and for addressing livestock improvements and fencing in a manner to reduce impacts to GRSG. Alternative 3 provides the greatest protections to the potential ACECs by removing any potential disturbance associated with livestock grazing.

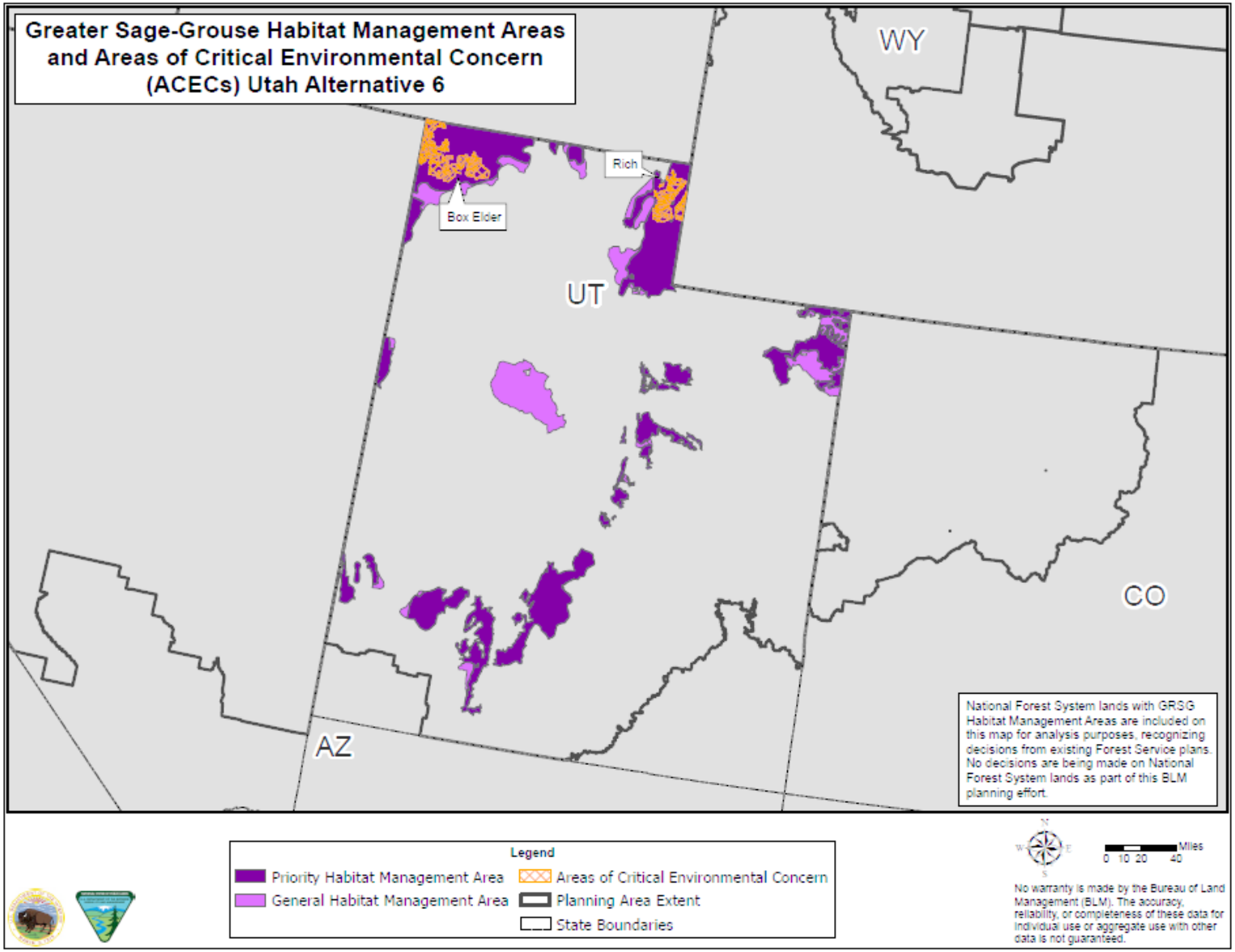
Summary of Effects

Considered comprehensively, the management direction provided under Alternatives 3 and 6 and the Proposed RMP Amendment would protect and prevent irreparable damage to the relevant and important values of the potential Rich and Box Elder ACECs; with Alternative 3 providing the highest level of protection. Alternatives 1, 2, 4, and 5 provide a relatively high degree of protection with PHMA management direction. However, as major rights of way and renewable energy development are more likely to occur under these alternatives, associated disturbances could negatively impact the relevant and important values of the potential ACECs.

Map 5.9: Utah Alternative 3 Potential ACECs



Map 5.10: Utah Alternative 6 Potential ACECs



WYOMING

BLM Wyoming considered the results of the rangewide assessment and evaluated the Carbon-Moffat, Little Sandy, Carter Crook, the Sagebrush Focal Areas (SFAs) in South-Central and Southwestern Wyoming, and the Greater South Pass and Upper Green River Basin areas to determine if they met the relevance and importance criteria. The Little Sandy area was both internally identified and nominated by an external group during the scoping period. The BLM also evaluated the Red Desert area that was nominated by an external group during the scoping period. Through the evaluation process, Wyoming BLM identified the Little Sandy, Carter Crook, Sagebrush Focal Areas in South Central and Southwestern Wyoming, and the Greater South Pass and Upper Green River Basin as meeting the relevance and importance criteria. These areas were identified as potential ACECs in the Draft EIS in Alternatives 3 and 6.

Between the Draft and Final EIS, the BLM refined the acreage of the Little Sandy ACEC (which is also commonly referred to as the Golden Triangle) to align more closely with the boundaries that had been identified for the area in the concurrent plan revision for the Rock Springs RMP. This resulted in a change from 475,284 acres in the Draft EIS to 272,557 acres in the Final EIS. The selection of this ACEC boundary alignment for both planning efforts was in response to the proposed management direction in the Rock Springs RMP that would provide oil and gas leasing restrictions and viewshed protections for the 202,727 acres that were removed from the potential ACEC identified in the GRSG Draft RMPA/EIS. The change in boundary also responds to the special recreation management area direction proposed in the Rock Springs RMP.

Importance Evaluations

Wyoming GRSG ACEC Importance Evaluation: Carbon-Moffat GRSG Connectivity Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	No	• The nominated area provides a genetic linkage between GRSG populations in NW CO with populations in central and western portions of the species' range (Cross et al. 2023). • However, models of potential movement among PHMA throughout the range of GRSG suggest additional movement pathways from CO populations in this region to population strongholds in WY (Crist et al. 2017; Oyler-McCance et al. 2022; Cross et al. 2023). • The nominated area contains several genetic nodes (i.e., leks most important to the overall genetic connectivity of GRSG populations across their range; Fig. 6; Cross et al. 2018 and 2023). • GRSG population density is high in much of the nominated area with portions of the nominated area modeled as having the highest densities of breeding GRSG in WAFWA MZ 2; MZ 2 has the highest proportion of breeding GRSG in the range of the species (Doherty et al. 2016). • Lek densities are higher in this area than most other areas in WY, although many of the documented leks are currently unoccupied (as defined by the WGFD; Whitford and Bish 2022), especially those more closely associated with energy development. The data most likely to suggest the nominated area has more than locally significant qualities are the genetic linkage data. These data suggest the nominated area is a likely corridor for the functional movement of GRSG from habitats in NW CO to the rest of the species' range via population strongholds in WY. But the preponderance of evidence suggests other movement corridors between CO and WY likely exist (see Crist et al. 2017; Oyler-McCance et al. 2022) suggesting the nominated area does not have greater than local-level significance.
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened • Vulnerable to adverse change	No	GRSG population linkage (i.e., the functional movement of individuals between CO and WY) in this area may establish the area as being more than locally significant to the sustainability of GRSG populations in the broader region. However, other likely corridors exist allowing movement of individual GRSG between WY and CO so the nominated area is not unique, rare or irreplaceable.

Wyoming GRSG ACEC Importance Evaluation: Carbon-Moffat GRSG Connectivity Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	No	The nominated area meets relevance criteria but does not meet importance criteria. Therefore, it is not recommended that the nominated area as nominated nor as modified be considered a potential ACEC for GRSG for analysis in the Draft EIS in the current range-wide planning effort.
Conclusion		
This area did not meet importance criterion and was not identified as a potential ACEC in Alternatives 3 and 6.		

Wyoming GRSG ACEC Importance Evaluation: Little Sandy Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	Yes	• GRSG population density is very high especially in northern portions of the nominated area with most of the nominated area modeled as having the highest densities of breeding GRSG in WAFWA MZ 2; MZ 2 has the highest proportion of breeding GRSG in the range of the species (Doherty et al. 2016). • The nominated area contains a genetic node (i.e., leks most important to the overall genetic connectivity of GRSG populations across their range) and includes portions of the most likely genetic linkage between GRSG populations in eastern and central WY with populations in southwestern portions of the State (Fig. 6; Cross et al. 2023). • However, models of potential movement among PHMA throughout the range of GRSG suggest east-west movement pathways are more likely to occur across southern portions of the State (Crist et al. 2017). The data most likely to suggest the nominated area has more than locally significant qualities are the GRSG breeding density data. These data suggest the nominated area, especially northern portions of the area, has some of the highest densities of breeding GRSG in the range of the species establishing the nominated area is more than locally important with special worth and is distinctive.
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened • Vulnerable to adverse change	Yes	High densities of breeding GRSG relative to the rest of the species' range establish the area as exemplary, rare, unique, and irreplaceable. The potential expansion of liquid and renewable energy development in the nominated area establishes the area as vulnerable to adverse change.

Wyoming GRSG ACEC Importance Evaluation: Little Sandy Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	No	The proposed ACEC includes multiple lines of evidence identifying the area as valuable for the long-term population sustainability of GRSG. Because (1) the area has relatively (compared to the rest of the species' range) robust populations, (2) includes portions of the most likely genetic corridor between populations to the east and west of this region, (3) the loss of the ability of GRSG to move through this area could isolate GRSG populations in eastern and western portions of the species' range and the isolation of populations increases the probability of regional-level extirpation (Knick et al. 2013) and conserving habitat connectivity is a national priority for managing bureau sensitive status species (Manual 6840 and IM 2023-005), and (4) the area has high potential for energy development in the future, it is recommended that the nominated area as modified be considered a potential ACEC for GRSG for analysis under at least one alternative in the current range-wide planning effort.
Conclusion		
Due to meeting the relevance and importance criteria, this area was identified as a potential ACEC in Alternatives 3 and 6. Refer to Wyoming - ACEC Maps for Alternatives 3 and 6 that follow.		

Wyoming GRSG ACEC Importance Evaluation: Carter-Cook GRSG Connectivity Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	Yes	• The nominated area provides the primary genetic linkage between GRSG populations in the entirety of northeastern portions of the species' range with populations in central and western portions of the species' range (Crist et al. 2017; Oyler- McCance et al. 2022; Cross et al. 2023). • The nominated area contains at least 2 genetic nodes (i.e., leks most important to the overall genetic connectivity of GRSG populations across their range; Cross et al. 2018 and 2023). The data most likely to suggest the nominated area has more than locally significant qualities are the genetic linkage data. The nominated area is the most likely corridor and a bottleneck to functional movement of GRSG from habitats in most of Management Zone 1 to the rest of the species' range establishing that the nominated area is more than locally important with special worth and is distinctive.

Wyoming GRSG ACEC Importance Evaluation: Carter-Cook GRSG Connectivity Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened • Vulnerable to adverse change	Yes	Potential genetic bottleneck of the most likely movement corridor between populations in northeastern portions of the GRSG range and the rest of the species' range establish the area as rare, unique, and irreplaceable. Energy development and mining (and the likely expansion of bentonite mining in the area) and invasive annual grass (and the increased risk of fire eliminating the sagebrush overstory) establishes the area as vulnerable to adverse change.
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	No	The proposed ACEC includes multiple lines of evidence identifying the area as valuable for the long-term population sustainability of GRSG, especially populations in MZ 1. Because (1) the area is the most likely genetic corridor between populations in eastern portions of the species range, (2) the loss of the ability of GRSG to move through this area could isolate MZ 1 populations, (3) the isolation of populations increases the probability of regional-level extirpation (Knick et al. 2013), and (4) conserving habitat connectivity is a national priority for managing bureau sensitive status species (Manual 6840 and IM 2023-005), it is recommended that the nominated area as modified be considered a potential ACEC for GRSG for analysis under at least one alternative in the current range-wide planning effort.
Other Items		
Additional Notes	While the New Castle FO (NFO) agrees with the premise of the rationale of regional-level extirpation (Knicks et al. 2013), the NFO believes that the added protection of an ACEC is not necessary to meet goals of the area. The NFO believes that goals can be met with the current Core Area strategy as the proposed ACEC area is located in a PHMA Connectivity Area. The protections include a 5% disturbance density threshold and associated NSOs and TLSs, which should allow existing GRSG populations to persist and maintain genetic connectivity between populations.	
Conclusion		
Due to meeting the relevance and importance criteria, this area was identified as a potential ACEC in Alternatives 3 and 6. Refer to Wyoming - ACEC Maps for Alternatives 3 and 6 that follow.		

Wyoming GRSG ACEC Importance Evaluation: Red Desert Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	No	• The nominated area does not contain high density GRSG populations, and only portions of the area provide suitable habitats for the species. • The nominated area is not important for genetic connectivity. Data suggest the nominated area does not have more than locally significant qualities for GRSG.

Wyoming GRSG ACEC Importance Evaluation: Red Desert Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened • Vulnerable to adverse change	No	None of the data considered establish the nominated area as having rare, unique, or irreplaceable values for GRSG. Energy development (and the likely expansion of this development in the area) establishes the area as vulnerable to adverse change, but these potential threats are not likely to directly impact substantial numbers of GRSG.
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	No	The proposed ACEC does not include habitat conditions that meet relevance and importance criteria for GRSG. Therefore, it is not recommended that the nominated area be considered a potential ACEC for GRSG for analysis in the Draft EIS for the current range-wide planning effort.
Conclusion		
This area did not meet importance criterion and was not identified as a potential ACEC in Alternatives 3 and 6.		

Wyoming GRSG ACEC Importance Evaluation: Sagebrush Focal Areas in South-Central and Southwestern Wyoming Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	Yes	• GRSG population density is high in far western and far eastern portions of the SFA area with these areas modeled as having the highest densities of breeding GRSG in WAFWA MZ 2; MZ 2 has the highest proportion of breeding GRSG in the range of the species (Doherty et al. 2016). • The SFA area contains several genetic nodes (i.e., leks most important to the overall genetic connectivity of GRSG populations across their range; Fig. 6; Cross et al. 2018 and 2023). • The general area in far western portions of the SFA area additionally appears to be a genetic mixing zone for populations farther to the south in UT, populations in CO and southern WY, and populations in eastern ID (Oyler-McCance et al. 2022). • The SFA area includes portions of the most likely genetic linkage between GRSG populations in eastern and central WY with populations in southwestern portions of the State (Cross et al. 2023). • However, models of potential movement among PHMA throughout the range of GRSG suggest east-west movement pathways are more likely to occur across southern portions of the State (Crist et al. 2017). • Models of climate impacts on sagebrush habitat integrity suggest that some of the habitats throughout the SFA area will not maintain high value conditions for GRSG into the near future (2030-2060; Doherty et al. 2022). The data most likely to suggest the SFA-designated area being considered has more than locally significant qualities are the GRSG breeding density data, the genetic mixing data, and the genetic connectivity data. These data suggest far western portions of the SFA area are more than locally important with special worth and are distinctive.
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened • Vulnerable to adverse change	Yes	High densities of breeding GRSG relative to the rest of the species' range, GRSG population linkage (i.e., the functional movement of individuals between UT and WY), and genetic mixing which appears to be relatively unique to the species' range establish far western portions of the SFA area as exemplary, rare, unique, and irreplaceable. Models of habitat response to climate change in the far western region establish the area as vulnerable to adverse change.

Wyoming GRSG ACEC Importance Evaluation: Sagebrush Focal Areas in South-Central and Southwestern Wyoming Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	N/A	Far western portions of the SFA-designated area being considered includes multiple lines of evidence identifying the area as valuable for the long-term population sustainability of GRSG. Because (1) the area has relatively (compared to the rest of the species' range) robust populations, (2) is the most likely genetic corridor between populations to the east and west of this region, (3) the loss of the ability of GRSG to move through this area could isolate GRSG populations in eastern and western portions of the species' range and the isolation of populations increases the probability of regional-level extirpation (Knick et al. 2013), and (4) conserving habitat connectivity is a national priority for managing bureau sensitive status species (Manual 6840 and IM 2023-005), it is recommended that the SFA- designated area being considered as modified be considered a potential ACEC for GRSG for analysis under at least one alternative in the current range-wide planning effort.
Conclusion		
Due to meeting the relevance and importance criteria, this area was identified as a potential ACEC in Alternatives 3 and 6. Refer to Wyoming - ACEC Maps for Alternatives 3 and 6 that follow.		

Wyoming GRSG ACEC Importance Evaluation: Greater South Pass and Upper Green River Basin GRSG Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
More than locally significant qualities, especially compared to any similar resource, that give it: • Special worth: • Consequence • Meaning • Distinctiveness • Cause for concern	Yes	• GRSG population density is very high especially in western portions of the nominated area with most of the nominated area modeled as having the highest densities of breeding GRSG in WAFWA MZ 2; MZ 2 has the highest proportion of breeding GRSG in the range of the species (Doherty et al. 2016). • The nominated area contains several genetic nodes (i.e., leks most important to the overall genetic connectivity of GRSG populations across their range; Cross et al. 2018 and 2023). • The nominated area provides the most likely genetic linkage between GRSG populations in eastern and central WY with populations in southwestern portions of the State (Cross et al. 2023). • However, models of potential movement among PHMA throughout the range of GRSG suggest east-west movement pathways are more likely to occur across southern portions of the State (Crist et al. 2017). The data most likely to suggest the nominated area has more than locally significant qualities are the GRSG breeding density data. These data suggest the nominated area, especially central and western portions of the area, has the highest densities of breeding GRSG in the range of the species establishing the nominated area is more than locally important with special worth and is distinctive.

Wyoming GRSG ACEC Importance Evaluation: Greater South Pass and Upper Green River Basin GRSG Proposed ACEC		
Importance Consideration	**Yes/No**	**Rationale for Determination**
Qualities or circumstances that make it: • Fragile • Sensitive • Rare • Irreplaceable: • Exemplary • Unique: • Endangered • Threatened • Vulnerable to adverse change	Yes	High densities of breeding GRSG relative to the rest of the species' range establish the area as exemplary, rare, unique, and irreplaceable. Energy development (and the potential expansion of liquid and renewable energy development in the nominated area) establishes the area as vulnerable to adverse change.
Has been recognized as warranting protection in order to satisfy national priority concerns or to carry out the mandates of FLPMA	No	The proposed ACEC includes multiple lines of evidence identifying the area as valuable for the long-term population sustainability of GRSG. Because (1) the area has relatively (compared to the rest of the species' range) robust populations, (2) is the most likely genetic corridor between populations to the east and west of this region, (3) the loss of the ability of GRSG to move through this area could isolate GRSG populations in eastern and western portions of the species' range and the isolation of populations increases the probability of regional- level extirpation (Knick et al. 2013), and conserving habitat connectivity is a national priority for managing bureau sensitive status species (Manual 6840 and IM 2023-005), it is recommended that the nominated area as modified be considered a potential ACEC for GRSG for analysis under at least one alternative 4 in the current range-wide planning effort.
Conclusion		
Due to meeting the relevance and importance criteria, this area was identified as a potential ACEC in Alternatives 3 and 6. Refer to Wyoming - ACEC Maps for Alternatives 3 and 6 that follow.		

Effects of the Alternatives on the Potential Little Sandy/Golden Triangle, Carter Crook, Sagebrush Focal Areas in South Central and Southwestern Wyoming, and Greater South Pass and Upper Green River Basin ACECs

In Wyoming, the Little Sandy/Golden Triangle area was identified in the Draft EIS as a potential ACEC in Alternatives 3 and 6 and totaled 475,284 acres. Between Draft and Final EIS, the acreage was refined as described above and totals 272,557 acres in Alternatives 3 and 6 in the Final EIS. Under the Proposed RMP Amendment the 272,557 acre area would receive PHMA with limited exceptions protections. The Little Sandy/Golden Triangle is a large expanse of intact sagebrush that supports portions of the densest population of GRSG across its entire range, has limited invasive annual grasses and anthropogenic infrastructure, and faces potential threats from fluid mineral development.

The potential Carter Crook ACEC, totaling 19,400 acres is identified for potential ACEC designation under Alternatives 3 and 6. The area contains at least 2 genetic nodes (i.e., leks most important to the overall genetic connectivity of GRSG populations across their range; Cross et al. 2018 and 2023) and is the most likely genetic corridor between populations in eastern portions of the species range. The potential Sagebrush Focal Areas in South Central and Southwestern Wyoming ACEC, totaling 33,166 acres is identified for potential ACEC designation under Alternatives 3 and 6. The area has: high densities of breeding GRSG relative to the rest of the species' range; GRSG population linkage (i.e., the functional movement of

individuals between UT and WY); and genetic mixing which appears to be relatively unique to the species' range. The far western portions of the SFA area as exemplary, rare, unique, and irreplaceable. Models of habitat response to climate change in the far western region establish the area as vulnerable to adverse change.

The potential Greater South Pass and Upper Green River Basin ACEC, totaling 311,229 acres is identified for potential ACEC designation under Alternatives 3 and 6. The area's high densities of breeding GRSG relative to the rest of the species' range establish the area as exemplary, rare, unique, and irreplaceable. Energy development, and the potential expansion of liquid and renewable energy development in the nominated area, establishes the area as vulnerable to adverse change.

Table 5-11 displays the HMA allocation for these areas under each alternative. Under the Proposed RMP Amendment, the Little Sandy/Golden Triangle area would be managed as PHMA with limited exceptions, and Carter Crook, Sagebrush Focal Areas in South Central and Southwestern Wyoming, and Greater South Pass and Upper Green River Basin would be managed entirely as PHMA. Under Alternatives 1 through 6, the Little Sandy/Golden Triangle, Carter Crook, Sagebrush Focal Areas in South Central and Southwestern Wyoming areas would be managed entirely as PHMA. Under Alternatives 1 and 2, 96% of the Greater South Pass and Upper Green River Basin area would be managed as PHMA and 4% of the area would be managed as GHMA. Under Alternatives 3 through 6, the Greater South Pass and Upper Green River Basin area would be managed entirely as PHMA. Under Alternative 3 and 6, all four areas would also be proposed for designation as ACECs and would receive the additional management protections identified for ACECs under those alternatives.

Table 5-11. HMA Allocations in the Wyoming Potential ACECs by Alternative

Potential ACEC	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment[15]
Little Sandy/Golden Triangle							
PHMA with limited exceptions	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	272,557 acres (100%)
PHMA	272,557 acres (100%)	272,557 acres (100%)	272,557 acres (100%)	272,557 acres (100%)	272,557 acres (100%)	272,557 acres (100%)	272,557 acres (100%)
GHMA	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**272,557 acres**	**272,557 acres**	**272,557 acres**	**272,557 acres**	**272,557 acres**	**272,557 acres**	**272,557 acres**
Carter Crook							
PHMA	19,400 acres (100%)	19,400 acres (100%)	19,400 acres (100%)	19,400 acres (100%)	19,400 acres (100%)	19,400 acres (100%)	19,400 acres (100%)
GHMA	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**19,400 acres**	**19,400 acres**	**19,400 acres**	**19,400 acres**	**19,400 acres**	**19,400 acres**	**19,400 acres**

[15] HMA with limited exceptions are areas within PHMA where additional protections to support conservation of GRSG habitat would reduce impacts from highly probable resource threats. These acreages are therefore included in both PHMA and PHMA with limited exceptions.

Potential ACEC	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment[15]
Sagebrush Focal Areas in South Central and Southwestern Wyoming							
PHMA	33,166 acres (100%)	33,166 acres (100%)	33,166 acres (100%)	33,166 acres (100%)	33,166 acres (100%)	33,166 acres (100%)	33,166 acres (100%)
GHMA	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**33,166 acres**	**33,166 acres**	**33,166 acres**	**33,166 acres**	**33,166 acres**	**33,166 acres**	**33,166 acres**
Greater South Pass and Upper Green River Basin							
PHMA	299,929 acres (96%)	299,929 acres (96%)	311,229 acres (100%)	311,229 acres (100%)	311,229 acres (100%)	311,229 acres (100%)	311,229 acres (100%)
GHMA	11,300 acres (4%)	11,300 acres (4%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)	0 acres (0%)
Total	**311,229 acres**	**311,229 acres**	**311,229 acres**	**311,229 acres**	**311,229 acres**	**311,229 acres**	**311,229 acres**

This section details the effects of the alternatives on these areas considered for ACEC designation.

Fluid Mineral Development

Under the Proposed RMP Amendment the Little Sandy/Golden Triangle potential ACEC would be wholly managed under the PHMA with limited exceptions designation. The No Surface Occupancy (NSO) with no exceptions management direction identified for these limited exception areas would protect the potential ACEC from the threat of fluid mineral development. Under the Proposed RMP Amendment the other three potential ACECs would be managed as NSO for fluid mineral development within .6 miles of leks and seasonal limitations (breeding, nesting, early brood-rearing and winter habitat) and Controlled Surface Use (CSU) (density and disturbance) in PHMA outside of the 0.6-mi NSO buffer. Under Alternative 3, all of the potential ACECs would be closed to fluid mineral development without exception. Under Alternative 6, the areas would also be subject to NSO but development could occur if an exception for the entire ACEC area could be met. Under Alternatives 1, 2, and 5, in PHMA, which includes the vast majority of areas within these potential ACECs, NSO would be allowed within .6 miles of leks. PHMA outside .6 miles has season limitations (breeding, nesting, early brood-rearing and winter habitat) and CSU (density and disturbance). Under Alternative 4, there would be NSO in the potential ACEC areas. The Proposed RMP Amendment and Alternative 3 provide the greatest amount of protections from fluid mineral development. The second highest protections would occur under Alternative 6. Alternatives 1, 2, and 4 would provide the least amount of protections to the potential ACEC from fluid mineral development.

The Carter Crook, Sagebrush Focal Areas in South Central and Southwestern Wyoming, and Greater South Pass and Upper Green River Basin potential ACECs would not receive PHMA with limited protections under the Proposed RMP Amendment. Under the Proposed RMP Amendment, these areas would be managed as PHMA, there would be NSO for fluid mineral development within .6 miles of leks and season limitations (breeding, nesting, early brood-rearing and winter habitat) and Controlled Surface Use (CSU) (density and disturbance) outside of the 0.6-mi NSO buffer with exceptions. The fluid mineral management direction identified for the Little Sandy/Golden Triangle described above for Alternatives 1, 2, 3, 4, 5, and 6 would be the same for these three potential ACECs. As such, the greatest amount of protections from fluid mineral development for these three areas would occur under Alternatives 3. Alternative 6 and the Proposed RMP

Amendment provide the next highest level of protection. Alternatives 1, 2, and 4 would provide the least amount of protections to the potential ACECs from fluid mineral development.

Solar, Wind, Major Rights of Way, Saleable Minerals/Material Management, and Locatable Minerals

Alternatives 3 and 6 would provide additional protections to all of the potential ACECs by excluding solar, wind, and non-energy leasable mineral development. While these alternatives also exclude major rights of way and close the area to saleable minerals/material management, Alternative 3 provides the greatest protection as Alternative 3 provides no exceptions to the rights of way exclusion or to the saleable mineral closure. In addition, under Alternative 3, the areas would be recommended for locatable mineral withdrawal. Under both Alternative 3 and 6, a plan of operations and BLM approval would be required before beginning any locatable mineral operations causing surface disturbance greater than casual use in these areas.

Under the Proposed RMP Amendment, the Little Sandy/Golden Triangle ACEC would be managed as exclusion for solar, wind, and non-energy leasable mineral development and exclusion with exceptions to major rights of way. Under the Proposed RMP Amendment, the other three potential ACECs would be managed as PHMA, and would be exclusion with exceptions for solar and wind. Under the Proposed RMP Amendment these three ACECs would be open to expansion of existing non-energy leasable minerals subject to occupancy, seasonal limitations, disturbance, and density, but closed to new leases except in situations required for human health and safety. Under the Proposed RMP Amendment these three ACECs would be avoidance areas for new major rights of way with criteria that must be met to authorize the right of way. Therefore, under the Proposed RMP Amendment, the protections resulting from the PHMA with limited exceptions management direction related to solar, wind, non-energy minerals, and major rights of way would provide greater protections for the Little Sandy/Golden Triangle than the protections provided by the PHMA management direction that would apply to the Carter Crook, Sagebrush Focal Areas in South Central and Southwestern Wyoming, and Greater South Pass and Upper Green River Basin potential ACECs.

Under Alternatives 1 and 2, all four potential ACEC would be managed as avoidance areas for wind in PHMA. Alternatives 1 and 2 do not provide management direction for solar development in PHMA. General surface disturbance limits would exclude solar development near leks (0.6 miles) and minimize solar development disturbance through disturbance cap and mitigation requirements elsewhere in PHMA. The 4% of the potential Greater South Pass and Upper Green River Basin ACEC managed as GHMA under Alternatives 1 and 2 would be open for wind and solar. Under Alternatives 4, the four areas would be managed as exclusion areas for wind and solar as PHMA. Under Alternative 5, in PHMA, the areas would be managed as avoidance for solar and wind with criteria that would need to be met for development to occur. Under Alternatives 4 and 5, these areas would be avoidance areas for major rights of way.

Under Alternative 3, all four potential ACECs would be recommended for locatable mineral withdrawal. Under both Alternative 3 and 6, a plan of operations and BLM approval would be required before beginning any locatable mineral operations causing surface disturbance greater than casual use. Under Alternatives 1, 2, 4, 5, and the Proposed RMP Amendment, all four potential ACEC areas would be open to locatable mineral development and notice level exploration would be allowed without a plan of operations.

Disturbance Cap

In Wyoming, the Proposed RMP Amendment sets a 5% disturbance cap at the project scale with exceptions that would apply to all four of the potential ACEC areas. Alternative 6 sets the same disturbance cap for the areas but there are no exceptions. Alternative 3 affords the most protections relative to the disturbance cap

by closing the areas to new infrastructure projects and setting a 3% disturbance cap for existing developments. Similar to the Proposed RMP Amendment, Alternatives 1 and 2 set a 5% disturbance cap in PHMA. Alternative 3, followed by Alternative 6, provide the highest degree of protection relative to disturbance.

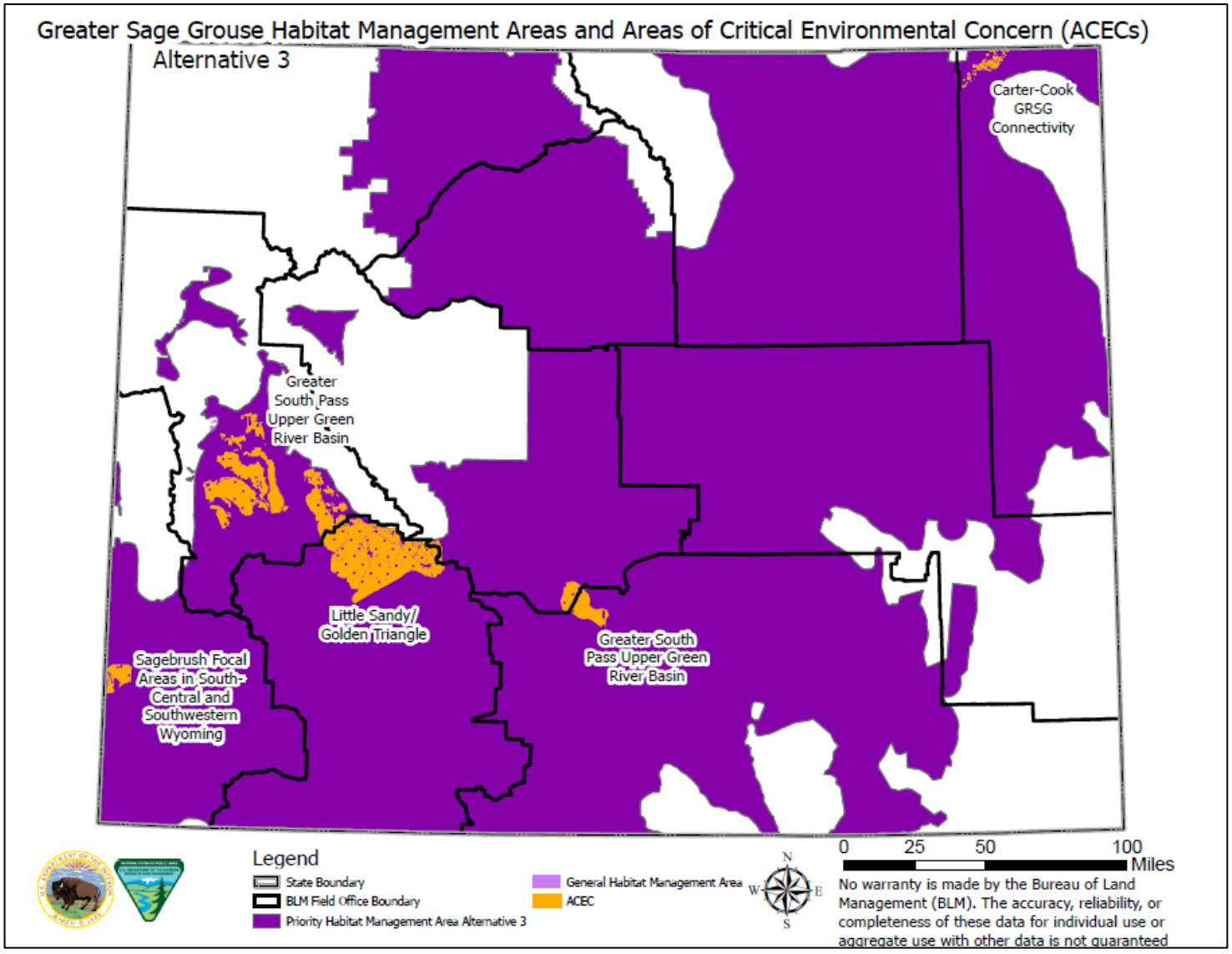
Livestock Grazing

Under Alternative 3, GRSG habitat would be unavailable to livestock grazing. Under Alternatives 1 and 2, in PHMA, thresholds and responses that would allow the authorized officer to make adjustments to livestock grazing are required. Under Alternatives 4, 5, 6, and the Proposed RMP Amendment, thresholds and responses are also addressed but under these alternatives, more comprehensive guidance is provided for addressing areas not meeting the special status species land health standard due to livestock grazing and for addressing livestock improvements and fencing in a manner to reduce impacts to GRSG. Alternative 3 provides the greatest protections to the potential ACECs by removing any potential disturbance associated with livestock grazing.

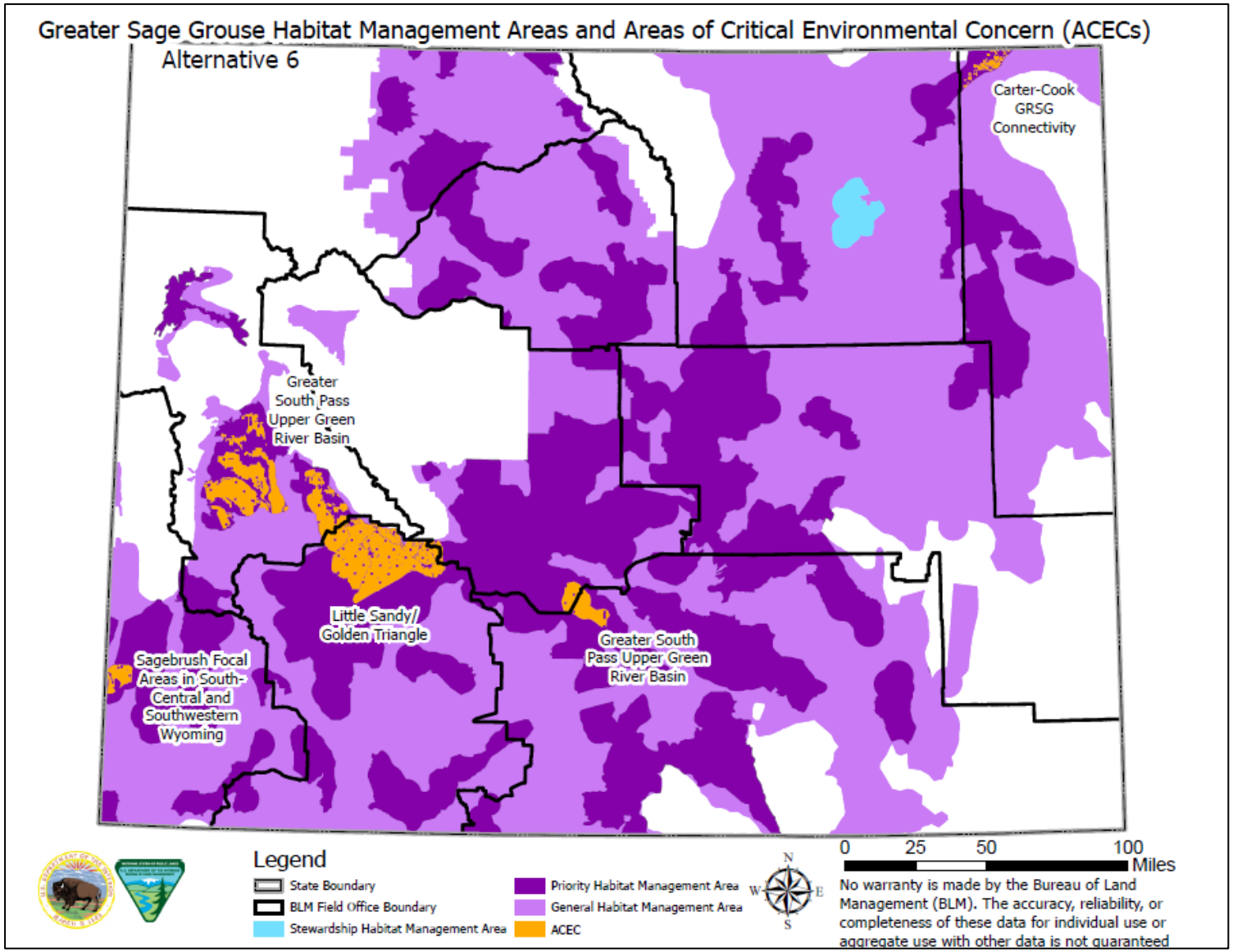
Summary of Effects

Considered comprehensively, Alternatives 3 and 6 would protect and prevent irreparable damage to the relevant and important values of all four of the potential ACECs. The application of PHMA with limited exceptions management direction under the Proposed RMP Amendment would protect and prevent irreparable damage to the relevant and important values of the Little Sandy/Golden Triangle ACEC and the application of the PHMA management direction in the Proposed RMP Amendment would protect and prevent irreparable damage to the relevant and important values of the Carter Crook, Sagebrush Focal Areas in South Central and Southwestern Wyoming, and Greater South Pass and Upper Green River Basin potential ACECs. Alternative 4 provides a high degree of protection from development and would also protect and prevent irreparable damage to the relevant and important values of all four of the ACECs. Although Alternatives 1, 2, and 5 provide a relatively high degree of protection within PHMA within these potential ACEC areas, fluid mineral, solar, wind, and major rights of way development under these alternatives are more likely to occur and could negatively impact the relative and important values of all four of the potential ACECs. As 4% of the potential Greater South Pass and Upper Green River Basin ACEC would be open to wind and solar as GHMA, the likelihood of these potential disturbances and associated impacts to GRSG is slightly increased in this potential ACEC under Alternatives 1 and 2.

Map 5.11: Wyoming Alternative 3 Potential ACECs



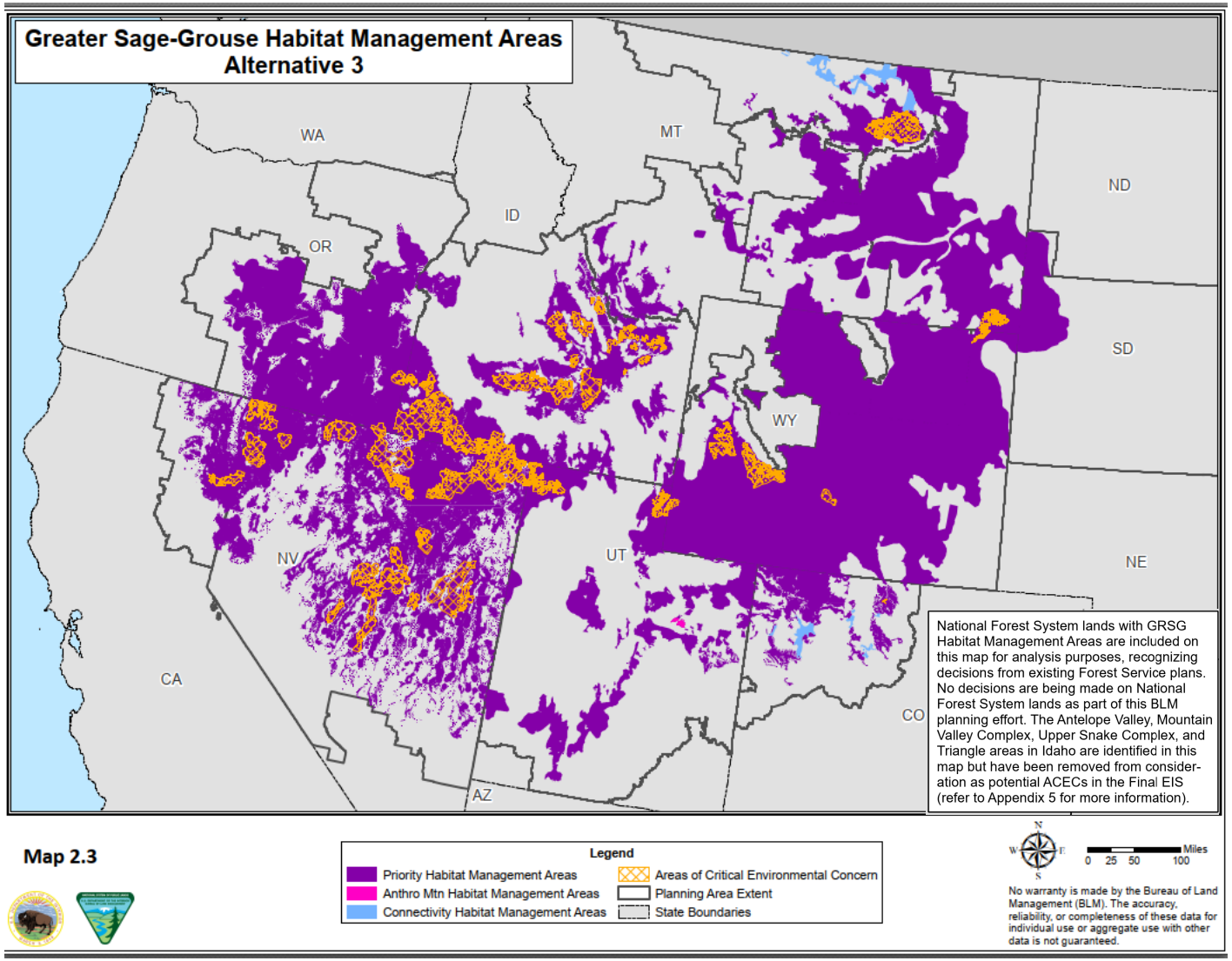
Map 5.12: Wyoming Alternative 3 Potential ACECs



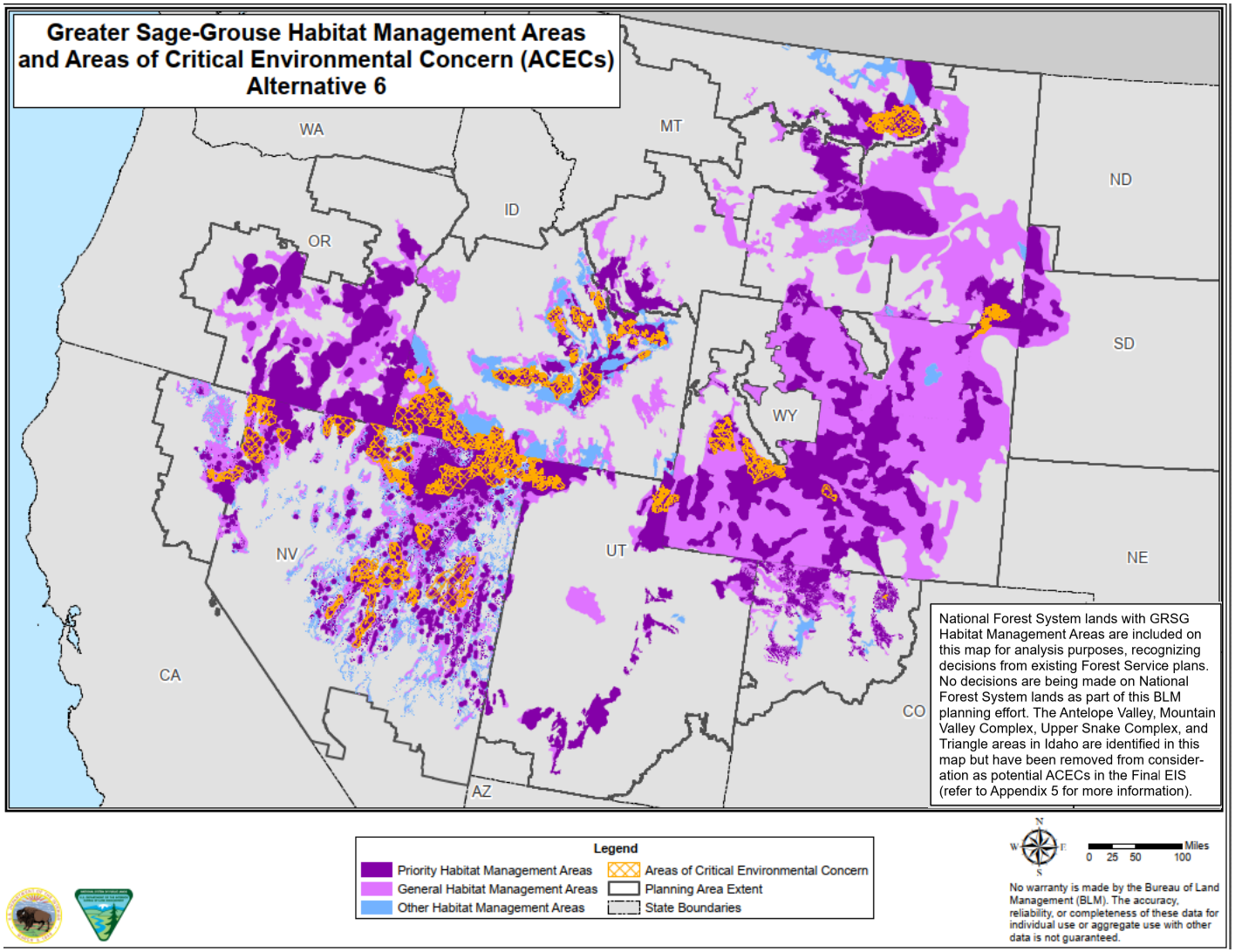
5.5 RANGEWIDE MAPS

Map 5.13 depicts the potential ACEC areas in relation to the Alternative 3 habitat management area boundaries. **Map 5.14** depicts the potential ACEC areas in relation to the Alternative 6 habitat management area boundaries. **Map 5.15** depicts the Priority Habitat Management Areas with limited exceptions identified in the Proposed RMP Amendment.

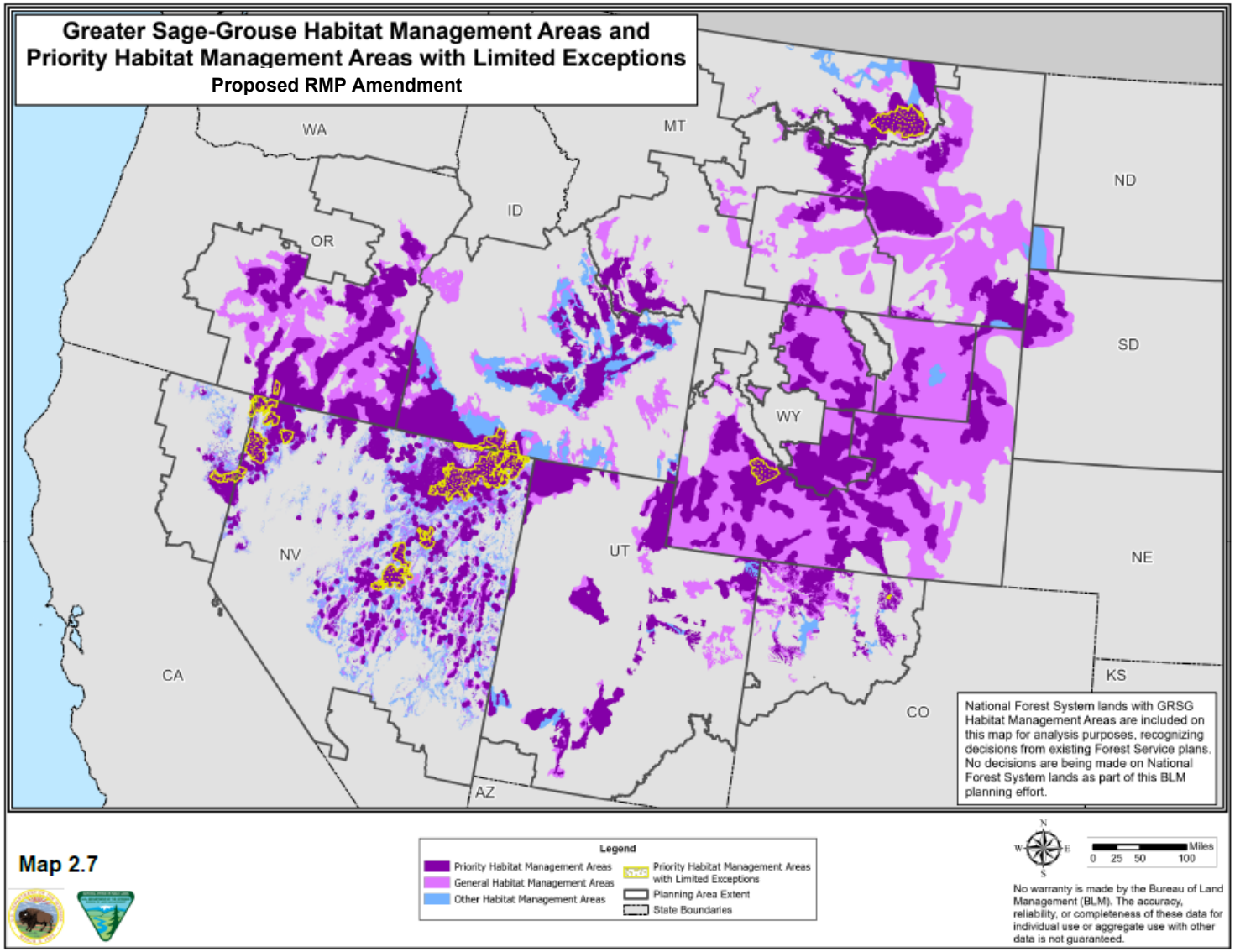
Map 5.13: Potential ACECs in relation to Alternative 3 Habitat Management Areas



Map 5.14: Potential ACECs in relation to Alternative 5 and 6 Habitat Management Areas



Map 5.15: Priority Habitat Management Areas with limited exceptions in the Proposed RMP Amendment



5.6 CUMULATIVE EFFECTS

This section presents an assessment of the cumulative effects on the ACECs proposed for designation under Alternatives 3 and 6. These potential ACECs were identified for their GRSG relevant and important values and, therefore, the cumulative effects to these areas will be similar to those identified for GRSG in **Chapter 4**, **Section 4.2.3**. This analysis considers the past, present, and reasonably foreseeable actions that may impact the ACECs and their relevant and important values. The cumulative effects analysis covers a 20-year timeframe, corresponding to the duration of the GRSG RMPA. The spatial scope encompasses the the 32 potential ACECs considered in this RMP Amendment and their immediate surroundings.

Surface-disturbing activities such as mining, renewable and fluid mineral energy development, rights of way, improper grazing, wild horses and burros, wildfires, and fuels management activities are examples of past and ongoing actions and conditions that have affected and could continue to affect the relevant and important values of the ACECs considered in this RMP amendment. Wildfires can impact relevant and important values due to the removal of vegetation, which can increase the risk of erosion. Fuels management projects, while aiming to reduce wildfire risk, can also help maintain soil stability by preventing large-scale vegetation removal that might lead to soil erosion. These projects can also contribute to preserving habitats for fish, wildlife, and other natural resources. Projects focused on managing vegetation and GRSG habitat can impact relevant and important values. Strategies like prescribed burns can help restore ecosystems, but they might also impact wildlife habitat temporarily.

The cumulative impacts of climate change could also negatively impact the potential ACECs' relevant and important values. Climate change is expected to impact temperatures and precipitation, which will have a number of cascading impacts on the ACECs' relevant and important values. These habitat impacts could include the loss of important plant species and the degradation of GRSG habitat.

Considering the different threats to these potential ACECs in combination with the management direction proposed under the Alternatives, the management protections identified under Alternatives 3, 6, and the Proposed RMP Amendment would provide the highest levels of protection to the potential ACECs and would protect and prevent irreparable damage to the relevant and important values of all 32 of the potential ACECs considered in this RMP amendment. Under Alternatives 1, 2, 4, and 5, the protections are not as strong as under Alternatives 3, 6, and Proposed RMP Amendment. However, because under these alternatives the areas are predominately managed as PHMA, these areas would receive a high degree of protection. Under alternatives 1,2, 4, and 5, there is just a higher likelihood that development activities (e.g., rights of way and renewable and fluid mineral energy development) could occur and these could result in negative impacts to the ACECs relevant and important values.

5.7 LITERATURE CITED

Bureau of Land Management. 2022. Greater Sage-Grouse Site-Scale Habitat Assessment Summary Report for North Park, Colorado. Kremmling Field Office, Kremmling, CO.

Bureau of Land Management. 2023. Wind River Platte Mid-Scale Habitat Assessment Report. Colorado State Office, Lakewood, CO.

Colorado Parks & Wildlife. 2021. North Park Wildlife Mitigation Plan. Denver, CO.

Crist, M.R., S.T., Knick, and S.E. Hanser. 2017. Range-wide connectivity of priority areas for greater sage-grouse: implications for long-term conservation from graph theory. The Condor 119:44-57.

Cross, T.B., M.K. Schwartz, D.E. Naugle, B.C. Fedy, J.R. Row, and S.J. Oyler-McCance. 2018. The genetic network of greater sage-grouse: Range-wide identification of keystone hubs of connectivity. Ecology and Evolution 8: 5394–5412. https://doi:10.1002/ece3.4056.

Cross, T.B., J.D. Tack, D.E. Naugle, M.K. Schwartz, K.E. Doherty, S.J. Oyler-McCance, R.D. Pritchert, and B.C. Fedy. 2023. The ties that bind the sagebrush biome: integrating genetic connectivity into range-wide conservation of greater sage-grouse. Royal Society Open Science 10:220437. https://doi.org/10.1098/rsos.220437.

Doherty, K.E., J.S. Evans, P.S. Coates, L.M. Juliusson, and B.C. Fedy. 2016. Importance of regional variation in conservation planning: a rangewide example of the Greater Sage-Grouse. Ecosphere 7:e01462.

Doherty, K., D.M. Theobald, J.B. Bradford, L.A. Wiechman, G. Bedrosian, C.S. Boyd, M. Cahill, P.S. Coates, M.K. Creutzburg, M.R. Crist, S.P. Finn, A.V. Kumar, C.E. Littlefield, J.D. Maestas, K.L Prentice, B.G. Prochazka, T.E. Remington, W.D. Sparklin, J.C. Tull, Z. Wurtzebach, and K.A. Zeller. 2022. A sagebrush conservation design to proactively restore America's sagebrush biome. U.S. Geological Survey Open-File Report 2022–1081. https://pubs.usgs.gov/of/2022/1081/ofr20221081.pdf.

Knick, S.T., S.E. Hanser, and K.L. Preston. 2013. Modeling ecological minimum requirements for distribution of greater sage-grouse leks: implications for population connectivity across their western range, U.S.A. Ecology and Evolution 3:1539-1551.

Oyler-McCance, S.J., T.B. Cross, J.R. Row, M.K. Schwartz, D.E. Naugle, J.A. Fike, K. Winiarski, and B.C. Fedy. 2022. New strategies for characterizing genetic structure in wide-ranging, continuously distributed species: a greater sage-grouse case study. Plos ONE 17:e0274189, https://doi.org/10.1371/journal.pone.0274189.

Pratt, A.C., J.J. Millspaugh, C. Carpenter III, D.K. Dahlgren, and J.L. Beck. 2021. Adaptive management of the Normally Pressured Lance Natural Gas Development project for greater sage-grouse. February 2019-February 2021 Progress Report for Pre-development Data Collection, University of Wyoming, Department of Ecosystem Science and Management, Laramie, WY.

Rigge, M.B., B. Bunde, H. Shi, and K. Postma. 2021a. Rangeland Condition Monitoring Assessment and Projection (RCMAP) Fractional Component Time-Series Across the Western U.S. 1985-2020 (ver. 2.0, October 2021): U.S. Geological Survey data release, https://doi.org/10.5066/P95IQ4BT.

Rigge, M., Homer, C., Shi, H., Meyer, D.K., Bunde, B., Granneman, B., Postma, K., Danielson, P., Case, A., and Xian, G. 2021b. Rangeland fractional components across the western United States from 1985-2018. Remote Sensing 13(4):813. https://doi.org/10.3390/rs13040813.

Row et al., 2018. Quantifying functional connectivity: the role of breeding habitat, abundance, and landscape features on range-wide gene flow in sage-grouse (https://onlinelibrary.wiley.com/doi/full/10.1111/eva.12627)

Smith, K.T., C.P. Kirol, J.L. Beck, and F.C. Blomquist. 2014. Prioritizing winter habitat quality for greater sage-grouse in a landscape influenced by energy development. Ecosphere 5(2):15. http://dx.doi.org/10.1890/ES13-00238.

Smith, K.T., C.L. Stumpner, C.P. Kirol, A.C. Pratt, and J.L. Beck. 2023. Atlantic Rim greater sage-grouse population and habitat study. Final Technical Report, Department of Ecosystem Science and Management, College of Agriculture and Natural Resources, University of Wyoming, Laramie, WY.

Wann, G.T., N.D. Van Schmidt, J.E. Shyvers, B.C. Tarbox, M.M. McLachlan, M.S. O'Donnell, A.J. Titolo, P.S. Coates, D.R. Edmunds, J.A. Heinrichs, A.P. Monroe, and C.L. Aldridge. 2023. A regionally varying habitat model to inform management for greater sage-grouse persistence across their range. Global Ecology and Evolution 41:e02349. https://doi.org/10.1016/j.gecco.2022.e02349.

Wanner, C.P. 2022. Validation of winter concentration area guidelines and winter habitat ecology for greater sage-grouse in the Red Desert, Wyoming. Thesis, Department of Ecosystem Science and Management, University of Wyoming, Laramie, WY.

Whitford, N., and W. Bish. 2022. Chapter 12: Sage-Grouse. In: Tessman, S.A., and J.R. Bohne (Eds.) Wyoming Handbook of Biological Techniques, 3rd Edition, Rev. 2022. 12-1, 43p, Cheyenne, WY. https://wgfd.wyo.gov/WGFD/media/content/Wildlife/Techniques-Manual_SageGrouseCh_AgeSexGuide_Final_091622.pdf.

Appendix 6

NTT, COT, and USGS Science Incorporation

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This appendix outlines how the NTT and COT and reports factored into the prior GRSG planning processes, and how NTT, COT, and USGS science was incorporated into those efforts.

Appendix 6. NTT, COT, and USGS Science Incorporation

In 2010, the US Fish and Wildlife Service (USFWS) determined that greater sage-grouse (GRSG) warranted listing under the Endangered Species Act, in part due to insufficient regulatory mechanisms to conserve habitat, but the listing was precluded due to higher priorities. In response the BLM initiated a land use planning process in 2011. To help inform that process the BLM assembled a "National Technical Team" (NTT), comprised of state and federal resource specialists and scientists to review the scientific literature available at that time. On December 21, 2011, the NTT finalized a document entitled *A Report on National Greater Sage-Grouse Conservation Measures*, also known as the National Technical Team Report (NTT Report). The report was developed to summarize "the latest science and best biological judgement" from the available literature (NTT Report, Introduction, page 5).

Neither the NTT nor the BLM's policy intended the conservation measures in the NTT Report to be automatically applied across the range without intervening consideration through detailed land use planning and NEPA analysis. On December 27, 2011, the BLM issued Instruction Memorandum 2012-044 requiring BLM offices to "consider all applicable conservation measures when revising or amending its RMPs in Greater Sage Grouse habitat" (IM-2012-44, Policy/Action). IM-2012-044 also notes that "while these conservation measures are range-wide in scale, it is expected that at the regional and sub-regional planning scales there may be some adjustments of these conservation measures in order to address local ecological site variability." The NTT understood that the measures in its report would be evaluated alongside competing land use planning considerations and with follow-up environmental analysis relating to the conservation efficacy of its measures. As the NTT Report described, the conservation measures are not themselves management decisions but rather have been prepared "to assist [the BLM] in making management decisions." (NTT Report, Introduction, page 5.) IM-2012-044 states that "the NTT-developed conservation measures were derived from goals and objectives developed by the NTT" and that "these goals and objectives are a *guiding philosophy* that should *inform* the goals and objectives developed for individual land use plans. However, *it is anticipated that individual plans may develop goals and objectives that differ and are specific to individual planning areas*" (emphasis added).

IM-2012-44 stated "the conservation measures developed by the NTT…must be considered and analyzed, as appropriate, through the land use planning process" (ibid). The BLM's policy requiring consideration of the conservation measures in the NTT Report allowed for individual planning efforts to make adjustments to the report's conservation measures. IM-2012-44 notes that "while [the NTT Report's] conservation measures are range-wide in scale, *it is expected* that at the regional and sub-regional planning scales there may be some adjustments of these conservation measures in order *to address local ecological site variability*" (emphasis added). With specific consideration of this variability, each BLM planning and NEPA effort as part of the 2015 amendment efforts developed and analyzed a range of alternative approaches for GRSG habitat management in each sub-region/state. Through this process, the BLM considered local and regional differences, analyzing the effect of each alternative approach locally and cumulatively.

The NTT also developed its conservation measure recommendations without taking into consideration other legal and regulatory requirements associated with land use planning and NEPA. For example, the NTT's range-wide conservation measures did not consider State or local GRSG conservation efforts, the regulatory process to determine areas for unsuitability as outlined under 43 Code of Federal Regulations (CFR) 3461, or BLM planning guidance directing planning teams that "when applying leasing restrictions, the least restrictive constraint to meet the resource protection objective should be used" (BLM-H-1601 Appendix C page 24). In recognition of instances where the NTT Report's conservation measures were not consistent with law, regulation, or policy, the BLM's policy direction in IM-2012-044 directs that "when considering the [NTT Report's] conservation measures…BLM offices should ensure that implementation of any of the measures is consistent with applicable statute and regulation. Where inconsistencies arise, BLM offices should consider the conservation measure(s) to the fullest extent consistent with such statute and regulation."

Each BLM 2015 planning effort fully considered the broad, range-wide recommendations from the NTT Report through the required NEPA process. Through careful consideration of the NTT's conservation measures, as well as local expertise, monitoring, partnerships, and other resource and land uses, the BLM developed GRSG management goals, objectives, and management actions that accounted for the variability of habitat and resources across the range.

What the NTT Report and its Conservation Measures Are:

- The NTT Report included science-based management considerations for GRSG to promote sustainable GRSG populations.
- The conservation measures were to be considered and analyzed through the BLM's land use planning process.
- The conservation measures are range-wide in scale, not accounting for local variability.
- The conservation measures were a starting point to be used in the BLM's planning process.

What the NTT Report and its Conservation Measures Are Not:

- Unlike FLPMA's requirement that the BLM develop and modify Land Use Plans in coordination with state and local plans and policies, the NTT Report was not developed with input from or consideration of plans, policies, or programs of State, Tribal, or local government agencies.
- The conservation measures were not developed using a systematic interdisciplinary approach, as required by FLPMA for land use plans.
- The NTT Report presented conservation measures that would provide food and habitat for one species of wildlife but did not consider other FLPMA requirements for BLM to manage for other species and resources while also recognizing the need for sources of minerals, food, timber and fiber from public lands.
- The NTT Report is not a land use plan, or an amendment or revision to a land use plan.
- The conservation measures were based on best available science at the time and do not provide for future updates in scientific knowledge or technological advancements.
- When preparing the NTT Report, the NTT did not complete a NEPA analysis on its conservation measures. Instead, the BLM completed NEPA and land use planning processes in 2015 and 2019 to assess the environmental consequences of the NTT Report's conservation measures, as well as alternatives to those measures—and to account for competing land management considerations.

6.1 US FISH AND WILDLIFE CONSERVATION OBJECTIVES TEAM REPORT (2013)

In 2012 the director of the USFWS convened a Conservation Objectives Team (COT) of state and USFWS representatives. The team developed a peer-reviewed report (COT Report) that delineated objectives based on the "best scientific and commercial data available at the time of its release" (COT Report, page ii). The COT Report, released in March 2013, identifies conservation objectives, measures, and options for each of the GRSG threats assessed. The COT Report also identified Priority Areas for Conservation (PACs) which were identified as "the most important areas needed for maintaining GRSG representation, redundancy, and resilience across the landscape" (ibid, page 13). Unique compared to the NTT Report, the COT Report identified threats to each PAC, recognizing that threats vary across the range, and therefore corresponding management should vary to address those threats. The preface of the report is clear that it "is guidance only" and that the "identification of conservation objectives and measures does not create a legal obligation beyond existing legal requirements" (ibid, page ii). Further, the preface notes that the objectives "are subject to modification as dictated by new findings, changes in species' status, and the completion of conservation actions" (ibid, page ii).

The COT Report clearly identifies the necessity to adapt GRSG conservation goals, objectives, and measures due to variability across the range. The COT noted that "due to the variability in ecological conditions and the nature of the threats across the range of the sage-grouse, *developing detailed, prescriptive species or habitat actions is not possible at the range-wide scale*" (emphasis added) (COT Report, Section 5- Conservation Objectives, page 31). The COT Report summarizes the relationship between its range-wide conservation goals, objectives, and measures and the state-specific planning efforts, noting that "specific strategies or actions necessary to achieve the following conservation objectives must be developed and implemented at the state or local level, with the involvement of all stakeholders" (ibid).

The BLM received the COT Report when developing its 2013 Draft EIS and fully considered it prior to Draft EIS publication, providing for public review of the BLM's evaluation. The BLM evaluated the range of alternatives and determined that the threats and impacts to GRSG addressed by the COT Report were addressed in the Draft EISs. Following public comments and development of the 2015 Proposed Plans, the Final EISs updated the crosswalk between the USFWS threats and the BLM program areas, showing that all the threats for which the BLM has discretion were addressed. A table was added to the 2015 Final EISs Executive Summary that showed the management actions from the 2015 Proposed Plans that addressed the COT Report threats.

On October 2, 2015, the USFWS determined that "listing the sage-grouse as a threatened or endangered species is not warranted…" (Federal Register Vol. 80, No. 191, 59936). One of the reasons for this determination was that "the new Federal land-management paradigm is established in 98 amended Federal Plans that reduce and minimize threats to the species in the most important habitat for the species" (ibid).

What the COT Report and its Objectives, Measures and Options Are:

- The COT Report is a compilation of reasonable objectives, based upon the best scientific and commercial data available at the time of its release, for the conservation and survival of GRSG.
- The COT Report is guidance to federal land management agencies, state GRSG teams, and others developing efforts to achieve conservation for GRSG.
- The COT Report was clear that its objectives were subject to modification based on new findings, changes in species' status, and the completion of conservation actions.

- The COT Report was developed by a team of state and USFWS representatives selected by their respective state or agency.

What the COT Report and its Objectives, Measures and Options Are Not:

- The COT Report is not a recovery plan, conservation strategy, or conservation agreement.
- The COT Report did not include input from BLM biologists or BLM field staff familiar with local habitat conditions and threats.
- When preparing the COT Report, the USFWS did not complete a NEPA analysis on its conservation objectives, measures, and options. Instead, the BLM completed NEPA and land use planning processes in 2015 and 2019 to assess the environmental consequences of the COT Report conservation objectives, measures, and options, as well as alternatives to those objectives, measures, options—as they applied to the development of affected BLM land use planning decisions.

Appendix 7

Greater Sage-grouse Monitoring Framework

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Appendix 7. Greater Sage-grouse Monitoring Framework

7.1 FORWARD

The revised BLM Greater Sage-Grouse (GRSG) Monitoring Framework was developed after five years of implementing the 2015 BLM and USFS GRSG Monitoring Framework which culminated in the 2020 Greater Sage-Grouse Five-year Monitoring Report. Since implementing the monitoring efforts described in the original Monitoring Framework, new data has become available and new approaches to analyzing these data have been developed. This update maintains the existing measures included in the original document and expands upon them to include this new science. Measures for monitoring are identified at two scales: the rangewide scale and land use plan scale. The former will provide insight into habitat conditions and BLM management actions across jurisdictional boundaries which will, in turn, provide context to the smaller scale land use plan monitoring described herein. For each scale of monitoring a suite of 6 measures are identified and a methodology which the BLM will utilize to collect information informing each measure is described. Importantly, specific datasets and analysis approaches may be modified through the implementation of this monitoring framework so that BLM can adapt to new information as it becomes available. The data collected and analyzed for each of the measures described at both scales will vary in spatial extent. For example, measures leveraging remotely sensed data can and will be examined across all habitat management areas within the planning area as well as the BLM managed subset of these habitats. Other measures will apply specifically to BLM managed habitats or subsets thereof (i.e. disturbance and density caps). Further, land use plan decisions may identify specific spatial extents at which some measures are analyzed and tracked, such as to inform adaptive management threshold status. As such, during the implementation of this monitoring framework, the spatial extent of all monitoring and analyses addressing the identified measures will be documented and communicated during effectiveness evaluation efforts.

This Monitoring Framework is related to several other pieces of larger land use plans and associated management direction they provide. The GRSG Monitoring Framework leverages data, information, and assessments to monitor land use plan implementation. Appendix 8 of this Land Use Plan (LUP) establishes GRSG habitat objectives, indicators, and benchmarks. These indicators and benchmarks are utilized in the Habitat Assessment Framework (HAF). The results of these habitat assessments inform the wildlife and/or sensitive species component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2). The GRSG Monitoring Framework provides a consistent format for reporting if the LUP objectives are being met or making progress to being met, based on the results of these assessment and planning tools.

Table 7-1. Relationships of LUPs, HAF, LHS, and MF

Land Use Plan (LUP)	GRSG Habitat Assessment Framework (HAF)	Land Health Standards Evaluation (LHS)	GRSG Monitoring Framework (MF)
Sets GRSG habitat objective(s) and identifies the GRSG habitat indicators and benchmarks from best available science for evaluating progress toward meeting the objective.	Provides methods to assess GRSG habitats at multiple scales, using the indicators and benchmarks from the applicable LUP Habitat Indicators appendix.	Evaluates if the sage-grouse portion of the Special Status Species Land Health Standard is achieved or significant progress towards achievement is made. These evaluations utilize HAF results along with other data.	Provides framework for reporting progress toward achieving the objective(s) of the LUP, including habitat suitability.

7.2 SECTION I: RANGEWIDE MONITORING

7.2.1 Introduction

This rangewide monitoring section of the BLM Revised Greater Sage-Grouse (GRSG) Monitoring Framework is an update from the original BLM and USFS GRSG Monitoring Framework (2015) expands and clarifies the BLM's GRSG rangewide habitat condition monitoring and reporting. Described here are the six measures (**Table 7-2**), and associated updated methodologies, incorporating the original monitoring measures from 2015 (habitat condition and habitat degradation) with additional measures (land cover, habitat indicators, habitat suitability and population trend) that guide the BLM's GRSG monitoring and reporting.

The information gathered from monitoring and reporting on the six rangewide measures (**Table 7-2**) is intended to inform an evaluation of BLM's effectiveness (Section III of this BLM Revised GRSG Monitoring Framework) toward meeting the BLM's overarching goal for greater sage-grouse: *to conserve and manage greater sage-grouse habitats to support persistent, healthy populations, consistent with BLM's sensitive species policy and in cooperation with other conservation partners. Conservation and management should maintain existing connectivity between GRSG populations.*

Table 7-2. The Six Rangewide Monitoring Measures, Associated Sub-Measures, Monitoring Questions and Data Sources for BLM Monitoring of GRSG Habitat Conditions and Population Trends

Measures	Monitoring Questions	Data
Measure 1: Vegetation Availability and Condition		
Measure 1a: Vegetation Condition and trend	What is the status and trend of the habitat indicators describing habitat characteristics important to GRSG as well as ecological threats to GRSG (e.g., annual invasive grasses, bare ground) on BLM lands?	AIM
Measure 1b: Current and Historical Amounts of Sagebrush	What is the current versus historical extent of sagebrush within GRSG habitat? How have recent disturbances (fires and treatments) affected the extent of sagebrush?	LANDFIRE
Measure 1c: Percent Sagebrush Cover and Trend	What is the percent cover of sagebrush and trend in sagebrush percent cover?	RCMAP
Measure 1d: Percent Annual Herbaceous Cover and Trend	What is the percent cover and trend of annual herbaceous cover?	RCMAP

Measures	Monitoring Questions	Data
Measure 1e: Percent Tree Cover within Sagebrush	What is the percent cover and trend of tree cover in sagebrush communities?	RCMAP
Measure 2: Habitat Degradation and Development Intensity in GRSG Habitat		
Measure 2a: Habitat degradation	What is the estimated amount of habitat degradation rangewide and the estimated change in the amount?	Geospatial analysis using datasets representing anthropogenic development
Measure 2b: Intensity of degradation	What is the estimated density of energy development activities and the change in the estimated density?	Geospatial analysis using datasets representing anthropogenic development
Measure 2c: Degradation cap compliance	Were any disturbance or density caps above project scale exceeded?	Geospatial analysis using datasets representing anthropogenic development
Measure 2d: Reclamation	What is the amount of reclaimed energy-related degradation on BLM lands and the change in the amount?	Geospatial analysis using datasets representing reclamation on BLM-managed lands
Measure 3: GRSG Habitat Suitability		
Measure 3a: Habitat assessment status	What is the status of GRSG habitat assessments at the mid- and fine-scales across the range?	BLM's Habitat Assessment Framework (HAF) tracking system
Measure 3b: Habitat suitability at mid and fine scales	What is the suitability of GRSG habitats at mid and fine spatial scales across the range?	BLM's HAF tracking system
Measure 4: Achievement of Land Health Standards in GRSG Habitat		
Measure 4a: Status of land health evaluations	How many acres were evaluated for achievement of the SSS/Wildlife Habitat Land Health Standard in GRSG habitat across the range?	BLM's Land Health Standards Database
Measure 4b: Status of land health standards	For areas that have been evaluated in GRSG habitat, what is the status of land health and what are the causes of non-achievement (as applicable)?	BLM's Land Health Standards Database
Measure 5: BLM On-The-Ground Conservation and Restoration Efforts for GRSG		
Measure 5a: Summary of conservation efforts	How many acres/miles were conserved or restored by treatment or action type in GRSG habitat across the range?	NFPORS/VMAP, Other BLM Project Tracking
Measure 6: GRSG Population Trend Rangewide		
Measure 6a: Annual Range-wide Trend	What is the rangewide average annual population trend?	USGS Rangewide Population Trend Analysis for Greater Sage-Grouse
Measure 6b: Cumulative Range-wide Trend	What is the rangewide cumulative population trend?	USGS Rangewide Population Trend Analysis for Greater Sage-Grouse

7.2.2 Methods

The datasets used, and the land ownerships included in the data, vary by monitoring type. For example, the monitoring of habitat indicators uses on-the-ground data and information from BLM lands only. Conversely, the rangewide monitoring of landcover, sagebrush availability and disturbance use geospatial data covering all land ownerships. The population trend monitoring uses state wildlife agencies' data that also covers all land ownership in GRSG habitat. Best available datasets outlined here will be used to analyze the monitoring measures and for reporting on GRSG habitat however BLM reserves the right to change data and analysis methods as it deems appropriate.

Measure 1. Vegetation Availability and Condition

Sagebrush availability and vegetation condition analyses are analyzed rangewide for GRSG, excluding the Bi-State Distinct Population Segment and the Columbia Basin population. Analyses differ in the timeframe and type of data used (remotely sensed products vs collected on the ground), the lands to which the analyses apply (all lands vs BLM-managed lands), and in GRSG habitat.

Datasets selected for monitoring must meet key criteria to ensure consistent and accurate monitoring:

- The dataset must be consistent rangewide
- There must be a known accuracy level or level of confidence for the dataset
- The dataset must be based in peer-reviewed science
- The dataset must be maintained and have a known update plan
- The dataset must be readily available
- Consistent methodology must have been used to derive datasets that are compared; different datasets may be used to calculate different measures.

The following datasets, which meet the key criteria, should be analyzed for Measure 1; however, additional data and analyses may also be considered, if justified and documented:

1. BLM Assessment Inventory & Monitoring (AIM) for 1a,
2. LANDFIRE (Picotte et al. 2016) for 1b and
3. Rangeland Condition Monitoring Assessment and Projection (RCMAP; Rigge, 2020) for 1c, 1d, and 1e.

We considered three types of fractional datasets for calculating Measures 1c, 1d, and 1e. Fractional datasets contain pixels or cells that represent areas on the ground which may each contain vegetation cover types such as sagebrush, trees, or herbaceous. A fractional dataset represents the percentage of one vegetation cover type that is present in each pixel (e.g., 50 percent sagebrush, 25 percent trees, or 25 percent herbaceous). The three datasets considered, that are new since the 2015 BLM/USFS GRSG Monitoring Framework, are:

- Landscape Cover Analysis and Reporting Tools (LandCART; Zhou et al 2020),
- Rangeland Analysis Program (RAP; Allred et al 2021), and
- RCMAP.

Accuracies and applicability for the three types of datasets are similar but mixed. BLM Tech Note 456, which compares these datasets, recommends that users consider their individual data needs and uses when selecting from them (Savage et al 2022). **Table 7-3** summarizes some characteristics of the datasets specifically considered for this BLM Revised GRSG Monitoring Framework and, although not comprehensive, reflects the intent to use RCMAP. RAP does not have a sagebrush dataset and it is currently difficult to obtain rangewide data from LandCART but improvements are in progress. Importantly, BLM partners with USGS to fund RCMAP, ensuring the reliability of readily available data, regular updates and maintenance, and data suited for use in this BLM Revised GRSG Monitoring Framework. See **Appendix B, Table B2** for the RCMAP Accuracy Assessment. We recommend using only one data type (for 1c, 1d, & 1e) such that data can be overlaid or compared without concern for different methods that created the data. If additional fractional datasets become available and fit the key criteria above, they may be considered for use in calculating the Measures 1c, 1d, and 1e.

Table 7-3. Dataset Characteristics For Measure 1c, 1d, And 1e

Dataset Characteristics	LandCART	RAP	RCMAP
Annual herbaceous	Y	Y	Y
Sagebrush	Y	N	Y
Tree cover	Y	Y	Y
Rangewide extent	Difficult	Y	Y
Trend	Y	User calculates	Y

Measure 1a: What is the status and trend of the habitat indicators and threats to GRSG (e.g., non-native invasive grasses, bare ground) on BLM lands?

The vegetation condition monitoring is based on estimates for 6 greater sage-grouse habitat indicators (e.g., sagebrush cover) and estimates of 7 threat indicators (e.g., invasive species) (Herrick et al. 2017). These estimates will be based on field data collected through the BLM's national monitoring efforts on BLM-managed rangeland ecosystems. These data are part of the Assessment, Inventory, and Monitoring (AIM) program including the National AIM Survey (also known as the Landscape Monitoring Framework (LMF), Yu Li et al. 2020 and generally described in Karl et al. 2016). The AIM estimates provide consistent and standardized data about vegetation conditions broadly across the range.

The 6 GRSG habitat indicators are:

1. Percent cover of sagebrush
2. Mean sagebrush species height
3. Proportion of sagebrush that is spreading shaped
4. Percent cover of perennial grasses and perennial forbs
5. Mean herbaceous plant species height
6. Percent of lands where native plants make up 95% or more of vegetation cover

The 7 threat indicators are:

1. Proportion of sagebrush that is columnar shaped
2. Percent cover of bare ground
3. Proportion of nonnative invasive species present
4. Proportion where ≥5% of foliar cover is comprised of nonnative invasive species

5. Proportion of vegetation composed of annual grasses
6. Proportion of vegetation composed of nonnative invasive plant species
7. Percent of lands with >3% cover of pinion – juniper.

The vegetation condition summary is reported for BLM-managed GRSG habitats. Also of importance is that the data is collected in areas that retain rangeland vegetation and exclude areas physically converted to agriculture or disturbance from development.

The estimates combine indicator data from all sampling locations collected within a given year. An analysis for trend will be performed for each of these indicators. Analysis details will be included in monitoring reports.

Measure 1b: What is the current versus historical extent of sagebrush within the range of greater sage-grouse? How have recent disturbances affected the extent of sagebrush?

Measure 1b estimates both historic and current extent of sagebrush. The datasets to calculate these metrics are the most recent LANDFIRE Biophysical Setting (BpS), Existing Vegetation Type (EVT), Existing Vegetation Cover (EVC), and Existing Vegetation Height (EVH). EVT will be adjusted for recent fires and BpS will be adjusted for Sagebrush areas in EVT (see below for details). LANDFIRE data meets the key criteria defined above and has ample thematic resolution with several different sagebrush vegetation classes. For the 2015 Monitoring Framework, vegetation classes from LANDFIRE EVT and BpS were selected to use in the sagebrush and sagebrush potential or historic layers by identifying the classes that include sagebrush species and that could provide suitable seasonal habitat for greater sage-grouse (See **Appendix A, Table A1**). In these classes, sagebrush may not be the dominant species, but it is an attempt to include the maximum likely geographic extent and some of the uncertainty on the ground captured by products derived from remotely sensed data (see **Appendix B, Table B1** for Agreement Assessment details). The sagebrush layer used for reporting will be created using these selected classes from EVT. The following two metrics will be reported for each year:

1) 1.b.1. The amount of sagebrush in GRSG habitat compared with the amount of sagebrush that GRSG habitat could historically support without disturbance, that is, the existing sagebrush versus the potential sagebrush. The measure will be calculated as [the existing area of sagebrush] divided by [the potential area of sagebrush expected pre-Euro American settlement]. The data will be summarized including a histogram, mean and standard deviation, and median and quartiles for GRSG habitat.
2) 1.b.2. Recent vegetation treatments (NFPORS and VMAP data) are integrated into some LANDFIRE data causing changes in EVH and EVC datasets but these changes are not reflected in EVT for now, although this may change (personal communication Daryn Dockter, Brian Tolk, May 2023). BLM will use EVH and EVC with EVT to determine how recent treatments affect the extent of sagebrush using the guidelines:
    a. If EVT = sagebrush but EVH or EVC = 0 for shrubs, then disturbance has likely removed the sagebrush. These pixels will be removed from the EVT dataset annually.
    b. If EVT = sagebrush and EVH = grass < 1.0 m, past disturbance has likely removed the sagebrush and grass or forbs are growing. These pixels will be removed from the EVT dataset annually.
    c. If EVT = sagebrush and EVH = shrub 1-3 m then there is likely sagebrush here. These pixels will be retained in the EVT dataset annually.
    d. These changes will be summarized across GRSG habitat.

LANDFIRE EVT includes fires burned up to the end of the previous fiscal year so updates will be needed for more recent fires and can be made using NIFC WFIGS *yyyy*, Interagency Fire Perimeters to Date (where *yyyy* is the current year). LANDFIRE processes postfire change detection using satellite imagery and MTBS. See below for LANDFIRE data accuracy and update details.

In EVT there are small areas that show sagebrush and sagebrush associated classes which are not matched in the BpS dataset. Based on the assumption that sagebrush is unlikely to expand in the short term, we assume that BpS is in error and these classes in BpS need to be adjusted to the classes shown in EVT. This adjustment supports the simple division of existing by potential sagebrush that is described above.

Because of concerns over the thematic accuracy of individual classes mapped by LANDFIRE, all ecological systems listed in **Appendix A, Table A1** will be aggregated into three groups that represent sagebrush, sagebrush associated, and other vegetation types. With all ecological systems aggregated, the combined accuracy, measured as an agreement assessment, of the sagebrush base layer (EVT) will be much greater than if all categories were treated separately (LANDFIRE 2016 Remap EVT Agreement Assessment). We used the Southwest (AZ, CA, NV, UT, west CO, and west NM) and Northwest GeoAreas (ID, MT, OR, WA, and WY) to estimate sagebrush assessment agreements where sagebrush, sagebrush associated, and other field data are assigned autokeys and these are compared to LANDFIRE EVT (**Appendix B, Table B1**). The Southwest GeoArea agreement assessments were 55% for sagebrush, and 50% for sagebrush associated. The Northwest GeoArea agreement assessments were 69% for sagebrush and 57% for sagebrush associated.

LANDFIRE maintains a substantial disturbance spatial database using agency and other data; refinements to the process were made in 2020 with plans to update annually. LANDFIRE also uses National Landcover Database (NLCD) roads and urban classes, Monitoring Trends in Burn Severity (MTBS), Burned Area Reflectance Classification (BARC), and Rapid Assessment of Vegetation Condition after Wildfire (RAVG) to apply changes to the data on a yearly basis. LANDFIRE uses a change algorithm to account for fires and models postfire vegetation recovery. While LANDFIRE intends to update annually, refinements may still be made to the EVT data for more recent changes due to wildfire (see above) and anthropogenic disturbances such as agriculture and urban, using the processes and datasets recommended below.

LANDFIRE uses the National Land Cover Database (NLCD) (Fry et al. 2011) to make urban adjustments including imperviousness dataset, high, medium, and low development, roads, open space, and broad vegetation types. NLCD is prioritized over other datasets if there is a discrepancy in land cover. NLCD impervious data has a roads description including primary, secondary, and tertiary; two track roads are not included. NLCD obtains building footprints from Microsoft data and USGS processing. NLCD data are generated on a 5-year cycle and are specifically designed to support monitoring efforts but the lag in NLCD may limit LANDFIRE data. To determine agricultural areas and types, LANDFIRE uses the annually updated National Agricultural Statistics Service (NASS) Cropland Data Layer (CDL). The LANDFIRE disturbance processing will also pick up agricultural expansion and treatments when they are reported.

Measure 1c: What is the percent cover of sagebrush and trend in sagebrush percent cover?

Sagebrush fractional cover data will be used to estimate the current proportion of sagebrush in GRSG habitat. The most recent RCMAP fractional sagebrush cover will be used to calculate this measure (Rigge et al. 2022).

For each year of monitoring, the statistical distribution of percent sagebrush cover will be calculated and reported including a histogram, mean and standard deviation, and median and quartiles at spatial scales

relevant to BLM land use plan decisions and management, for example, Habitat Assessment Fine-scale extents. If updated literature suggests levels of percent sagebrush cover that are more appropriate to GRSG, these thresholds will be applied in addition to the standards described above. For example, if less than x% sagebrush is determined to be unsuitable for GRSG across GRSG habitat, assessment of the area of and distribution that is above and below this x% cover threshold will be conducted.

Shi et al (2022) modeled time-series trends in RCMAP continuous vegetation using two methods: 1) linear regression and 2) breaks and stable states modeling. We recommend using the linear trends results because, while accuracy was similar between the two modeling versions, linear trend results are more easily interpreted (Shi et al. 2022). For each pixel in the linear trends data, the slope represents the average percent cover change and the p-value is the confidence in the change value for each year. Within GRSG habitat, the trend of sagebrush cover will be monitored using the time-series linear trends data from RCMAP for all years of data to calculate the summary statistics as described above.

Measure 1d: What is the percent cover and trend of annual herbaceous cover?

The most recent RCMAP Annual Herbaceous fractional data will be used to estimate the current area, distribution, and proportion of annual forbs and grasses in GRSG habitat. In the Western US, the RCMAP annual herbaceous dataset primarily represents annual invasive species such as Cheatgrass, Medusahead, Red Brome, and annual mustards (MLRC RCMAP website, https://www.mrlc.gov/data/rcmap-annual-herbaceous-cover-1, accessed March 2023). At higher elevations and in California, the annual herbaceous cover dataset may also represent native annual herbaceous vegetation types. (https://www.mrlc.gov/data/rcmap-annual-herbaceous-cover-1, accessed March 2023).

For each year of monitoring, the statistical distribution of percent annual herbaceous cover will be calculated including a histogram, the mean and standard deviation, and median and quartiles at spatial scales relevant to BLM land use plan decisions and management, for example, at Habitat Assessment Fine-scale extents. If updated literature suggests levels of percent annual herbaceous cover that are more appropriate to GRSG, apply these thresholds in addition to the standards described above. For example, if less than x% annual herbaceous cover is determined to be unsuitable for GRSG across GRSG habitat, assessments of and distribution of annual herbaceous cover that is above and below this x% cover threshold will be conducted.

The trend of annual herbaceous cover will be reported for all years of data using the annual time-series linear trends data from RCMAP to calculate the summary statistics described above. The trend of annual herbaceous cover will be compared to the trend in sagebrush cover in GRSG habitat.

Measure 1e: What is the percent cover and trend of tree cover in sagebrush communities?

Over the past several decades, many studies have found that GRSG avoid habitat near conifers (Nisbet et al 1983, Doherty et al, 2010; Fedy et al 2014; Doherty et al 2016; Westover et al 2016; Baxter et al 2017; Picardi et al 2020; Roth et al 2022;), survival tends to increase when GRSG inhabit areas further away from conifers (Brussee et al 2022), and that populations have increased when conifers are removed (Olsen et al 2021).

For the purposes of the Monitoring Framework, an upper limit threshold is needed to determine the percent of conifer cover within a certain distance of sagebrush that still provides suitable habitat for GRSG (see **Appendix C, Table C1** for summaries). Peer-reviewed findings are summarized in the following bullets:

- **0%** In NV, GRSG preferred areas with no conifer cover for lekking (Nisbet et al 1983) and for brood rearing to areas with 1 to 10% conifer cover (Brussee et al, 2022).

- **2%** In CA GRSG preferred < 2% conifer cover year-round (Coates et al 2017) and in NV/UT, GRSG preferred areas with < 2% conifer cover for breeding and summer season (Beers at al 2022).
- **3%** In OR and UT < 3% conifer was found to be more suitable for GRSG lekking and nesting within 800m and 1000m (Cook et al 2017), within 560m for lekking (Doherty et al 2021), and within 800m for nesting (Severson et al 2017).
- **4%** In OR, NV, UT, areas with < 4% conifer cover were found to be more suitable for nesting (Sandford et al 2017; Severson et al 2017) or found to be more suitable year-round within 400m and 800m and while there was sagebrush contiguity (Beers et al 2022). Areas with > 4% had no active leks (Baruch-Mordo et al 2013) or were found to be less suitable for lekking (Cook et al 2017).

We examined other work that obtained values outside of this range and determined that they were not useful for our purposes. In CA, large-scale evidence suggested that GRSG avoided areas with >5% conifer cover for brood rearing but 5% was set as a value instead of being determined by the data and the subsequent modeling was inconclusive (Casazza et al 2011). In NV/UT, Beers et al (2022) found that during winter GRSG selected areas with < 11% conifer cover but year-round 4% was a more appropriate threshold. In NV, GRSG avoided areas with > 30% conifer cover and selected areas with 10-30% cover within 1000m; the authors speculated that these unusually high conifer cover values may have been in areas where heterogenous shrub communities thrived and, in the absence of predators, attracted GRSG (Gibson et al 2015).

The range of 0 to 4% of tree canopy cover has been shown to have the lowest impacts on GRSG year-round in several states (**Appendix C, Table C1**). Within GRSG habitat the extent and summary statistics (histogram, mean and standard deviation, and median and quartiles) of tree cover that is within 1000m of sagebrush and 1) less than 4% and 2) greater than 4% will be calculated.

Within GRSG habitat, the trend of tree cover that is greater than 4% and is within 1000m of sagebrush will be calculated and reported for all years of data using the annual time-series linear trends data from RCMAP to calculate the summary statistics described above. The trend of tree cover will be compared to the trend in sagebrush cover in GRSG habitat at spatial scales relevant to BLM land use plan decisions and management, for example, at Habitat Assessment Fine-scale extents.

Measure 2. Habitat Degradation and Development Intensity in GRSG Habitat

Rangewide disturbance estimates

The measure of habitat degradation will be calculated by combining estimated footprints of, or the counts of, threats identified in **Table 7-4** within GRSG habitat. Footprints are estimated to be the direct area of influence of "active" energy and infrastructure and, in combination with feature counts, will be used as a surrogate for human activity. Data sources for each threat are found in **Table 7-4**, Geospatial Data Sources for Habitat Degradation and Intensity Calculations (Measure 2) in GRSG Habitat Excluding the Bi-State Distinct Population Segment and the Columbia Basin Population. Specific assumptions (inclusion criteria for data, width/area assumptions for point and line features, etc.) and methodologies are described below. All datasets will be updated annually to monitor changes through time and to inform adaptive management.

Table 7-4. Geospatial Data Sources for Habitat Degradation and Intensity Calculations (Measure 2) in GRSG Habitat Excluding the Bi-State Distinct Population Segment and the Columbia Basin Population

Degradation Type	Subcategory	Data Source	Direct Area of Influence	Area Source
Energy (oil & gas)	Wells	IHS; BLM (AFMSS)	5.0ac (2.0ha)	BLM WO-300
	Power Plants	Platts (power plants)	5.0ac (2.0ha)	BLM WO-300
Energy (coal)	Mines	BLM; USFS; Office of Surface Mining Reclamation and Enforcement; USGS Mineral Resources Data System	Polygon area (digitized)	Esri/ Google Imagery
	Power Plants	Platts (power plants)	Polygon area (digitized)	Esri Imagery
Energy (wind)	Wind Turbines	Federal Aviation Administration	3.0ac (1.2ha)	BLM WO-300
	Power Plants	Platts (power plants)	3.0ac (1.2ha)	BLM WO-300
Energy (solar)	Fields/Power Plants	Platts (power plants)	7.3ac (3.0ha)/MW	NREL
Energy (geothermal)	Wells	IHS	3.0ac (1.2ha)	BLM WO-300
	Power Plants	Platts (power plants)	Polygon area (digitized)	Esri Imagery
Mining	Locatable Developments	InfoMine	Polygon area (digitized)	Esri Imagery
Infrastructure (roads)	Surface Streets (Minor Roads)	Esri StreetMap Premium	40.7ft (12.4m)	USGS
	Major Roads	Esri StreetMap Premium	84.0ft (25.6m)	USGS
	Interstate Highways	Esri StreetMap Premium	240.2ft (73.2m)	USGS
Infrastructure (railroads)	Active Lines	Federal Railroad Administration	30.8ft (9.4m)	USGS
Infrastructure (power lines)	1-199kV Lines	Platts (transmission lines)	100ft (30.5m)	BLM WO-300
	200-399 kV Lines	Platts (transmission lines)	150ft (45.7m)	BLM WO-300
	400-699kV Lines	Platts (transmission lines)	200ft (61.0m)	BLM WO-300
	700+kV Lines	Platts (transmission lines)	250ft (76.2m)	BLM WO-300
Infrastructure (communication)	Towers	Federal Communications Commission	2.5ac (1.0ha)	BLM WO-300
Infrastructure (other vertical structures)	Tall Structures	Federal Avian Administration	2.5 acres (1.0ha)	Knick et al 2011

Rangewide Habitat Degradation Datasets and Assumptions

Energy (Oil and Gas Wells And Development Facilities)

This dataset will compile information from three oil and gas databases: the proprietary IHS database, the BLM Automated Fluid Minerals Support System (AFMSS) database, and the proprietary Platts (a McGraw-Hill Financial Company) GIS (hereafter, Platts) database of power plants.

Point data from wells active within the last 10 years from IHS and producing wells from AFMSS will be considered as a 5-acre (2.0ha) direct area of influence centered on the well point, as recommended by the BLM WO-300 (Minerals and Realty Management). Plugged and abandoned wells will be separated from the active oil and gas well dataset but retained for analysis inclusion if the date of well abandonment was before the first day of the reporting year (i.e., for the 2015 reporting year, a well must have been plugged and abandoned by 12/31/2014 to be removed).

Platts oil and gas power plants data (subset to operational power plants) will also be included as a 5-acre (2.0ha) direct area of influence.

Wells marked as plugged and abandoned within the last 10-years will also be segregated from the "active" and "active within the last 10 years" well data described above. These data attempt to quantify energy-related degradation that may have been reclaimed, but not necessarily fully restored to sage-grouse habitat. Direct area of influence will be considered 3 acres (1.2ha) (J. Perry, personal communication, February 12, 2014) be included in analyses.

Energy (Coal Mines)

Currently, there is no comprehensive dataset available that identifies the footprint of active coal mining across all jurisdictions. Therefore, point and polygon datasets will be used each year to identify coal mining locations. Data sources will be identified and evaluated annually and will include at a minimum: BLM coal lease polygons, U.S. Energy Information Administration mine occurrence points, U.S. Office of Surface Mining Reclamation and Enforcement coal mining permit polygons (as available), and U.S. Geological Survey (USGS) Mineral Resources Data System mine occurrence points. These data will inform where active coal mining may be occurring.

Coal power plant data from Platts power plants database (subset to operational power plants) will be included. Aerial imagery will then be used to digitize manually the active coal mining and coal power plants surface disturbance in or near these known occurrence areas. While the date of aerial imagery varies by scale, the most current data available from Esri and/or Google will be used to digitize (generally at 1:10,000 and below) active coal mine and power plant direct area of influence. Coal mine location data source and imagery date will be documented for each digitized coal polygon at the time of creation. Subsurface facility locations (polygon or point location as available) will also be collected if available, included in density calculations, and added to the active surface activity layer as appropriate (if an actual direct area of influence can be located).

Energy (Wind Energy Facilities)

This dataset will be a subset of the Federal Aviation Administration (FAA) Digital Obstacles point file. Points where attribution indicates the feature is a windmill will be included. The direct area of influence of these point features will be a circular totaling 3 acres (1.2ha) centered on each tower point. See the BLM's "Wind Energy Development Programmatic Environmental Impact Statement" (BLM 2005). Additionally, the Platts power plants database will be used for transformer stations associated with wind energy sites (subset to operational power plants), also with the same 3-acre (1.2ha) direct area of influence.

Energy (Solar Energy Facilities)

This dataset will include solar plants as compiled with the Platts power plants database (subset to operational power plants). This database includes an attribute that indicates the operational capacity of each solar power plant. Total capacity at the power plant was based on ratings of the in-service unit(s), in megawatts. Direct area of influence polygons will be centered over each point feature representing 7.3ac (3.0ha) per megawatt of the stated operational capacity, per the report of the National Renewable Energy Laboratory (NREL), "Land-Use Requirements for Solar Power Plants in the United States" (Ong et al. 2013).

Energy (Geothermal Energy Facilities)

This dataset will include geothermal wells in existence or under construction as compiled with the IHS wells database and power plants as compiled with the Platts database (subset to operational power plants). Direct area of influence of these point features will be measured by converting to a polygon dataset of 3 acres (1.2ha) centered on each well or power plant point.

Mining (Active Developments; Locatable, Leasable, Saleable)

This data theme is notably lacking in a comprehensive source spanning the range of GRSG. Currently, there are no known complete databases available for leasable or saleable mining sites beyond coal mines. Aerial imagery will be used to manually digitize large active mining surface disturbance in or near known occurrence areas originally informed by the proprietary InfoMine database. While the date of aerial imagery varies by scale, the most current data available from Esri and/or Google will be used to digitize (generally at 1:10,000 and below) active mine direct area of influence. Mine location data source and imagery date will be documented for each digitized polygon at the time of creation. Other data sources will be evaluated and used as they are identified or as they become available. Point data may be converted to polygons to represent direct area of influence unless actual surface disturbance is available.

Infrastructure (Roads)

This dataset will be compiled from the proprietary Esri StreetMap Premium for ArcGIS. Dataset features that will be used are: Interstate Highways, Major Roads, and Surface Streets to capture paved and "crowned and ditched" roads. The surface street data have been demonstrated to include some "two-track" and 4-wheel-drive routes. The direct area of influence for roads will be represented by 240.2ft, 84.0ft, and 40.7ft (73.2m, 25.6m, and 12.4m) total widths centered on the line feature for Interstate Highways, Major Roads, and Surface Streets, respectively (Knick et al. 2011).

Infrastructure (Railroads)

This dataset will be a compilation from the Federal Railroad Administration Rail Lines of the USA dataset. Non-abandoned rail lines will be used; abandoned rail lines will not be used. The direct are of influence for railroads will be represented by a 30.8ft (9.4m) total width (Knick et al. 2011) centered on the non-abandoned railroad line feature.

Infrastructure (Power Lines)

This line dataset will be derived from the proprietary Platts transmission lines database. Linear features in the dataset attributed as "buried" will be removed from the disturbance calculation. Only "In Service" lines will be used; "Proposed" lines will not be used. Direct area of influence will be determined by the kV designation: 1–199 kV (100ft/30.5m), 200–399 kV (150ft/45.7m), 400–699 kV (200ft/61.0m), and 700-or greater kV (250ft/76.2m) based on average right-of-way and structure widths, according to BLM WO-300 (Minerals and Realty Management).

Infrastructure (Communication Towers)

This point dataset will be compiled from the Federal Communications Commission (FCC) communication towers point file; all duplicate points will be removed (duplicates within the FCC dataset). Points will be converted to a polygon dataset by using a direct area of influence of 2.5 acres (1.0ha) centered on each communication tower point (Knick et al. 2011).

Infrastructure (Other Vertical Structures)

This point dataset will be compiled from the FAA's Digital Obstacles point file. This dataset generally captures all tall structures over 200 meters, with additional structures below this threshold captured in areas surrounding airports which could pose an aviation risk. For additional information please visit the FAA DOF FAQs site. Points where attribution indicates the feature is a windmill will be removed. Duplicate points from the FCC communication towers point file will be removed. The remaining features will be converted to a polygon dataset using a direct area of influence of 2.5 acres (1.0ha) centered on each vertical structure point (Knick et al. 2011).

Other Developed Rights-Of-Way

Currently, no additional data sources for other developed rights-of-way have been identified. Roads, power lines, railroads, pipelines, and other known linear features are represented in the categories described above. If additional features representing human activities are identified representing developed rights-of ways outside of the themes described above, they will be added to the degradation analyses using similar assumptions to those used with the threats described above.

Disturbance Inventories

The BLM has partnered with the USGS and, over the past several years, has begun inventorying existing disturbances via "heads-up" digitization using aerial imagery within current Priority Habitat Management Areas. This inventory includes several disturbance types in addition to those used in the rangewide analyses as outlined in the 2015 land use plan disturbance appendices:

Coalbed Methane and Other Energy-Related Retention Ponds

The footprint boundary will follow the fence line and includes the area within the fence line surrounding the impoundment. If the pond is not fenced, the impoundment itself is the footprint. Other infrastructure associated with the containment ponds (roads, well pads, etc.) will be captured in other disturbance categories.

Meteorological Towers

This feature includes long-term weather monitoring and temporary meteorological towers associated with short-term wind testing. The footprint boundary includes the area underneath the guy wires.

Nuclear Energy Facilities

The footprint boundary includes visible facilities (fence, road, etc.) and undisturbed areas within the facility's perimeter.

Airport Facilities and Infrastructure (Public And Private)

The footprint boundary will follow the boundary of the airport or heliport and includes mowed areas, parking lots, hangers, taxiways, driveways, terminals, maintenance facilities, beacons and related features. Indicators of the boundary, such as distinct land cover changes, fences and perimeter roads, will be used to encompass the entire airport or heliport.

Military Range Facilities and Infrastructure
The footprint boundary will follow the outer edge of the disturbed areas around buildings and includes undisturbed areas within the facility's perimeter.

Hydroelectric Plants
The footprint boundary includes visible facilities (fence, road, etc.) and undisturbed areas within the facility's perimeter.

Recreation Areas and Facilities
This feature includes all sites/facilities larger than 0.25 acres in size. The footprint boundary will include any undisturbed areas within the site/facility.

Where this inventory is complete in GRSG habitat and if the digitization is within an acceptable timeframe (ie. not deemed outdated), these disturbance data will also be used to evaluate the existing disturbance footprint and density of development.

Rangewide Habitat Degradation and Development Intensity Data Combination and Calculation Approaches
The threats targeted for measuring human activity (**Table 7-4**) and intensity of activities will be converted to direct area of influence polygons as described for each data source above. These threat polygon layers will be combined to create one overall polygon layer representing footprints of estimated active human activity in GRSG habitat. Individual datasets, however, will be preserved to indicate which types of threats may be contributing to overall habitat degradation. For intensity calculations, source data locations will be preserved with no additional removal beyond the methodology described above. Thus, overlapping inputs will be retained such that the density calculation reflects an overall intensity of development.

More complex disturbance and density estimation approaches may also be implemented, leveraging datasets described above, to facilitate a more complete picture of the level anthropogenic disturbance within GRSG habitat and potential impacts to GRSG habitats. For example, moving window analyses, estimating development density within multiple spatial extents, can facilitate an understanding of potential direct and indirect effects of development on GRSG habitats (e.g., see Decker et al (2014) and Leinwand, I., Carr, N. B., & Wood, D. J. A. (2016)).

Measure 2a: What is the estimated amount of habitat degradation rangewide and the estimated change in the amount?
Within GRSG habitats, divide the combined estimated area of the active/direct footprint by the total area of GRSG habitat at spatial scales relevant to BLM land use plan decisions and management, for example, at Habitat Assessment Fine-scale extents. (% disturbance in GRSG habitats).

Measure 2b: What is the estimated density of energy development activities and the change in the estimated density?
Within GRSG habitats, divide the total count of energy and mining locations (identified in **Table 7-4**) by the total area of GRSG habitat at spatial scales relevant to BLM land use plan decisions and management, for example, at Habitat Assessment Fine-scale extents. The resulting density will be reported in units of "count per square mile".

Measure 2c: Were any disturbance or density caps above project scale exceeded?
Leveraging the outcomes of analyses performed to answer 2a and 2b, summaries of any disturbance or density caps, as articulated in each land use plans, will be created.

Measure 2d: What is the amount of reclaimed energy-related degradation on BLM lands and the change in the amount?

Currently no single data repository exists which captures BLM's reclamation accomplishments in a spatial manner. As data becomes available depicting reclamation activities in sage-grouse habitats, they will be summarized.

Measure 3: Greater Sage-Grouse Habitat Suitability

Measure 3.a. What is the status of GRSG habitat assessments at the mid-, fine- and site scales across the range?

BLM will provide a rangewide summary of the total number of GRSG habitat assessments at the mid-, and fine-scales that are either completed or underway.

Measure 3.b. What is the suitability of GRSG habitats at mid and fine spatial scales?

BLM will summarize the results of the completed mid- and fine-scale assessments across the range of GRSG. Site-scale summaries are addressed in the Land Use Plan section of the BLM Revised GRSG Monitoring Framework.

Measure 4: Achievement of Land Health Standards in GRSG Habitat

Measure 4.a. How many acres were evaluated for achievement of the SSS/Wildlife Habitat Land Health Standard in GRSG habitat across the range?

BLM will evaluate Land Health Standards on BLM-managed lands that contain GRSG habitat. Reporting will include the number of acres: evaluated in the reporting period, evaluated prior to the reporting period, and not evaluated.

Measure 4.b. For areas that have been evaluated in GRSG habitat, what is the status of land health and what are the causes of non-achievement (as applicable)?

BLM will summarize the results of land health assessments conducted within the reporting period as follows: achieving, making progress towards achieving, or not achieving land health standards. Further, BLM will summarize the causes for not achieving land health when a causal factor analysis has been completed. As available, management responses will also be summarized.

Measure 5: BLM On-The-Ground Conservation and Restoration Efforts for GRSG

Measure 5.a. How many acres/miles were conserved or restored by treatment or action type in GRSG habitat?

BLM implements a variety of efforts to conserve and restore GRSG habitat. These efforts range from conifer removal and habitat restoration to riparian exclosures and fence modifications. BLM will use several existing databases to summarize the number of actions and number of acres/miles of conservation efforts by type.

Measure 6: GRSG Population Trend Rangewide

Measure 6.a. What is the rangewide average annual population trend?

The BLM will report rangewide population trends for GRSG. For rangewide populations trends, the BLM will report results from the most current version of the *Range-wide Population Trend Analysis for Greater Sage-Grouse (Centrocercus urophasianus)* conducted by the USGS (e.g., Coates et al. 2022). This analysis estimates annual rangewide populations trends using these scales:

- Range-wide average annual trend (e.g., 2.9% average annual decline from 1953-2021)
- Range-wide cumulative trend across three time periods:
  - Short (two oscillations, ~19 years) (e.g., 42.5% decline)
  - Medium (four oscillations, ~35 years) (e.g., 65.6% decline)
  - Long (six oscillations, ~55 years) (e.g., 80.1% decline)

7.3 SECTION II: LAND USE PLAN IMPLEMENTATION MONITORING

7.3.1 Introduction

One key goal of monitoring BLM land use plan implementation is to produce data and information to inform the GRSG portion of BLM land use plan (LUP) evaluations (as required by 43 CFR 1610.4-9 and the BLM H-1601-1 Land Use Planning Handbook). This section of the GRSG Revised Monitoring Framework describes the monitoring methodology for BLM to implement three types of monitoring and reporting across GRSG planning areas in 10 western states (CA, CO, ID, MT, ND, NV, OR, SD, UT, and WY):

- Land use plan implementation monitoring focuses on the primary cross-cutting GRSG conservation commitments (LUP objectives, decisions, and desired conditions) contained in the BLM 2023 GRSG LUP Amendments.
- Planning area GRSG habitat monitoring focuses on assessing suitability of habitat at the mid-, fine- and site scales. Planning area habitat monitoring also focuses on GRSG habitat availability to determine the status of BLM adaptive management habitat thresholds.

Planning area population monitoring focuses on GRSG population trends (tracked in partnership with state wildlife agencies and similar entities) to determine the status of BLM adaptive management population thresholds.

This Revised GRSG Monitoring Framework builds on the BLM's experience of annual monitoring and reporting on the first 5 years of GRSG BLM LUP implementation (2016 – 2020) published in the 5-year monitoring report (BLM Rangewide Monitoring Report, Herren et al. 2021). The structure for this section of the framework carries forward the monitoring questions from the Greater Sage-Grouse Monitoring Framework (Interagency Disturbance and Monitoring Subteam, May 2014) that have been modified to reflect the data, methods and information that has become available since 2015. Two additional monitoring questions have been added. The six monitoring questions are summarized in **Table 7-5**.

Table 7-5. The Six Land Use Plan Monitoring Measures, Associated Sub-Measures, Monitoring Questions and Data Sources for BLM Monitoring of GRSG Habitat Conditions And Population Trends

Measures	Monitoring Questions	Data
Measure 1: Status of greater sage-grouse habitat suitability within the planning area relative to the LUP objectives		
Measure 1a: Site-scale Habitat Suitability	What are the seasonal habitat suitability ratings as assessed by the Habitat Assessment Framework (HAF, Stiver et al. 2015, BLM TR 6710-1, as revised) and the combination of site-scale indicators?	State Office and National tracking of completed habitat assessments.
Measure 1b: Mid- and Fine-scale Habitat Suitability	What are the mid- and fine-scale suitability ratings for GRSG habitats that overlap with the planning area as assessed by the mid- and fine-scale indicators?	State Office and National tracking of completed habitat assessments.
Measure 1c: Status of Habitat Assessments	What is the status of habitat assessments completed within the planning area?	State Office and National tracking of completed habitat assessments.

Measures	Monitoring Questions	Data
Measure 2: Special Status Species/Wildlife habitat (SSS/WL) standard being achieved, or making progress towards being achieved, in allotments that contain greater sage-grouse habitats where evaluations have been completed since the 2024 ROD within the planning area		
Measure 2a: Achieving, Making progress towards achieving, or not achieving the SSS/WL standard.	What is the number of allotments evaluated in the planning area and how many are achieving, making progress towards achieving, or not achieving the SSS / WL standard?	State Office and National tracking of completed land health evaluations.
Measure 2b: If grazing allotments include areas that are not achieving the standard and current grazing was identified as a significant causal factor.	How many livestock grazing authorizations or allotments had management adjusted and what type of action was taken?	State Office tracking of grazing authorizations.
Measure 2c: If grazing allotments include areas that are not achieving the standard and current grazing was identified as a significant causal factor.	How many permits/leases include an adaptive management strategy that incorporates specific thresholds and defined responses?	State Office tracking of grazing authorizations.
Measure 3: BLM LUP disturbance and density measures (e.g., surface disturbance caps)		
Measure 3a: Disturbance Caps	Were the disturbance caps for BLM authorizations exceeded at any scale in GRSG HMAs in the planning area? If so, which projects that exceeded the disturbance cap were authorized and why?	State office tracking of authorizations requiring a disturbance cap. SDARTT or State managed disturbance databases.
Measure 3b: Density Caps	If applicable, were the density caps for BLM authorizations exceeded at any scale in GRSG HMAs in the planning area? If so, which projects that exceeded the density cap were authorized and why?	State office tracking of authorizations requiring a disturbance cap. SDARTT or State managed disturbance databases.
Measure 4: BLM LUP Adaptive Management habitat or population thresholds		
Measure 4a: Count of tripped thresholds	How many soft or hard BLM LUP adaptive management habitat or population thresholds were tripped in the planning area annually?	State office tracking of adaptive management thresholds.
Measure 4b: Count of Untripped / reversed thresholds	How many thresholds were reversed ("untripped") annually in the planning area?	State office tracking of adaptive management thresholds.
Measure 4c: Responses to tripped thresholds taken by BLM	In areas where thresholds were tripped or untripped, what responses as described in the BLM LUP were taken initially? Were the response implementation actions modified after a causal factor analysis, if applicable?	State office tracking of responses to adaptive management thresholds being tripped or untripped.
Measure 4d: Status of causal factor analyses	What is the status of causal factor analyses? For completed causal factor analyses, what factors were identified as possible causal factors?	State office tracking of causal factor analysis in response to adaptive management thresholds being tripped.

Measures	Monitoring Questions	Data
Measure 5: Compensatory Mitigation		
Measure 5a: Use of compensatory mitigation.	How many projects included compensatory mitigation annually? Which projects included compensatory mitigation?	State office tracking of compensatory mitigation.
Measure 6: Use of Waivers, Exceptions or Modifications (WEMs)		
Measure 6a: Projects where WEMs are granted	Of the stipulations in the land use plan developed for GRSG, which projects had a Waivers, Exceptions or Modification granted? Of these projects, which type of stipulation and in which type of GRSG Habitat Management Area were the WEMs granted?	State office tracking of WEMs associated with authorizations.

7.3.2 Methods

The following methods, datasets and reporting units apply to implementation, habitat and population monitoring across all BLM GRSG planning areas including variations that occur in some BLM GRSG planning areas due to partnerships with the states. Additional monitoring of GRSG conservation commitments may be implemented in BLM planning areas. The following descriptions of monitoring and reporting will be implemented to inform the six measures:

Measure 1: Status of greater sage-grouse habitat suitability within the planning area relative to the LUP objectives

Summaries of habitat suitability ratings, as assessed by the Habitat Assessment Framework (HAF, Stiver et al. 2015, BLM TR 6710-1, as revised), will be aggregated from National and State Office tracking mechanisms.

Measure 1a: What are the seasonal habitat suitability ratings as assessed by the Habitat Assessment Framework (HAF, Stiver et al. 2015, BLM TR 6710-1, as revised) and the combination of site-scale indicators?

The BLM will summarize the results of site-scale assessment reports that overlap with the planning area, reported in 5-year intervals. Example reporting would be: 50% suitable/ 20% Marginal/ 30% Unsuitable (proportional area estimates) or 50 plots S/ 20 plots M/ 30 plots U (plot counting).

Measure 1b: What are the mid- and fine-scale suitability ratings for GRSG habitats that overlap with the planning area as assessed by the mid- and fine-scale indicators?

The BLM will summarize the results of mid and fine-scale assessment reports that overlap the planning area.

Measure 1c: What is the status of habitat assessments completed within the planning area?

The BLM will summarize and report on the number of completed habitat assessments that overlap the planning area using the BLM National Operations Center tracking system.

Measure 2: Special Status Species/Wildlife habitat (SSS/WL) standard being achieved, or making progress towards being achieved, in allotments that contain greater sage-grouse habitats where evaluations have been completed since the 2024 ROD within the planning area.

Summaries of allotments achieving, making progress towards achieving, or not achieving the SSS/WL standard.

Measure 2a: What is the number of allotments evaluated in the planning area and how many are achieving, making progress towards achieving, or not achieving the SSS / WL standard?

The BLM will use the BLM's Land Health Standards database and State Office tracking mechanisms to monitor and report the achievement of the Special Status Species/Wildlife Habitat standard in completed

land health evaluations in GRSG habitat within the planning area and whether livestock grazing was identified as a significant causal factor in non-achievement.

Measure 2b: For grazing allotments with areas not achieving SSS/Wildlife Habitat standard and livestock grazing is a causal factor, how many livestock grazing authorizations or allotments had management adjusted and what type of action was taken?

The BLM will use available BLM databases and State Office tracking mechanisms to report on the number of livestock grazing authorizations or allotments that had management actions taken in each planning area. BLM Field, District and State Offices will coordinate to report on the type of actions taken (e.g., changes to season of use or amount of use, changes to infrastructure).

Measure 2c: For grazing allotments with areas not achieving SSS/Wildlife Habitat standard and livestock grazing is a causal factor, how many permits/leases include an adaptive management strategy that incorporates specific thresholds and defined responses??

BLM Field, District and State Offices will coordinate to report on the number of permits/leases that were modified to incorporate an adaptive management strategy that includes specific thresholds and defined responses in each planning area.

Measure 3: BLM LUP disturbance and density measures (e.g. surface disturbance and density caps)

The BLM field offices will use disturbance tracking databases (e.g., Surface Disturbance and Reclamation Tracking Tool (SDARTT)) or other methods to track the amount of disturbance authorized by the BLM. The BLM State Offices/BLM NOC will compile the results and summaries of habitat disturbance calculations conducted at the project and larger scale management areas within the planning area to include in monitoring reports.

Measure 3a: Were the disturbance caps for BLM authorizations exceeded at any scale in GRSG HMAs in the planning area? If so, which projects that exceeded the disturbance cap were authorized and why?

For projects that exceeded the disturbance cap, the BLM SOs will identify those projects, and the reason(s) why the disturbance cap was exceeded using available databases and project records (NEPA etc).

Measure 3b: If applicable, were the density caps for BLM authorizations exceeded at any scale in GRSG HMAs in the planning area? If so, which projects that exceeded the density cap were authorized and why?

If the land use plan includes a cap on the density of anthropogenic disturbances, the BLM SOs will identify the projects that were authorized which exceeded the density cap and provide the reason for the exceedance using available databases and project records (NEPA etc).

Measure 4: BLM LUP Adaptive Management habitat or population thresholds

BLM State Offices will complete adaptive management threshold and causal factor (as required) analyses annually as described in each land use plan.

Measure 4a: How many soft or hard BLM LUP adaptive management habitat or population thresholds were tripped in the planning area annually?

BLM State Offices, in coordination with BLM Field and District Offices, will report on annual calculations and counts of land use plan adaptive management thresholds tripped.

Measure 4b: How many thresholds were reversed ("untripped") annually in the planning area?
BLM State Offices, in coordination with BLM Field and District Offices, will report on annual calculations and counts of land use plan adaptive management thresholds reversed / untripped.

Measure 4c: In areas where thresholds were tripped or untripped, what responses as described in the BLM LUP were taken initially? Were the response implementation actions modified after a causal factor analysis, if applicable?
The BLM State Office, in coordination with BLM Field and District Offices, will summarize and report on the action(s) taken, as described in the land use plan, in response to each threshold being tripped or reversed.

Measure 4c: What is the status of causal factor analyses? For completed causal factor analyses, what factors were identified as possible causal factors?
The BLM State Office, in coordination with BLM Field and District Offices, will summarize the number and status of causal factor analyses required in response to adaptive management thresholds being tripped / untripped as required in the land use plan. For completed causal factor analyses, the BLM State Office, in coordination with BLM Field and District Offices, will also report on the identified causal factors (if known) and the responses or implementation actions taken to address the causal factors if different than those taken in response to a threshold being tripped / untripped (as applicable).

Measure 5: Compensatory Mitigation
BLM State Offices will track the implementation of the use of compensatory mitigation for individual authorizations.

Measure 5a: How many projects included compensatory mitigation annually? Which projects included compensatory mitigation?
The BLM State Office, in coordination with BLM Field and District Offices, will report on the number of authorized projects that included compensatory mitigation and report on which projects included compensatory mitigation.

Measure 6: Use of Waivers, Exceptions or Modifications (WEMs)
BLM State Offices will track the use of Waivers, Exceptions and Modifications (WEMs) in GRSG habitat.

Measure 6a: Of the stipulations in the land use plan developed for GRSG, which projects had a Waiver, Exception or Modification granted? Of these projects, which type of stipulation and in which type of GRSG Habitat Management Area were the WEMs granted?
The BLM State Office, in coordination with BLM Field and District Offices, will report on which projects had a Waivers, Exceptions or Modification granted for the stipulations in the land use plan developed for GRSG. Of these projects, the type of stipulation and in which type of GRSG Habitat Management Area the WEMs were granted will also be reported.

Table 7-6. Example Reporting Structure for WEMs

Waivers, Exceptions, Modifications granted by BLM by stipulation type and GRSG Habitat Management Type			
Project NEPA ID	**Stipulation Type (NSO, CSU, TL)**	**WEM Type (Waiver, Exception, Modification)**	**Habitat Type (PHMA, IHMA, GHMA)**
Example: NEPA number	TL	Exception	PHMA

7.4 SECTION III: EVALUATION OF EFFECTIVENESS

The information collected at the rangewide scale will be used by the BLM to provide a cohesive look at conditions across administrative boundaries. Measures which are analyzed across all lands (vegetation availability and condition, disturbance estimates, etc.) will be also analyzed on BLM managed lands so that BLM management influence on each can be inferred. Similarly, trend analyses and monitoring of changes through time for several measures will facilitate an understanding of BLM's influence on sage-grouse habitats. Conceptually, if rangewide monitoring identifies increasing sagebrush availability and improving vegetation conditions, decreasing disturbance, and a stable or increasing, there is evidence that the BLM's goal to conserve and maintain habitats for healthy populations and connectivity of populations have been met. Conversely, where information indicates that sagebrush is decreasing and vegetation conditions are degrading, disturbance in sage-grouse areas is increasing, and/or populations are declining relative to the baseline, there is evidence that the BLM's goal is not being achieved. Given the variety of measures this Framework outlines, the inherent challenges of establishing cause-and-effect relationships in mixed ownership landscapes and the complexity of population dynamics, such straight forward interpretations are expected to be minimal. To the best of the BLM's ability, factors driving observed changes will be identified and discussed when each measure is examined and synthesized with BLM's role in observed change identified (ie. Were changes due to drought or other climactic drives or directly related to BLM's management).

The information collected under the six land use plan questions of this monitoring framework will be leveraged in the broader land use plan effectiveness evaluation required in 43 CFR 1610.4-9 and as described in the BLM Land Use Planning Handbook (BLM H-1601-1, 2005). BLM State Offices will include sage-grouse specific sections in these evaluations of effectiveness for areas where sage-grouse management goals and objectives are applicable. The complexity of these evaluations may be based on the amount of sage-grouse habitats within the area, known issues within sage-grouse habitats or other factors deemed important by the State Office. The sage-grouse specific components of these evaluations will include, at a minimum, the information collected to inform the six land use plan measures. Additional local information that supports or clarifies the conclusions or effectiveness summaries shall also be considered. Information from the range wide effectiveness section of this monitoring framework will be used to inform the effectiveness evaluation at the land use plan level as applicable. This information will also be used to place the field office's effectiveness evaluation conclusions in context with how the implementation of sage-grouse management decisions are supporting the overall BLM's goals to conserve and manage greater sage-grouse habitats to support persistent, healthy populations, consistent with BLM's sensitive species policy and in cooperation with other conservation partners and maintain existing connectivity between sage-grouse populations. The interdisciplinary team will develop and recommend a suite of actions, as appropriate, the BLM can take to address any conclusions made within the sage-grouse portion of the larger effectiveness evaluation. These recommendations may vary from land use plan implementation changes to land use plan revision as described in the Land Use Planning Handbook, section VI.

7.5 REFERENCES

Allred, B.W., B.T. Bestelmeyer, C.S. Boyd, C. Brown, K.W. Davies, M.C. Duniway, L.M. Ellsworth, T.A. Erickson, S.D. Fuhlendorf, S.D., T.V. Griffiths, V. Jansen, M.O. Jones, J. Karl, A. Knight, J.D. Maestas, J.J. Maynard, S.E. McCord, D.E. Naugle, H.D. Starns, D. Twidwell, and D.R. Uden. Improving Landsat predictions of rangeland fractional cover with multitask learning and uncertainty. Methods in Ecology and Evolution 12(15): 841-849. https://doi.org/10.1111/2041-210X.13564

Baruch-Mordo, S., J.S. Evans, J.P. Severson, D.E. Naugle, J.D. Maestas, J.M. Kiesaecker, M.J. Falkowski, C.A. Hagan, and K.P. Reese, 2013. Saving sage-grouse from the trees: a proactive solution to reducing a key threat to a candidate species. Biological Conservation 167:233-241.

Baxter, J.J., R.J. Baxter, D.K. Dahlgren, and R.T. Larsen, 2017, Resource selection by greater sage-grouse reveals preference for mechanically-altered habitats: Rangeland Ecology and Management, 70(4): 493-503.

Beers, A.T. and S.N. Frey, 2022. Greater sage-grouse habitat selection varies across the marginal habitat of its lagging range margin. Ecosphere. 2022;13:e4146. https://doi.org/10.1002/ecs2.4146

Brussee, Brianne E., Peter S. Coates, Shawn T. O'Neil, Michael L. Casazza, Shawn P. Espinosa, John D. Boone, Elisabeth M. Ammon, Scott C. Gardner, David J. Delehanty, 2022. Invasion of annual grasses following wildfire corresponds to maladaptive habitat selection by a sagebrush ecosystem indicator species. Global Ecology and Conservation, Volume 37, September 2022. https://doi.org/10.1016/j.gecco.2022.e02147

Casazza, M. L., P. S. Coates, and C. T. Overton. 2011. Linking habitat selection and brood success in Greater Sage-Grouse. Pp. 151–167 in B. K. Sandercock, K. Martin, and G. Segelbacher (editors). Ecology, conservation, and management of grouse. Studies in Avian Biology (no. 39), University of California Press, Berkeley, CA. *(4) (PDF) Linking habitat selection and brood success in Greater Sage-Grouse*. Available from: https://www.researchgate.net/publication/258348291_Linking_habitat_selection_and_brood_success_in_Greater_Sage-Grouse [accessed Jun 27 2023].

Coates, P.S., B.G. Prochazka, C.L. Aldridge, M.S. O'Donnell, D.R. Edmunds, A.P. Monroe, S.E. Hanser, L.A. Wiechman, and M.P. Chenaille, 2023, Range-wide population trend analysis for greater sage-grouse (*Centrocercus urophasianus*)—Updated 1960–2022: U.S. Geological Survey Data Report 1175, 17 p., https://doi.org/10.3133/dr1175.

Coates, P.S., Brian G. Prochazka, Mark A. Ricca, K. Ben Gustafson, Pilar Ziegler, Michael L. Casazza, 2017. Pinyon and Juniper Encroachment into Sagebrush Ecosystems Impacts Distribution and Survival of Greater Sage-Grouse. Rangeland Ecology & Management 70 (2017) 25–38. http://dx.doi.org/10.1016/j.rama.2016.09.001

Cook, A.A., T.A. Messmer, and M.R. Guttery, 2017., Greater sage-grouse use of mechanical conifer reduction treatments in northwest Utah: Wildlife Society Bulletin, 41(1): 27-33.

Decker, K. L., A. Pocewicz, S. Harju, M. Holloran, M. M. Fink, T. P. Toombs, and D. B. Johnston. 2017. Landscape disturbance models consistently explain variation in ecological integrity across large landscapes. Ecosphere 8(4): e01775. 10.1002/ecs2.1775

Doherty, K.E., D.E. Naugle, and B.L. Walker, 2010. Greater Sage-Grouse Nesting Habitat: The Importance of Managing at Multiple Scales. Journal of Wildlife Management 74(7): 1544-1553.

Doherty, K.E., J.S. Evans, P.S. Coates, L.M. Juliusson, and B.C. Fedy, 2016, Importance of regional variation in conservation planning- A rangewide example of the greater sage-grouse: Ecosphere, 7(10), article e01462, 27 p.

Doherty, K., C.S. Boyd, J.D. Kerby, A. L. Sitz, L.J. Foster, M.C. Cahill, D.D. Johnson, and B.D. Sparklin, 2021. Threat-Based State and Transition Models Predict Sage-Grouse Occurrence while Promoting Landscape Conservation. Wildlife Society Bulletin 45(3):473–487; DOI: 10.1002/wsb.1200

Fedy, Bradley C., Kevin E. Doherty, Cameron L. Aldridge, Micheal O'Donnell, Jeffrey L. Beck, Bryan Bedrosian, David Gummer, Matthew J. Holloran, Gregory D. Johnson, Nicholas W. Kaczor, Christopher P. Kirol, Cheryl A. Mandich, David Marshall, Gwyn Mckee, Chad Olson, Aaron C. Pratt, Christopher C. Swanson, and Brett L. Walker, 2014. Habitat prioritization across large landscapes, multiple seasons, and novel areas: An example using greater sage-grouse in Wyoming. The Wildlife Society, Wildlife Monograph, 190(1): 1-39. https://doi.org/10.1002/wmon.1014

Gibson, Daniel, Erik J. Blomberg, Michael T. Atamian, James S. Sedinger, 2016. Nesting habitat selection influences nest and early offspring survival in greater sage-grouse. The Condor, 118(4): 689–702, https://doi.org/10.1650/CONDOR-16-62.1

LANDFIRE 2019. LANDFIRE Remap Existing Vegetation Type Agreement Assessment https://www.landfire.gov/remapevt_assessment.php and https://www.landfire.gov/documents/LANDFIRE_Remap_Agreement_Assessment_Summary.pdf (Accessed 9/2022)

Leinwand, I., N. B. Carr, & D. J. A. Wood, 2016. A Multiscale Index of Landscape Intactness for the Western U.S. [Data set]. U.S. Geological Survey. https://doi.org/10.5066/F75H7DCW

Nisbet, R.A., S.H. Berwick, and K.L Reed, 1983. A spatial model of sage-grouse habitat quality. In Analysis of Ecological Systems: State-of-the-art in Ecological modeling Eds. W.K. Lauenroth, G.V. Skogerbee, and M. Flug. Elsevier Scientific p991.

Olsen, A. C., J. P. Severson, J. D. Maestas, D. E. Naugle, J. T. Smith, J. D. Tack, K. H. Yates, and C. A. Hagen, 2021. Reversing tree expansion in sagebrush steppe yields population-level benefit for imperiled grouse. Ecosphere 12(6): e03551. 10.1002/ecs2.3551

Picardi, Simona, Terry Messmer, Ben Crabb, Michel Kohl, David Dahlgren, Nicki Frey, Randy Larsen, and Rick Baxter, 2020. Predicting greater sage-grouse habitat selection at the southern periphery of their range. Ecology and Evolution 10(23): 13451-13463. https://doi.org/10.1002/ece3.6950

Picotte, J.J, Long, J., Peterson, B, Nelson, K.J, 2017. LANDFIRE 2015 Remap – Utilization of Remotely Sensed Data to Classify Existing Vegetation Type and Structure to Support Strategic Planning and Tactical Response. Earthzine (https://pubs.er.usgs.gov/publication/70192856).

Rigge, M.B., B. Bunde, K. Postma, H. Shi, and U.S. Geological Survey, 2022. Rangeland Condition Monitoring Assessment and Projection (RCMAP) Fractional Component Time-Series Across the Western U.S. 1985-2021: U.S. Geological Survey data release, https://doi.org/10.5066/P9ODAZHC

Roth, Cali L., Shawn T. O'Neil, Peter.S. Coates, Mark A. Ricca, David A. Pyke, Cameron L. Aldridge, Julie A. Heinrichs, Shawn P. Espinosa and David J. Delehanty, 2022 Targeting Sagebrush (Artemisia Spp.) Restoration Following Wildfire with Greater Sage-Grouse (Centrocercus Urophasianus) Nest Selection and Survival Models. Environmental Management 70, 288–306. https://doi.org/10.1007/s00267-022-01649-0

Sandford, Charles P., Michel T. Kohl, Terry A. Messmer, David K. Dahlgren, Avery Cook, Brian R.Wing, 2017. Greater Sage-Grouse Resource Selection Drives Reproductive Fitness Under a Conifer Removal Strategy. Rangeland Ecology & Management 70: 59–67.

Savage, S., and J. Slyder. 2022. Evaluation of Fractional Vegetation Cover Products. Tech Note 456. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO.

Severson, J.P., C.A. Hagen, J.D. Maestas, D.E. Naugle, J. Todd Forbes, and K.P. Reese, 2016. Effects of conifer expansion on GRSG nesting habitat selections. The Journal of Wildlife Management; DOI: 10.1002/jwmg.21183

Severson, J.P., C.A. Hagen, J.D. Maestas, D.E. Naugle, J. Todd Forbes, and K.P. Reese, 2017. Short-term response of sage-grouse nesting conifer removal in the northern Great Basin. Rangeland Ecology and Management.

Shi, Hua, Matthew Rigge, Kory Postma & Brett Bunde, 2022. Trends analysis of rangeland condition monitoring assessment and projection (RCMAP) fractional component time series (1985–2020), GIScience & Remote Sensing, 59:1, 1243-1265, DOI: 10.1080/15481603.2022.2104786

Westover, M., J. Baxter, R. Baxter, C. Day, R. Jensen, S. Petersen, and R. Larsen, 2016. Assessing greater sage-grouse selection of brood-rearing habitat using remotely-sensed imagery-Can readily available high-resolution imagery be used to identify brood-rearing habitat across a broad landscape? PLoS ONE, 11(5) article e0156290, 19 p.

Wickham, James, Stephen V. Stehman, Leila Gass, Jon A. Dewitz, Daniel G. Sorenson, Brian J. Granneman, Richard V. Poss, and Lori A. Baer, 2021. "Thematic Accuracy assessment of the NLCD 2016 land cover for the conterminous United States", Remote Sensing of Environment, volume 257, May 2021, 112357 https://doi.org/10.1016/j.rse.2021.112357.

Zhou B., G. S. Okin, and J. Zhang. 2020. Leveraging Google Earth Engine (GEE) and machine learning algorithms to incorporate in situ measurement from different times for rangelands monitoring. Remote Sens Environ, 236, Article 111521, 10.1016/j.rse.2019.111521.

APPENDIX A. LANDFIRE ECOLOGICAL SYSTEMS CAPABLE OF SUPPORTING SAGEBRUSH

Table A1. Ecological systems in BpS and EVT capable of supporting sagebrush vegetation and capable of providing suitable seasonal habitat for Greater Sage-Grouse.

Ecological System	Sagebrush Vegetation that the Ecological System has the Capability of Producing	Sagebrush (SB) or Sagebrush Associated (SBA)
Colorado Plateau Mixed Low Sagebrush Shrubland	*Artemisia arbuscula* ssp. *longiloba* *Artemisia bigelovii* *Artemisia nova* *Artemisia frigida* *Artemisia tridentata* ssp. *wyomingensis*	SB
Columbia Plateau Low Sagebrush Steppe	*Artemisia arbuscula* *Artemisia arbuscula* ssp. *longiloba* *Artemisia nova*	SB
Columbia Plateau Scabland Shrubland	*Artemisia rigida*	SBA
Columbia Plateau Steppe and Grassland	*Artemisia* spp.	SBA
Great Basin Xeric Mixed Sagebrush Shrubland	*Artemisia arbuscula* ssp. *longicaulis* *Artemisia arbuscula* ssp. *longiloba* *Artemisia nova* *Artemisia tridentata* ssp. *wyomingensis*	SB
Inter-Mountain Basins Big Sagebrush Shrubland	*Artemisia tridentata* ssp. *tridentata* *Artemisia tridentata* ssp. *xericensis* *Artemisia tridentata* ssp. *vaseyana* *Artemisia tridentata* ssp. *wyomingensis*	SB
Inter-Mountain Basins Big Sagebrush Steppe	*Artemisia cana* ssp. *cana* *Artemisia tridentata* ssp. *tridentata* *Artemisia tridentata* ssp. *xericensis* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia tripartita* ssp. *tripartita* *Artemisia frigida*	SB
Inter-Mountain Basins Curl-Leaf Mountain Mahogany Woodland	*Artemisia tridentata* ssp. *vaseyana* *Artemisia arbuscula* *Artemisia tridentata*	SBA
Inter-Mountain Basins Curl-Leaf Mountain Mahogany Shrubland	*Artemisia tridentata* ssp. *vaseyana* *Artemisia arbuscula* *Artemisia tridentata*	SBA
Inter-Mountain Basins Mixed Salt Desert Scrub	*Artemisia tridentata* ssp. *wyomingensis* *Artemisia spinescens*	SBA
Inter-Mountain Basins Montane Sagebrush Steppe	*Artemisia tridentata* ssp. *vaseyana* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia nova* *Artemisia arbuscula* *Artemisia tridentata* ssp. *spiciformis*	SB
Inter-Mountain Basins Semi-Desert Shrub-Steppe	*Artemisia tridentata* *Artemisia bigelovii* *Artemisia tridentata* ssp. *wyomingensis*	SBA
Northwestern Great Plains Mixed Grass Prairie	*Artemisia cana* ssp. *cana* *Artemisia tridentata* ssp. *vaseyana* *Artemisia frigida*	SBA

Ecological System	Sagebrush Vegetation that the Ecological System has the Capability of Producing	Sagebrush (SB) or Sagebrush Associated (SBA)
Northwestern Great Plains Shrubland	*Artemisia cana* ssp. *cana* *Artemisia tridentata* ssp. *tridentata* *Artemisia tridentata* ssp. *wyomingensis*	SBA
Rocky Mountain Gambel Oak-Mixed Montane Shrubland	*Artemisia tridentata*	SBA
Rocky Mountain Lower Montane-Foothill Shrubland	*Artemisia nova* *Artemisia tridentata* *Artemisia frigida*	SBA
Western Great Plains Sand Prairie	*Artemisia cana* ssp. *cana*	SBA
Wyoming Basins Dwarf Sagebrush Shrubland and Steppe	*Artemisia arbuscula* ssp. *longiloba* *Artemisia nova* *Artemisia tridentata* ssp. *wyomingensis* *Artemisia tripartita* ssp. *rupicola*	SB
Artemisia tridentata ssp. *vaseyana* Shrubland Alliance (EVT only)	*Artemisia tridentata* ssp. *vaseyana*	SB
Quercus gambelii Shrubland Alliance (EVT only)	*Artemisia tridentata*	SB

APPENDIX B. DATA ACCURACY ASSESSMENTS FOR LANDFIRE AND RCMAP

LANDFIRE Agreement Assessment

In the monitoring framework we will use the most recent version of LANDFIRE EVT data (EVT 2.2.0) which currently is based on the 2016 EVT Remap with updates due to disturbances. The 2016 EVT Remap data were reviewed using agreement assessments that compared individual sample field plots with EVT classes for pixels at plot locations using the Auto-Key EVT assignment. The plot data used for the agreement assessment was not used in the 2016 remap process by LANDFIRE so this was formulated as the most independent and robust test possible for the data. More details of this process are here: https://landfire.gov/remapevt_assessment.php.

Agreement assessments of all classes of data in northwest (NW) and southwest (SW) GeoAreas provide overall results of 47% and 42% respectively (**Table B1**). However, for GRSG purposes we also aggregated all classes into sagebrush (SB), sagebrush associated (SBA), or nonhabitat using LANDFIRE's process of collapsing categories. This aggregation caused the agreement assessments to increase substantially for both the NW and SW GeoAreas (**Table B1**).

Table B1. Agreement assessments of sagebrush (SB), sagebrush associated (SBA), nonhabitat, and overall classes in LANDFIRE EVT data showing the increased accuracy estimated when classes are grouped.

GeoAreas	SB	SBA	SB and SBA	Nonhabitat	Overall
NW	85%	49%	86%	92%	47%
SW	75%	45%	71%	92%	42%

RCMAP Accuracy Assessment

Rigge et al (2020) accuracy metrics, using 1860 independent field measurements, are shown in the table under Published. The BLM-conducted accuracy assessment used more than 3,000 data points from the AIM

2.0 database in 2021 and compared them to RCMAP 2020 predictions that used training data to 2019 (Savage and Slyder, 2022).

Table B2. Results of RCMAP published and BLM-conducted accuracy assessments (Savage and Slyder, 2022). R2 is the coefficient of determination; RMSE is the root mean squared error; and MAE is the mean absolute error.

Indicator	Published			BLM-conducted		
	R2	RMSE	MAE	R2	RMSE	MAE
Annual Herbaceous	0.58	9.8	-	0.13	14.21	7.59
Sagebrush	0.4	7.5	-	0.33	8.41	5.51
Trees	-	-	-	-	-	-

APPENDIX C. LITERATURE SUMMARY OF CONIFER EFFECTS ON SAGE-GROUSE

Table C1. Summary of the literature on the effects of conifer cover on GRSG.

Name	% Conifer Cover	Distance /Area	State	Leks	Nesting	Brood Rearing	No Season Given
Baruch-Mordo et al 2013	>4%	-	OR	No active leks	-	-	-
Baxter et al 2017	-	-	UT	-	-	Selected areas far from trees	-
Beers et al. 2022	<2%, <11%, <4%	400m, 800m	NV UT	Summer & breeding Winter Year-round, selected for sagebrush patch contiguity			
Brussee et al. 2022	0%	-	NV	-	-	Preferred no PJ to 1-10% conifer	-
Casazza et al 2011	<5% (threshold was selected by the scientists based on Miller et al 2005)	7.9 ha (20 acre, 160m radius); 226.8 ha (560 acre, 850m radius)	CA	-	-	SG avoided PJ at large scale, but models were unsuccessful at explaining this	-
Coates et al 2017	< 2%	-	CA	-	-	-	SG tolerate < 2% but less may be better for survival
Cook et al 2017	4% >3 %	1000m 800m	UT	Lower suitability	Lower suitability	-	-
Doherty et al 2010	-	100m	MT, WY	-	Strong avoidance of conifer within	-	-
Doherty et al 2016			MZs	Strong neg relationship between SG occurrence and tree canopy cover			

Name	% Conifer Cover	Distance /Area	State	Leks	Nesting	Brood Rearing	No Season Given
Doherty et al 2021	>3%	560m	OR	Lower suitability	-	-	-
Fedy et al 2014	-	-	WY	SG avoided forested areas			
Gibson et al 2015	>30%, 10-30%	1000m	NV	-	Avoided 10-30% areas were selected	-	-
Nisbet et al 1983	0%	-	NV UT	Lek model preference for sites with no conifer	-	-	-
Olsen et al 2021	-	-	OR	SG population increased where conifer was removed, suggest limit to < 10% cover			
Picardi et al 2020	-	-	UT	Modeled relationship found that areas with no conifer cover would be selected and areas with high conifer cover would be avoided			
Roth et al 2022	-	-	NV	-	SG selected PJ class (1-10%) was below average	-	-
Sandford et al 2017	>4%	-	UT	-	Less suitable for nesting habitat	-	-
Severson et al 2017	> 3%, >4%	800m	OR	-	Lower suitability, Marginal/unsuitable	-	-
Westover et al 2016	-	-	UT	SG avoided areas with hi % trees SG broods found further from trees			

Appendix 8

Greater Sage-Grouse Habitat Indicators and Benchmarks

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Appendix 8. Greater Sage-Grouse Habitat Indicators and Benchmarks

8.1 Incorporating the Best Available Science into the Habitat Assessment Framework Process

The Habitat Assessment Framework (HAF/ BLM TR 6710-1, as revised) provides a standardized, scientifically based methodology to assess sage-grouse habitat suitability at multiple scales (broad, mid, fine, and site-scales, Levels 1, 2, 3 and 4 respectively). Habitat suitability occurs along a gradient ranging from unsuitable to suitable and is rarely uniform within and across the scales. Using multi-scale evaluations is important for assessing GRSG habitat by considering the entire suite of conditions that contribute to high quality habitat, the success of past conservation actions, and prioritizing future land uses and conservation actions. Descriptions of the scales of habitat selection (broad-, mid-, fine-, and site-) and the associated indicators for habitat assessment at each scale are available in the HAF (BLM TR 6710-1, as revised).

8.2 Habitat Indicators and Benchmarks for Site-Scale HAF

The vegetation characteristics associated with site-scale habitat suitability vary across the range of GRSG. For example, characteristics (both indicators and benchmarks) in the grasslands of Montana are different than the characteristics in the sagebrush shrublands in the southern Great Basin of Utah and Nevada. The HAF technical reference includes general site-scale forms for the indicators and benchmark values for suitable site scale habitat ratings. The indicators and benchmark values used in these forms at the site scale should be updated to incorporate the best available research related to habitat suitability applicable to the regional and local variability.

The Habitat Indicators Tables (**Tables 8-1.A-G**) provide a list of indicators and benchmarks, derived from local and regional research on GRSG habitat selection, that collectively are used to inform habitat suitability. BLM offices will use the indicators and benchmarks in **the tables below** to assess each monitoring location within seasonal habitats for site-scale suitability, with data collected during the appropriate corresponding seasonal use period, as applicable to address phenological changes. Not all areas within a given habitat management area will be capable of meeting the identified seasonal habitat values in the Habitat Indicators Table due to inherent variation in vegetation communities and ecological potential. Habitat Indicators and Benchmarks are habitat conditions that are based on habitat selection that may not be achievable or applicable in all areas. Site-specific benchmarks must be based on the site's ecological potential informed by ecological site descriptions and associated state-and-transition models and the site's current ecological state.

When completing site-scale assessments, **it is *inappropriate* to use a single indicator** from any of the below **Tables 8-1.A-G** or the HAF habitat suitability form to determine overall habitat suitability of the plot (i.e., suitable, marginal, or unsuitable) unless sagebrush is absent or limiting. Instead, BLM staff must consider all the indicators using multiple lines of evidence, as described in the HAF and in the training materials, to determine the plot's overall habitat suitability. The measured habitat indicator values will vary seasonally, driven largely by use and environmental conditions (e.g., ecological site potential of the monitoring plot), including factors such as annual rainfall, drought, annual production, and natural disturbances, such as high intensity wildfires and flooding. In addition, a site may not meet the suitable rating if many indicators are impacted by annual climate variability (e.g., drought conditions), which is independent of management. Thus, it is critical to document environmental factors when completing the habitat suitability forms. This

information is essential to inform land health assessments and evaluations. Factors to inform assessments and evaluations could also include grouping portions of the landscape based on ecological characteristics that influence their impact to and recovery from changes on the landscape (e.g., fire, drought and other extreme weather events, insect outbreaks, soil disturbance, etc.). Use of such disturbance response groupings (considering disturbance in the ecological sense, not based on the RMP disturbance cap) may also be appropriate to scale ecological site descriptions for larger planning areas and provide context to HAF assessments (Stringham et al. 2016).

Indicators are assessed following the methods described in the Sage-grouse Habitat Assessment Framework. BLM will leverage the terrestrial Assessment, Inventory, & Monitoring (AIM) methods (Herrick et al. 2021), additional monitoring approaches for wetland & riparian habitats, credible partner data, and supplemental long-term monitoring data and guidelines developed by the BLM to collect data on site-scale habitat condition (**Tables 8-1.A-G**). Not all monitoring locations within a given seasonal habitat area will be able to achieve all suitable benchmark values in the Habitat Indicators Table due to the inherent variation in vegetation communities and ecological site potential. The intent is not to meet all habitat requirements at all monitoring locations, but to provide seasonal habitat requirements sufficiently across the landscape. Marginal or unsuitable ratings may still provide, or have the capacity to provide, one or more of the habitat components.

As research becomes available, new data could refine or clarify GRSG selection for vegetation structure and composition in seasonal habitats for certain populations. Because of this, the Habitat Indicators Table(s) (**see below in the remainder of Section 8.2**) will be periodically reviewed to incorporate the best available science in coordination with applicable federal, state, local, and tribal agencies. The addition or adjustment to indicators or benchmarks in the Habitat Indicators Table must include the reference or basis for which the changes are made. Edits should only be made if warranted by scientific evidence, in coordination with the applicable state agency.

8.2.1 Colorado GRSG Habitat Indicators Table

Table 8-1.A. Colorado GRSG Seasonal Habitat Indicators and Benchmarks

Attribute	Indicators	Benchmark	Reference
BREEDING AND NESTING [1,2] Seasonal Use Period for Arid sites: March 1-June 15 Seasonal Use Period for Mesic sites: March 15-June 30 Apply 4 miles from active leks. [12]			[1] Doherty 2008 [2] Holloran and Anderson 2005
Lek Security	Proximity of trees [3]	Trees or other tall structures are none to uncommon within line of site or 1.86 miles (3 km) of leks [4,5]	[3] Baruch-Mordo et al. 2013 [4] Stiver et al. 2015 [5] Connelly et al. 2000
	Proximity of sagebrush to leks [4]	Adjacent protective sagebrush cover within 328 feet (100 m) of lek [4]	[4] Stiver et al. 2015
Cover	Sagebrush canopy cover [4,5,6,14] Arid sites Mesic sites	15 to 30% [14,15] 20 to 30% [14,15]	[4] Stiver et al. 2015 [5] Connelly et al. 2000 [6] Connelly et al. 2003 [14] CO GRSG Steering Committee 2008
	Sagebrush height [5,14] Arid sites [4,5,7] Mesic sites [4,5,8]	 11.8 to 31.5 inches (30-80 cm) 15.7 to 31.5 inches (40-80 cm)	[4] Stiver et al. 2015 [5] Connelly et al. 2000
	Perennial grass canopy cover (such as native bunchgrasses) [4,5,14] Arid sites [5,7] Mesic sites [5,8,14]	 ≥10% ≥20% [14]	[4] Stiver et al. 2015 [5] Connelly et al. 2000 [14] CO GRSG Steering Committee 2008

Attribute	Indicators	Benchmark	Reference
Cover *(cont.)*	Perennial grass and forb height (includes residual cover) [5,6,7]	>6 inches (15 cm) [5,13,14]	[5] Stiver et al. 2015 [14] CO GRSG Steering Committee 2008
	Perennial forb canopy cover [4,5,6] Arid sites [7] Mesic sites [8]	 ≥5% [4,5,14] ≥15% [4,5,14]	[4] Stiver et al. 2015 [5] Connelly et al. 2000 [6] Connelly et al. 2003 [14] CO GRSG Steering Committee 2008
	Invasive annual grass cover [16]	<2% cover [16]	[16] BLM synthesis of research
	Conifer [17]	0 (Absence of conifer) [17]	[17] BLM synthesis of research
BROOD-REARING/SUMMER Seasonal Use Period for Arid sites: June 16-October 31 Seasonal Use Period for Mesic sites: July 1-October 31			
Cover	Sagebrush canopy cover [4,5,6,14]	10 to 25%	[4] Stiver et al. 2015 [5] Connelly et al. 2000 [6] Connelly et al. 2003 [14] CO GRSG Steering Committee 2008
	Sagebrush height [5,6,14] Arid sites [7] Mesic sites [8]	11.8 to 31.5 inches (30-80 cm) 13.8 to 31.5 inches (35-80 cm)	[5] Connelly et al. 2000 [6] Connelly et al. 2003
	Perennial grass and forb cover [5,6,14] Arid sites [7] Mesic sites [8]	>15% [14] >25% [14]	[5] Connelly et al. 2000 [6] Connelly et al. 2003 [14] CO GRSG Steering Committee 2008
	Invasive annual grass cover [16]	<2% cover [16]	[16] BLM synthesis of research
	Conifer	0 (Absence of conifer)	[17] BLM synthesis of research
	Riparian areas (both lentic and lotic systems)	Proper Functioning Condition [10]	
	Upland and riparian perennial forb availability [4,5]	Preferred forbs are common with several preferred species present [9]	[4] Stiver et al. 2015 [5] Connelly et al. 2000
WINTER (Seasonal Use Period November 1-February 28) Seasonal Use Period for Arid sites: November 1-February 28 Seasonal Use Period for Mesic sites: November 1-March 14			
Cover and Food	Sagebrush canopy cover above snow [4,5,6] Arid sites [7] Mesic sites [8]	>20% [14] >25% [14]	[4] Stiver et al. 2015 [5] Connelly et al. 2000 [6] Connelly et al. 2003 [14] CO GRSG Steering Committee 2008
	Sagebrush height above snow [4,5,6]	>10 inches (25 cm) [11]	[4] Stiver et al. 2015 [5] Connelly et al. 2000 [6] Connelly et al. 2003
	Conifer	0 (Absence of conifer)	[17] BLM synthesis of research

Notes:
[1] Doherty 2008
[2] Holloran and Anderson 2005
[3] Baruch-Mordo et al. 2013
[4] Stiver et. al. 2015
[5] Connelly et al. 2000
[6] Connelly et al. 2003
[7] 10–12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub-species for this type site [4].
[8] >12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site [4].
[9] Preferred forbs are listed in Habitat Assessment Framework Table III-2 [4]. Overall, total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred in Table III-2.
[10] Existing land management plan desired conditions for riparian areas/wet meadows (spring seeps) may be used in place of properly functioning conditions, if appropriate for meeting GRSG habitat requirements.
[11] The height of sagebrush remaining above the snow depends upon snow depth in a particular year. The intent is to manage for a mosaic of sagebrush stands with tall, healthy, sagebrush present in swales or bottoms.
[12] Buffer distance may be changed only if 3 out of 5 years of telemetry studies indicate the 4 miles is not appropriate.
[13] Measured as "droop height"; the highest naturally growing portion of the plant.

[14] Colorado Greater Sage-grouse Steering Committee 2008
[15] If sagebrush cover exceeds 30%, this would not be cause to consider the site as less than suitable unless total shrub cover is above 40%[14]
[16] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[17] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

8.2.2 Idaho GRSG Habitat Indicators Table

Table 8-1.B. Idaho GRSG Seasonal Habitat Indicators and Benchmarks

Attribute	Indicator	Benchmarks	Reference
LEK HABITAT (Seasonal Use Period March 1 – May 15) [1]			
Lek Security	Proximity of trees	Trees (i.e., mainly juniper, conifers, and does not include old- growth juniper, pinyon pine and mountain mahogany) absent or uncommon on shrub/grassland ecological sites within 1.86 miles (3 km) of occupied leks.	Baruch-Mordo et al. 2013 Stiver et al. 2015
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek	Stiver et al. 2015
NESTING/EARLY BROOD REARING [1,5] (Seasonal Use Period May 1 – June 30) [1]			
Cover and Food	Sagebrush cover [2]	15-25%	Connelly et al. 2000 Connelly et al. 2003 Hagen et al. 2007 Stevens et al. 2023
	Sagebrush height Arid sites [3] Mesic sites [4]	 12-31 inches (30-80cm) 16-31 inches (40-80cm)	Connelly et al. 2000
	Predominant sagebrush shape	Predominantly spreading shape [5]	Stiver et al. 2015
	Perennial grass cover (such as native bunchgrasses) [2] Arid sites [3] Mesic sites [4]	 ≥10% ≥15%	Connelly et al. 2000 Stiver et al. 2015
	Perennial grass (and forb) height (includes residual grasses)	≥ 7 inches (18 cm)	Connelly et al. 2000 Connelly et al. 2003 Hagen et al. 2007 Stiver et al. 2015
	Perennial forb cover [2] Arid sites [3] Mesic sites [4]	 ≥5% ≥10%	Connelly et al. 2000
	Perennial forb availability	Preferred forbs are common with several species present [6]	Stiver et al. 2015
	Invasive annual grass cover	<2% cover	BLM synthesis of research [9]
	Conifer	0 (Absence of conifer)	BLM synthesis of research [10]
LATE BROOD-REARING/SUMMER [1, 7] (July-October) [1] Late brood-rearing areas, such as riparian, meadows, springs, higher elevation mesic uplands, etc. may occur within other mapped seasonal habitat areas. Apply late brood rearing/summer habitat desired conditions locally as appropriate.			
Cover and Food	Sagebrush cover [2]	Uplands 10-25% Riparian/Meadow: Sagebrush cover within 100 m	Connelly et al. 2000
	Sagebrush height	16 to 32 inches (40-80cm)	Connelly et al. 2000
	Perennial grass and forb cover [2]	>15%	
	Upland and riparian perennial forb availability [2]	Preferred forbs are common with appropriate numbers of species present [6]	Stiver et al. 2015
	Riparian and/or meadow habitat condition	Proper Functioning Condition	Stiver et al. 2015
	Invasive annual grass cover	<2% cover	BLM synthesis of research [9]
	Conifer	0 (Absence of conifer)	BLM synthesis of research [10]

Attribute	Indicator	Benchmarks	Reference
WINTER[1] November-March[1] (Apply to areas of known or likely winter-use)			
Cover and Food	Sagebrush cover and height above snow.	Sagebrush is at least 10 inches (25 cm) above snow and ≥10% cover [8]	Connelly et al. 2000 Stiver et al. 2015
	Conifer	0 (Absence of conifer)	BLM synthesis of research [10]

Notes:
[1] Seasonal dates can be adjusted by local unit according to geographic region.
[2] Since plant species and/or life forms may overlap, total vegetative cover, inclusive of shrubs, forbs and grasses may exceed 100%. Note that sagebrush cover objectives may exceed 25% in some areas, for example in areas with higher precipitation, and/or where local science is available demonstrating sage-grouse use of areas with sagebrush cover > 25%.
[3] Arid corresponds to the 10 – 12 inch precipitation zone; *Artemisia tridentata wyomingensis* is a common big sagebrush sub- species for this type site (Stiver et al. 2015).
[4] Mesic corresponds to the ≥12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (Stiver et al. 2015).
[5] Collectively the indicators for sagebrush (cover, height, and shape), perennial grass and perennial forb (cover, height and/or availability) represent the desired condition range for nesting/early brood rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. *2015*. Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.
[6] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.
[7] Some late brood habitat occurs at higher elevations outside of mapped nesting habitat and some is embedded within nesting landscapes especially areas such as wet meadows, riparian areas, springs and seeps.
[8] Winter habitat metrics are a guideline but snow depths and habitat availability may vary widely depending on winter severity, topography and elevation.
[9] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[10] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

8.2.3 Montana/Dakotas GRSG Habitat Indicators Tables

MT-Dak did not amend RMPs in 2019 and Butte/UMRBNM were not included in the 2015 amendment process. Original 2015 Tables are provided in Appendix 2 for reference but have been modified/adjusted for the Proposed Plan to take into account ecological boundaries, experience implementing the HAF, BLM review of recent range wide and local research, and additional comments/information provided during the planning process. Montana/Dakotas BLM offices will utilize three sets of boundaries, mostly aligned with one or multiple mid-scale HAF boundaries. These areas and associated offices are:

Name	Boundary and Offices
Headwaters	SW Montana: Dillon and Butte (Headwaters HAF Midscale)
North-Central Prairies	HiLine, Lewistown, UMRBNM, and parts of Billings and Miles City FOs (Northern Border and Midrivers HAF Midscale)
Bighorn-Custer High Plains	North and South Dakota, Billings and Miles City south of Yellowstone River (Custer midscale with extension to WY border)

Table 8-1.C.1. Headwaters Habitat Indicators and Benchmarks

Attribute	Indicator	Benchmarks	Reference
LEK HABITAT (Seasonal Use Period March 1 – May 15) [1]			
Lek Security	Proximity of trees	Trees and tall structures (> 3m [10 ft.]) are absent within 0.65 km (.388 miles) of active leks (line of sight).	Stiver et al. 2015
	Tree Cover in the Landscape	Tree canopy cover is < 1% within 3 kilometers (1.86 miles) of occupied Sage-grouse leks	Baruch-Mordo et al. 2013 Stiver et al. 2015
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek	Stiver et al. 2015

Attribute	Indicator	Benchmarks	Reference
NESTING/EARLY BROOD REARING (Seasonal Use Period May 1 – June 30) [1]			
Cover and Food	Sagebrush cover [2]	15-25%	Connelly et al. 2000 Connelly et al. 2003 Hagen et al. 2007
	Sagebrush height Arid sites [3]	12-31 inch (30-80cm) with taller individual sagebrush available within stand (for nesting) and a variety of heights (including those <30 cm)	Connelly et al. 2000 Scroff 2016 Boccadori et al. 2023 Scroff et al. 2018
	Mesic sites [4]	16-31 inch (40-80cm) with taller individual sagebrush available within stand (for nesting) and a variety of heights (including those <40 cm)	
	Predominant sagebrush shape	Predominantly spreading shape [5]	Stiver et al. 2015
	Perennial grass cover [2, 5] Arid sites [3] Mesic sites [4]	 >10% >15%	Connelly et al. 2000 Stiver et al. 2015
	Perennial grass height (includes residual grasses) [5]	≥ 7 inches (18 cm)	Connelly et al. 2000 Connelly et al. 2003 Hagen et al. 2007 Stiver et al. 2015 Smith et al. 2018
	Perennial forb cover [2] Arid sites [3] Mesic sites [4]	 >5% >10%	Connelly et al. 2000
	Perennial forb availability	Preferred forbs are common with several species present [7]	Stiver et al. 2015
	Invasive annual grass cover	<2% cover	BLM synthesis of research [10]
	Trees (e.g. Conifer)	0 (Absence of conifer trees)	BLM synthesis of research [11]
LATE BROOD-REARING/SUMMER (Seasonal Use Period June 16th-October 31)[1] Late brood-rearing areas, such as riparian, meadows, springs, higher elevation mesic uplands, etc. may occur within other mapped seasonal habitat areas. Apply late brood rearing/summer habitat desired conditions locally as appropriate.[8]			
Cover and Food	Sagebrush cover [2]	Uplands 10-25% Riparian/Meadow: Sagebrush cover within 100 m	Connelly et al. 2000
	Sagebrush height	16 to 32 inches (40-80cm)	Connelly et al. 2000
	Perennial grass and forb cover [2]	>15%	Connelly et al. 2000 Hagen et al. 2007 Sant et al. 2014
	Upland and riparian perennial forb availability [2]	Preferred forbs are common with appropriate numbers of species present (e.g., > 5)[7]	Stiver et al. 2015
	Riparian and/or meadow habitat condition	Proper Functioning Condition	Stiver et al. 2015 BLM 1997 Prichard et al. 1999 Prichard 1998 Gonzalez and Smith 2020
	Invasive annual grass cover	<2% cover	BLM synthesis of research [11]
	Conifer	0 (Absence of conifer trees)	BLM synthesis of research [12]

Attribute	Indicator	Benchmarks	Reference
WINTER November-March [1] (Apply to areas of known or likely winter-use) [9, 10]			
Cover and Food	Sagebrush cover	≥15% cover	Connelly et al. 2000 Stiver et al. 2015 Dusek et al. 2002
	Sagebrush height	>16 inch (40cm) with multiple tall sagebrush available within stand	Connelly et al. 2000 Stiver et al. 2015 Dusek et al. 2002
	Invasive Annual Grass Cover	<2%	BLM synthesis of research [11]
	Conifer	0 (Absence of conifer trees)	BLM synthesis of research [12]

Notes:
[1] Seasonal dates can be adjusted by local unit according to geographic region.
[2] Since plant species and/or life forms may overlap, total vegetative cover, inclusive of shrubs, forbs and grasses may exceed 100%.
[3] Arid corresponds to the 10 – 12 inch precipitation zone; *Artemisia tridentata wyoming*ensis is a common big sagebrush subspecies for this type site (Stiver et al. 2015).
[4] Mesic corresponds to the >12 inch precipitation zone; *Artemisia tridentata vaseyana* is a common big sagebrush sub-species for this type site (Stiver et al. 2015).
[5] Adequate nesting cover may be provided by a mix of shrub and herbaceous. For sites with sagebrush canopy cover and/or heights at the low end or below the benchmark values, higher herbaceous cover may provide suitable conditions for nesting. Conversely, for sites with preferred nesting shrubs (height, width, branch distribution, etc.) grass cover may not be predictive of suitable nesting locations.
[6] Collectively the indicators for sagebrush (cover, height, and shape), perennial grass and perennial forb (cover, height and/or availability) represent the desired condition range for nesting/early brood rearing habitat characteristics, consistent with the breeding habitat suitability matrix identified in Stiver et al. 2015. Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015). Some sagebrush plants are naturally columnar (e.g., Great Basin big sagebrush), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant management investigation or adjustments at site specific scales.
[7] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.
[8] Some late brood-rearing habitat occurs at higher elevations outside of mapped nesting habitat and some is embedded within nesting landscapes especially areas such as wet meadows, riparian areas, springs and seeps.
[9] Winter habitat metrics are a guideline but snow depths and habitat availability may vary widely depending on winter severity, topography and elevation.
[10] Winter habitat generally taller and denser stands relative to availability
[11] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[12] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

Table 8-1.C.2. North-Central Prairies Habitat Indicators and Benchmarks

Attribute	Indicator	Benchmarks	Reference
Lek Habitat (Seasonal Use Period March 1 – May 15) [1]			
Lek Security	Proximity of trees	Trees and tall structures (> 3m [10 ft.]) are absent within 0.65 km (.388 miles) of active leks (line of sight).	Stiver et al. 2015
	Tree Cover in the Landscape	Tree canopy cover is < 1% within 3 kilometers (1.86 miles) of occupied Sage-grouse leks	Baruch-Mordo et al. 2013 Stiver et al. 2015
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek	Stiver et al. 2015

Attribute	Indicator	Benchmarks	Reference
NESTING/EARLY BROOD REARING (Seasonal Use Period May 1 – June 30) [1]			
Cover and Food	Sagebrush cover [2] WY Big Sage [3] Silver Sage [4]	10-25% ≥5% (≥10)% [6]	Berkeley et al. 2013 Connelly et al. 2000 Doherty et al. 2010 Lane 2005 Hagen et al. 2007 Sant et al. 2014 Tack 2010
	Sagebrush height [2] WY Big Sage [3] Silver Sage [4]	 6-31 inch (15-80cm) with taller individual sagebrush available within stand (nesting shrubs) and a variety of heights (i.e., adequate nest cover based on ecological site potential) [2] 16-31 inch (40-80cm) with taller individual sagebrush available within stand (for nesting) and a variety of heights (including those <40 cm) [2]	Connelly et al. 2000 Lane 2005 Foster et al. 2014 Tack 2010
	Predominant sagebrush shape	Predominantly spreading shape [5]	Stiver et al. 2015
	Perennial grass cover	≥10%	Connelly et al. 2000 Lane 2005 Sant et al. 2014
	Perennial grass height (includes residual grasses)[2]	≥18 cm (≥7.1 inches) - i.e., adequate nest cover based on ecological site potential and seasonal precipitation	Berkeley et al. 2013 Connelly et al. 2000 Doherty et al. 2014 Hagen et al. 2007 Taylor et al. 2012 Smith et al. 2018
	Perennial forb cover	≥5%	Connelly et al. 2000 Sant et al. 2014
	Perennial forb availability	Preferred forbs are common with several species present (≥5) [7]	Stiver et al. 2015
	Invasive annual grass cover	<2% cover	BLM synthesis of research [10]
	Trees (i.e., Conifer)	0 (Absence of conifer)	BLM synthesis of research [11]

Attribute	Indicator	Benchmarks	Reference
LATE BROOD-REARING/SUMMER (Seasonal Use Period June 16th-October 31)[1]			
Cover and Food	Sagebrush cover WY Big Sage [4] Silver Sage [5] Saline/Acid Shale/Clay [6]	 10-25% 2-25% 5-25% Riparian/Meadow: Sagebrush cover within 100m	Connelly et al. 2000 Lane 2005 Hagen et al. 2007 Sant et al. 2014 Foster et al. 2014
	Sagebrush height WY Big Sage [4] Silver Sage [5] Saline/Acid Shale/Clay [6]	 12 to 31 inch (30-80cm) 12 to 31 inch (30-80cm) > 6 inches (15cm)	Connelly et al. 2000 Lane 2005
	Perennial grass cover WY Big Sage [4] Silver Sage [5] Saline/Acid Shale/Clay [6]	>15% >15% >10%	Connelly et al. 2000 Hagen et al. 2007 Sant et al. 2014
	Perennial forb cover WY Big Sage [4] Silver Sage [5] Saline/Acid Shale/Clay [6]	>5% >10% >3%	Prichard et al. 1999 Schroeder et al. 2020 BLM 1997
	Upland and riparian perennial forb availability WY/Silver Sage [4,5] Saline/Acid Shale/Clay [6]	 Preferred forbs are common with several species present (≥5) [7] Preferred forbs are common with several species present (≥2) [7]	Connelly et al. 2000 Stiver et al. 2015
	Riparian and/or meadow habitat condition	Majority of sites are in Proper Functioning Condition	BLM 1997 Prichard et al. 1999 Prichard 1998 Gonzalez and Smith 2020
	Invasive annual grass cover	<2% cover	BLM synthesis of research [10]
	Conifer presence	0 (Absence of conifer)	BLM synthesis of research [11]
WINTER (Seasonal Use Period: November 1 to February 28) [8, 9]			
Cover and Food	Sagebrush cover	≥15% cover, or cover supported based on ecological site potential	Connelly et al. 2000 Stiver et al. 2015 Dusek et al. 2002
	Sagebrush height	Multiple tall sagebrush available (>12 inch, 30cm) within stand [7,8]	Connelly et al. 2000 Stiver et al. 2015 Dusek et al. 2002
	Invasive Annual Grass Cover	<2%	BLM synthesis of research [10]
	Trees (i.e., Conifer)	0 (Absence of conifer trees)	BLM synthesis of research [11]

Notes:
[1] Seasonal dates can be adjusted by local unit according to geographic region.
[2] Adequate nesting cover may be provided by a mix of shrub and herbaceous. For sites with sagebrush canopy cover and/or heights at the low end or below the benchmark values, higher herbaceous cover may provide suitable conditions for nesting. Conversely, for sites with preferred nesting shrubs (height, width, branch distribution, etc.) grass cover may be less important towards providing suitable nesting locations. Overall cover and height may be lower based on ecological site potential but still provide important components of suitable GRSG habitat as part of the heterogeneous landscape.
[3] WY Big Sage - Unglaciated, semiarid (10-14 inches annual precipitation) plains where the dominant, most common, shrub is Wyoming Big Sage. Characterized by frigid soil temperature regime and the overlap of Great Plains rhizomatous grasslands and sagebrush ecosystems
[4] Silver sage – Predominantly areas north of the Milk River in Montana. Characterized by mixed grass prairie habitat containing silver sage (most common shrub, species of sagebrush)
[5] Saline/Acid Shale/Clay – Low productivity sites due to site limitations, soils. However, provide brood rearing and foraging habitat for sage-grouse as part of the heterogeneous landscape.

[6] In silver sage communities, both sagebrush and total shrub cover should be considered. Studies of nesting GRSG indicate that up to half of shrub cover may be of other species in silver sage habitats.
[7] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.
[8] Winter habitat metrics are a guideline but snow depths and habitat availability may vary widely depending on winter severity, topography and elevation.
[9] Winter habitat generally taller and denser stands relative to availability
[10] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[11] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

Table 8-1.C.3. Bighorn-Custer High Plains Habitat Indicators and Benchmarks

Attribute	Indicator	Benchmarks	References
Lek Habitat (Seasonal Use Period March 1 – May 15) [1]			
Lek Security	Proximity of trees	Trees and tall structures (> 3m [10 ft.]) are absent within 0.65 km (.388 miles) of active leks (line of sight).	Stiver et al. 2015
	Tree Cover in the Landscape	Tree canopy cover is < 1% within 3 kilometers (1.86 miles) of occupied Sage-grouse leks	Baruch-Mordo et al. 2013 Stiver et al. 2015
	Proximity of sagebrush to leks	Adjacent protective sagebrush cover within 328 ft. (100 m) of an occupied lek	Stiver et al. 2015
NESTING/EARLY BROOD REARING (Seasonal Use Period May 1 – June 30) [1]			
Cover and Food	Sagebrush cover [2] High Plains [3] Transitional Prairie [4]	 10-25% 2-25%	Herman–Brunson 2007 Swanson 2009 Doherty et al. 2010 Hagen et al. 2007 Doherty et al. 2011 Foster et al. 2014 Wright and Wegner 2008
	Sagebrush height [2] High Plains [3] Transitional Prairie [4]	 12-31 inch (30-80cm) with taller individual sagebrush available within stand (for nesting) and a variety of heights (including those <30 cm) [2] 7-31 inch (18-80cm) with taller individual sagebrush available within stand (for nesting) and a variety of heights (including those <30 cm) [2]	Swanson 2009 Doherty et al. 2011 Schroeder et al. 2020 Holloran et al. 2005
	Predominant sagebrush shape	Predominantly spreading shape [5]	Stiver et al. 2015
	Perennial grass cover [2] High Plains [3] Transitional Prairie [4]	 ≥10% ≥15%	Doherty et al. 2010 Hagen et al. 2007 Doherty et al. 2011 Holloran et al. 2005
	Perennial grass height (includes residual grasses) [2]	≥18 cm (≥7.1 inches) - i.e., adequate nest cover based on ecological site potential and seasonal precipitation	Doherty et al. 2014 Smith et al. 2018 Foster et al. 2014
	Perennial forb canopy cover	≥5%	Doherty et al. 2010 Hagen et al. 2007 Doherty et al. 2011 Holloran et al. 2005
	Perennial forb availability	Preferred forbs are common with several species present (≥5) [5]	Stiver et al. 2015
	Invasive annual grass cover	<2% cover	BLM synthesis of research [6]
	Trees (i.e., Conifer)_	0 (Absence of conifer trees)	BLM synthesis of research [7]

Attribute	Indicator	Benchmarks	References
BROOD-REARING/SUMMER (Seasonal Use Period June 16-October 31)[1]			
Cover and Food	Sagebrush cover High Plains [3] Transitional Prairie [4]	 10-25% 2-25%	Herman–Brunson 2007 Swanson 2009 Doherty et al. 2010 Hagen et al. 2007 Doherty et al. 2011 Foster et al. 2014
	Sagebrush height High Plains [3] Transitional Prairie [4]	 12 to 31 inch (30-80cm) > 6 inches (15cm)	Doherty et al. 2011 Foster et al. 2014 Schroeder et al. 2020 Holloran et al. 2005
	Perennial grass cover High Plains [3] Transitional Prairie [4]	 ≥10% ≥15%	Doherty et al. 2010 Hagen et al. 2007 Doherty et al. 2011 Holloran et al. 2005
	Perennial forb cover	≥10%	Prichard et al. 1999 Schroeder et al. 2020 BLM 1997
	Upland and riparian perennial forb availability	Preferred forbs are common with several species present (≥5)	Stiver et al. 2015 Doherty et al. 2011
	Riparian and/or meadow habitat condition	Majority of sites are in Proper Functioning Condition	BLM 1997 Prichard et al. 1999 Prichard 1998 Gonzalez and Smith 2020
	Invasive annual grass cover	<2% cover	BLM synthesis of research [6]
	Trees (i.e., Conifer)	0 (Absence of conifer trees)	BLM synthesis of research [7]
WINTER (Seasonal Use Period November 1-February 28) [8,9]			
Cover and Food	Sagebrush cover	≥10% cover, or cover supported based on ecological site potential	Swanson 2009 Foster et al. 2014 Schroeder et al. 2020 Dusek et al 2002
	Sagebrush height	Multiple tall sagebrush available (>12 inch, 30cm) within stand [8,9]	Doherty et al. 2011 Schroeder et al. 2020
	Invasive Annual Grass Cover	<2%	BLM synthesis of research [6]
	Trees (i.e., Conifer)	0 (Absence of conifer trees)	BLM synthesis of research [7]

Notes:
[1] Seasonal dates can be adjusted by local unit according to geographic region.
[2] Adequate nesting cover may be provided by a mix of shrub and herbaceous. For sites with sagebrush canopy cover and/or heights at the low end or below the benchmark values, higher herbaceous cover may provide suitable conditions for nesting. Conversely, for sites with preferred nesting shrubs (height, width, branch distribution, etc.) grass cover may be less important towards providing suitable nesting locations. Ecological site, including site potential and state, and additional GRSG information may inform suitability and benchmarks for individual sites.
[3] High Plains - Unglaciated, rolling, semiarid (10-14 inches annual precipitation) plains. Characterized by frigid soil temperature regime and the overlap of Great Plains rhizomatous grasslands and sagebrush ecosystems
[4] Transitional Prairie - Fringe areas on the edge of sagebrush range (far east Montana into the Dakotas) and Desertic Basins (more arid areas)
[5] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover since not all forb species are listed as preferred.
[6] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[7] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)
[8] Winter habitat metrics are a guideline but snow depths and habitat availability may vary widely depending on winter severity, topography and elevation.
[9] Winter habitat generally taller and denser stands relative to availability

8.2.4 Nevada/California GRSG Habitat Indicators Table(s)

Table 8-1.D. Nevada/California GRSG Habitat Indicators Table

Attribute	Indicators	Benchmarks	Reference
GENERAL/LANDSCAPE-LEVEL [1]			
All life stages	Rangeland health assessments	Meeting all standards[2]	
Cover (nesting)	Seasonal habitat needed	>65% of the landscape in sagebrush cover	Aldridge and Boyce 2007
	Annual grasses	<%5	Blomberg et al. 2012
Security (nesting)	Conifer encroachment	<3% phase I (>0 to <25% cover) No phase II (25 to 50% cover) No phase III (>50% cover)	Casazza et al. 2011 Coates et al. 2016
Cover and food (winter)	Conifer encroachment	<5% phase I (>0 to <25% cover) No phase II (25 to 50% cover) No phase III (>50%)	Coates et al. 2016
	Sagebrush extent	>85% sagebrush land cover	Doherty et al. 2008
LEK (Seasonal Use Period: March 1 to May 15) [1]			
Cover	Availability of sagebrush cover	Adjacent sagebrush provides escape cover	Blomberg et al. 2012 Connelly et al. 2000 Stiver et al. 2015
Security [3]	Pinyon or juniper cover	<2% landscape cover within .6 mile of leks	Connelly et al. 2000 (modified) Stiver et al. 2015 Baruch-Mordo et al. 2013 Coates et al. 2017b
	Proximity of Linear Features	>3.1 miles	Manier et al. 2014
	Proximity of Surface Disturbance	>3.1 miles	Manier et al. 2014
	Proximity of Tall Structures	>2 miles	Coates et al. 2013 Manier et al. 2014
	Proximity of Low Structures	>1.2 miles	Manier et al. 2014
NESTING (Seasonal Use Period: April 1 to June 30) [1]			
Cover [6]	Sagebrush cover	Arid [8]: ≥20% Mesic [8]: ≥20%	Kolada et al. 2009a, 2009b Coates et al. 2017a
	Residual and live perennial grass cover (such as native bunchgrasses)	Arid [8]: ≥7% if shrub cover is >20% [5] Mesic [8]: ≥13% if shrub cover is >20% [5]	Coates et al. 2013; 2017a Coates and Delehanty 2010 Kolada et al. 2009a, 2009b
	Annual grass cover	Arid [8]: <3% Mesic [8]: <3%	Coates et al. 2017a
	Total shrub cover	Arid [8]: >28% Mesic [8]: >26%	Coates and Delehanty 2010 Kolada et al. 2009a Coates et al. 2017a
	Perennial grass height (includes residual grasses)	Arid [8]: 12 cm Mesic [8]: 18 cm	Connelly et al. 2000, 2003 Hagen et al. 2007 Stiver et. al. 2015 Coates et al. 2017a
Security [2]	Proximity of tall structures [4] (3 feet [1 meter] above shrub height)	Use Manier et al. 2014, Conservation Buffer Distance Estimates for GRSG-A Review; preference is 3 miles	Coates et al. 2013 Gibson et al. 2013 Manier et al. 2014
	Pinyon or juniper cover	<3% within 800 meters	Severson et al. 2017
	Invasive annual grass cover	<2% cover	BLM synthesis of research [9]
	Conifer	0 (Absence of conifer at site)	BLM synthesis of research [10]

Attribute	Indicators	Benchmarks	Reference
BROOD-REARING/SUMMER (Seasonal Use Period: May 15 to September 15; Early: May 15 to June 15; Late: June 15 to September 15) [1]			
UPLAND HABITATS			
Cover [6]	Sagebrush cover	Arid [8]: ≥20% Mesic [8]: ≥15%	Connelly et al. 2000 Coates et al. 2017a
	Perennial grass and forb cover	Arid [8]: >19% Mesic [8]: >25%	Connelly et al. 2000 Hagen et al. 2007 Coates et al. 2017a
	Deep rooted perennial bunchgrass (within 522 feet [200 meters] of riparian areas and wet meadows)	Arid [8]: 12 cm [7] Mesic [8]: 14 cm [7]	Hagen et al. 2007 Casazza et al. 2011 Coates et al. 2017a
Cover and food [6]	Perennial forb cover	Arid [8]: >5% Mesic [8]: >9%	Casazza et al. 2011 Lockyer et al. 2015 Coates et al. 2017a
	Invasive annual grass cover	<2% cover	BLM synthesis of research [9]
	Conifer	0 (Absence of conifer)	BLM synthesis of research [10]
RIPARIAN/MEADOW HABITATS [1]			
Cover and food [6]	Riparian areas/meadows	PFC	Dickard et al. 2015 Gonzalez and Smith 2020 Prichard 1998 Prichard 1999 Stiver et al. 2015
Security [6]	Upland and riparian perennial forb availability and understory species richness	Preferred forbs are common with several species present and high species richness (all plants)	Stiver et al. 2015
	Riparian area/meadow interspersion with adjacent sagebrush	Has adjacent sagebrush cover within 200 meters	Casazza et al. 2011 Stiver et al. 2015
	Invasive annual grass cover	<2% cover	BLM synthesis of research [9]
	Conifer	0 (Absence of conifer)	BLM synthesis of research [10]
WINTER (Seasonal Use Period: November 1 to February 28)[1]			
Cover and Food	Sagebrush cover	≥10%	Connelly et al. 2000 Stiver et al. 2015
	Sagebrush height	> 25 cm above snow depth	Connelly et al. 2000 Stiver et al. 2015
	Conifer	0 (Absence of conifer)	BLM synthesis of research [10]

Notes:
[1] Any one single habitat indicator does not define whether the habitat objective is or is not met. Instead, the preponderance of evidence from all indicators within that seasonal habitat period must be considered when assessing GRSG habitat objectives.
[2] Upland standards are based on indicators for cover, including litter, live vegetation, and rock, appropriate to the ecological potential of the site in context of the site's current ecological state and using the associated state and transition model/disturbance response group.
[3] Applicable to Phase I and Phase II pinyon and/or juniper.
[4] Does not include fences.
[5] In addition, if upland rangeland health standards are being met.
[6] Ecological site potential to meet habitat objectives should be considered when determining if objectives are feasible for the site. .
[7] In drought years, 4-inch perennial bunchgrass height with greater than 20 percent measurements exceeding 5 inches in dry years.
[8] Arid is defined as areas that received >35.0 cm of average annual precipitation.
Mesic is defined as areas that received ≤35.0 cm of average annual precipitation.
[9] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[10] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

8.2.5 Oregon GRSG Habitat Indicators Table

Table 8-1.E. Oregon GRSG Habitat Indicators Table

Attribute	Indicators	Benchmarks	Reference
Breeding Including Lekking, Pre-nesting, Nesting, and Early Brood Rearing (Seasonal Use Period March 1 – June 30)			
Lek Security	Proximity of trees or other tall structures	No conifers or tall structures[1] within 1.0 mile of lek center and conifer cover ≤4% within 4.0 miles of lek, excluding pre-settlement trees	Connelly et al. 2000 Fresse 2009 Baruch-Mordo et al. 2013 Knick et al. 2013
	Proximity of sagebrush to leks	Lek has adjacent sagebrush cover	Connelly et al. 2000
Cover	Sagebrush cover (%)	10 to 25	Doescher et al. 1986 Gregg et al. 1994 Hanf et al. 1994 Coggins 1998 Crawford and Carver 2000 Bates and Davies 2014 BLM 2015a
	Sagebrush height (inches) Arid sites (warm-dry) Mesic sites (cool-moist)	 11 to 31 15 to 31	Gregg et al. 1994 Hanf et al. 1994 Coggins 1998 Crawford and Carver 2000 Freese 2009
	Predominant sagebrush shape	Spreading	Connelly et al. 2000
	Perennial grass cover (such as bunchgrass) (%) Arid sites Warm-dry Shallow-dry Mesic sites Cool-moist Warm-moist	 ≥10 ≥10 ≥20 ≥20	Gregg at al. 1994 Coggins 1998 Crawford and Carver 2000 Freese 2009 NRCS 2015 Bates and Davies 2014 Jon Bates, USDA ARS, pers. comm. 2/10/2015 BLM 2015a BLM 2015b
	Perennial grass and forb height (inches, including residual grasses) – most important in nest areas; excludes shallow-dry sites[2] Arid sites (warm-dry) Mesic sites (cool-moist)	 ≥7 ≥9	Gregg et al. 1994 Hanf et al. 1994 Crawford and Carver 2000 Hagen et al. 2007 Jon Bates, USDA ARS, pers. comm. 2/10/2015
	Perennial forb cover (%)[3] Arid sagebrush Warm-dry Shallow-dry Mesic sagebrush Cool-moist Warm-moist	 ≥2 ≥2 ≥6 ≥5	Drut 1992 Drut et al. 1994 Crawford and Carver 2000 Freese 2009 NRCS 2015 Bates and Davies 2014 BLM 2015a Jon Bates, USDA ARS, pers. comm. 2/10/2015 BLM 2015b
	Invasive annual grass cover	<2% cover	BLM synthesis of research[7]
	Conifer	0 (Absence of conifer)	BLM synthesis of research[8]

Attribute	Indicators	Benchmarks	Reference
Food	forb diversity and availability [3]	Palatable forbs are common (≥6 individual plants) with ≥5 species present[4] and ≥2% forb cover	Hanf et al. 1994 Crawford and Carver 2000 Freese 2009 Bates and Davies 2014 BLM 2015a Jon Bates, USDA ARS, pers. comm. 2/10/2015
Brood-rearing/Summer Including Late-brood Rearing, Summering, and Early Autumn (Seasonal Use Period July 1- October 31)			
Cover	Sagebrush cover (%)	10 to 25	Doescher et al. 1986 Drut et al. 1994 Connelly et al. 2000 Crawford and Carver 2000 Bates and Davies 2014 Jon Bates, USDA ARS, pers. comm. 2/10/2015
	Sagebrush height (inches)	15 to 31	Gregg et al. 1994 Hanf et al. 1994 Crawford and Carver 2000 Freese 2009
	Perennial herbaceous (grass and forbs) cover (%) Arid sagebrush Warm-dry Shallow-dry Mesic sagebrush Cool-moist Warm-moist Riparian [5]	 ≥15 ≥10 ≥20 ≥30 ≥50	Drut et al. 1994 Bates and Davies 2014 NRCS 2015 BLM 2015b Jon Bates, USDA ARS, pers. comm. 2/10/2015
	Riparian areas/mesic meadows	Majority of areas are in PFC	Stiver et al. 2015, or as updated
	Invasive annual grass cover	<2% cover	BLM synthesis of research[7]
	Conifer	0 (Absence of conifer)	BLM synthesis of research[8]
Food	Upland and riparian perennial forb availability [3]	Palatable forbs are common (≥6 individuals present) with ≥5 species present [4] and ≥2% forb cover in upland habitat and ≥4% forb cover in riparian habitat [5]	Hanf et al. 1994 Freese 2009 Bates and Davies 2014 BLM 2015b Jon Bates, USDA ARS, pers. comm. 2/10/2015
Winter Including Late Autumn and Winter (Seasonal Use Period November 1 – February 28)			
Cover and Food	Sagebrush cover (%)	≥10	Willis 1990 (in Hagen 2011) Bruce 2011
	Sagebrush height above snow (inches) [6]	≥10	Willis 1990 (in Hagen 2011) Bruce et al. 2011
	Conifer	0 (Absence of conifer)	BLM synthesis of research [8]

Notes:

[1] Tall structures are any man-made structure that has the potential to disrupt lekking or nesting birds by creating perching and nesting opportunities for predators (e.g., raptors and ravens) or that decrease use of an area by sage-grouse, including communication towers, meteorological towers, electrical transmission or distribution towers, power poles, wind turbines, and associated structures.

[2] Perennial grass and forb minimum height may not be achievable in years with below normal precipitation. Other indicators of desired condition may still render the site suitable, however.

[3] In drought years, forb cover and availability may not be at the desired condition. In certain plant associations, such as Wyoming big sagebrush/Needle and Thread, these indicators may rarely be achieved even in years with normal precipitation.

[4] Native plant species important for sage-grouse in Oregon are listed in Appendix I of the 2015 Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment. This partial list may be revised and expanded with additional plant species as new information becomes available.

[5] Riparian includes swales, wet meadows, and intermittent/ephemeral streams.

[6] Low sagebrush vegetation types (average sagebrush height <12 inches) found along slopes that are cleared of snow by prevailing winds are potentially important winter foraging areas.

[7] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)

[8] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

8.2.6 Utah GRSG Habitat Indicators Table

Table 8-1.F. Utah GRSG Habitat Indicators Table

Attribute	Indicators	Benchmarks	Reference
Breeding and Nesting (February 15-June 15)			
Lek Security	Proximity to conifers	Conifers are absent or uncommon on shrub/grassland ecological sites within 1.8 miles (approx. 3 kilometers) of occupied leks.	Stiver et al. 2015 Baruch-Mordo et al. 2013 Connelly et al. 2000
	Proximity of sagebrush to leks	Has adjacent sagebrush cover.	Stiver et al. 2015
Cover	Sagebrush cover	Low [2]: ≥ 7% Mid [3]: ≥ 18% High [4]: ≥ 14%	Dahlgren et al. 2019
	Total shrub cover	Low [2]: ≥ 17% Mid [3]: ≥ 22% High [4]: ≥ 19%	Stiver et al. 2015 Connelly et al. 2000 Dahlgren et al. 2019
	Sagebrush Composition	Low [2]: ≥ 36% Mid [3]: ≥ 71% High [4]: ≥ 83%	Dahlgren et al. 2019
	Shrub height	Low [2]: ≥ 12 inches (30 cm) Mid [3]: ≥ 5.9 inches (15 cm) High [4]: ≥ 9 inches (23 cm)	Stiver et al. 2015 Connelly et al. 2000 Dahlgren et al. 2019
	Perennial grass cover (such as native bunchgrasses, rhizomatous grasses called for on applicable ecological site descriptions, or other perennial grasses that provide similar functionality)	Low [2]: ≥ 5% Mid [3]: ≥ 4% High [4]: ≥ 8%	Stiver et al. 2015 Connelly et al. 2000 Dahlgren et al. 2019
	Perennial grass and forb height (includes residual grasses)	Provide overhead and lateral concealment from predators.[5]	Stiver et al. 2015 Connelly et al. 2000 Dahlgren et al. 2019
	Perennial forb canopy cover	Low [2]: ≥ 2% Mid [3]: ≥ 1% High [4]: ≥ 4%	Stiver et al. 2015 Connelly et al. 2000 Dahlgren et al. 2019
	Invasive annual grass cover	<2% cover	BLM synthesis of research [7]
	Conifer	0 (Absence of conifer)	BLM synthesis of research[8]
Brood-Rearing/Summer (April 15-August 15) [1]			
Cover	Sagebrush cover	Low [2]: ≥ 4% Mid [3]: ≥ 16% High [4]: ≥ 15%	Stiver et al. 2015 Connelly et al. 2000 Dahlgren et al. 2019
	Total shrub cover	Low [2]: ≥ 10% Mid [3]: ≥ 19% High [4]: ≥ 17%	Stiver et al. 2015 Connelly et al. 2000 Dahlgren et al. 2019
	Sagebrush Composition	Low [2]: ≥ 28% Mid [3]: ≥ 77% High: ≥ 77%	Dahlgren et al. 2019
	Shrub height	Low [2]: ≥ 10.25 inches (26 cm) Mid [3]: ≥ 4.3 inches (11 cm) High [4]: ≥ 8 inches (20 cm)	Stiver et al. 2015 Connelly et al. 2000 Dahlgren et al. 2019
	Perennial grass cover	Low [2]: ≥ 5% Mid [3]: ≥ 6% High: ≥ 8%	Dahlgren et al. 2019
	Perennial forb cover	Low [2]: ≥ 2% Mid [3]: ≥ 2% High [4]: ≥ 6%	Dahlgren et al. 2019
	Riparian areas/mesic meadows	Proper Functioning Condition	
	Upland and riparian perennial forb availability	Preferred forbs are common with several preferred species present [6]	Stiver et al. 2015

Attribute	Indicators	Benchmarks	Reference
Cover *(cont.)*	Invasive annual grass cover	<2% cover	BLM synthesis of research[7]
	Conifer	0 (Absence of conifer)	BLM synthesis of research [8]
Winter (November 15-March 15) [1]			
Cover and Food	Sagebrush cover above snow	≥10%	Stiver et al. 2015 Connelly et al. 2000
	Shrub height	Low [2]: ≥ 12 inches (30 cm) Mid [3]: ≥ 5.9 inches (15 cm) High [4]: ≥ 9 inches (23 cm)	Connelly et al. 2000
	Conifer	0 (Absence of conifer)	BLM synthesis of research [8]

Notes:
[1] Specific dates will be based on site-specific conditions and may be modified due to documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, and long and/or heavy winter), in coordination with the appropriate State of Utah agency.
[2] Low is equivalent to the *Low* cluster from Dahlgren et al. 2019. It covers lower elevation areas (~1,200–2,200 m) in Utah, consisting primarily of Wyoming big sagebrush communities, with some basin big sagebrush included.
[3] Mid is equivalent to the *Parker* cluster from Dahlgren et al. 2019. It occurs primarily on the plateau of Parker Mountain (~2,300–2,800 m) in south-central Utah, dominated by black sagebrush communities.[4] High is equivalent to the *Wasatch* cluster from Dahlgren et al. 2019. It covers mid- to high-elevation areas (~2,200–3,000 m) in Utah, consisting primarily of basin (mid-elevation) and mountain big sagebrush (high elevation), as well as other mesic and higher elevation vegetation communities.
[5] Specific height requirements needed to meet the objective will be set at the time of watershed assessments.
[6] Preferred forbs are listed in Stiver et al. 2015. Overall total forb cover may be greater than that of preferred forb cover, since not all forb species are listed as preferred.
[7] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)
[8] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

8.2.7 Wyoming GRSG Habitat Indicators Table

Table 8-1.G. Wyoming GRSG Habitat Indicators Table

Attribute	Indicators [1]	Benchmarks [2]	Reference
Breeding (Seasonal Use Period March 1 – June 15; Doherty 2008, Holloran and Anderson 2005) [3]			
Lek Security	Proximity of trees	Conifer cover in shrub/grassland ecological sites <4% in each 125-acre (50.6-ha) segment within 3.1 miles (5 km) of occupied leks [4]	Baruch-Mordo et al. 2013 Stiver et al. 2015 Beers and Frey 2022 Severson et al. 2017
	Proximity of sagebrush to leks	Protective sagebrush cover within 330 ft. (approx. 100 m) of occupied leks	Stiver et al. 2015
Cover	Sagebrush cover [5]	5 to 25%	Connelly et al. 2000 Hagen et al 2007 Hanser et al. 2018
	Sagebrush height	12 to 31 in (30 to 80 cm) Arid sites [6] 16 to 31 in (40 to 80 cm) Mesic sites [7]	Connelly et al. 2000
	Sagebrush shape	Predominantly spreading shape [8]	Stiver et al. 2015
	Perennial grass cover [5,9]	>10% Arid sites [6] >15% Mesic sites [7]	Connelly et al. 2000 Stiver et al. 2015 Cagney et al. 2010
	Perennial grass and forb height (including residual grasses)	Reference state as determined by ecological site potential in consideration of annual variability; robust cool-season bunchgrass understory necessary for adequate herbaceous height [9]	Connelly et al. 2000 Coates et al. 2017 Doherty et al. 2014 Hagen et al. 2007 Stiver et al. 2015 Cagney et al. 2010
	Forb cover [5]	>5% Arid sites [6] >10% Mesic sites [7] Preferred species [10] present in upland nesting/early brood-rearing areas	Connelly et al. 2000 Stiver et al. 2015 Hagen et al. 2007
	Invasive annual grass cover	<2% cover	BLM synthesis of research [13]
	Conifer	0 (Absence of conifer)	BLM synthesis of research [14]

Attribute	Indicators [1]	Benchmarks [2]	Reference
Late Brood-Rearing/Summer (Seasonal Use Period June 16 – October 31) [3]			
Cover and Food	Sagebrush cover [5]	5 to 25% in adjacent sagebrush stands within 200 ft. (approx. 60 m) of late brood-rearing/summer feeding sites [11]	Connelly et al. 2000 Slater 2003
	Sagebrush height	16 to 31 in (40 to 80 cm) in adjacent sagebrush stands within 200 ft. (approx. 60 m) of late brood-rearing/summer feeding sites [11]	Connelly et al. 2000 Slater 2003
	Perennial grass and forb cover [5]	>25% in late brood-rearing/summer feeding sites [11]	Connelly et al. 2000 Coates et al. 2017
	Riparian areas; Mesic meadows	Proper functioning condition	Stiver et al. 2015
	Forb availability	Preferred species [10] present in late brood-rearing/summer feeding sites [12]	Stiver et al. 2015
	Invasive annual grass cover	<2% cover	BLM synthesis of research [13]
	Conifer	0 (Absence of conifer)	BLM synthesis of research [14]
Winter (Seasonal Use Period November 1 – February 28) [3]			
Cover and Food	Sagebrush cover above snow [5, 12]	>5%	Connelly et al. 2000 Stiver et al. 2015
	Sagebrush height above snow [12]	>10 in (>25 cm)	Connelly et al. 2000
	Conifer	0 (Absence of conifer)	BLM synthesis of research [14]

Notes:

[1] The indicators included represent the minimum habitat requirements that should be considered. When assessing the suitability of a seasonal use area (e.g., HAF site-scale polygon), practitioners are encouraged to use a multiple lines of evidence approach that references all relevant data, expertise, and locally-relevant habitat indicators (BLM Technical Note 453; Kachergis et al. 2020).

[2] Collectively the indicators for sagebrush (cover, height, and shape), perennial grasses, and forbs (cover, height and/or availability) represent the desired condition for the seasonal habitats described. Connected habitats allowing for GRSG dispersal and migration among the seasonal ranges is needed to meet habitat objectives. GRSG habitats in northeastern Wyoming are ecologically limited in terms of sagebrush production and the ability to support dense stands of sagebrush (i.e., sagebrush canopy cover rarely exceeds 15%) and require additional consideration of local conditions, ecological site potential, and GRSG seasonal habitat selection (State of Wyoming Executive Order 2019-3).

[3] Where credible data support different seasonal dates than those identified, dates may be shifted but the amount of days cannot be shortened or lengthened by the local unit.

[4] Conifer reduction treatments should consider and limit potential impacts of those activities on populations of other sensitive species (e.g., pinon jay). Treatments where the likely impacts to habitats important for other sensitive species are not clearly outweighed by the likely benefits to GRSG habitat suitability should be reconsidered.

[5] Absolute cover is the actual recorded cover and can exceed 100% when recorded across all species and all layers. It is not relative cover, which is the proportion of each species and equals 100%. Note that cover is reported for only those species (e.g., sagebrush, preferred forbs) of interest to determine suitability of habitat for sage-grouse. Overall cover at the site may be greater than that sampled for sage-grouse habitat due to the presence of other species.

[6] Arid corresponds to the 10 – 12-inch precipitation zone; Wyoming big sagebrush (*A. t. wyomingensis*) is a common big sagebrush subspecies for this type site (Stiver et al. 2015).

[7] Mesic corresponds to the ≥12-inch precipitation zone; Mountain big sagebrush (*A. t. vaseyana*) is a common big sagebrush sub-species for this type site (Stiver et al. 2015).

[8] Sagebrush plants that are more tree or columnar-shaped provide less protective cover near the ground than sagebrush plants with a spreading shape (Stiver et al. 2015). Some sagebrush plants are naturally columnar (e.g., Basin big sagebrush; *A. t. tridentata*), and a natural part of the plant community. However, a predominance of columnar shape arising from animal impacts may warrant habitat management investigation or adjustments at site-specific scales.

[9] The intent is to manage for the long-term maintenance of sagebrush habitats in or restoration of sagebrush habitats to the reference state in combination with annually maintaining sufficient standing crop (i.e., current year's herbaceous growth) to provide residual hiding cover for the following nesting season (reference Cagney et al. 2010). A robust cool-season bunchgrass understory is necessary to achieve adequate herbaceous heights for suitable GRSG breeding habitats.

[10] Forb availability and diversity in sagebrush upland habitats used by GRSG during pre-laying (Barnett and Crawford 1994), nesting, and early brood-rearing (Hagen et al. 2007) is important for nesting success and chick survival; preferred forbs as established in the Habitat Assessment Framework (Stiver et al. 2015) as updated with state-specific information.

[11] Sage-grouse feed in habitats that maintain moist soils and high forb and insect availability throughout the summer (e.g., wet meadows, riparian areas, irrigated hay meadows, springs/seeps) that are closely associated with protective sagebrush cover (Connelly et al. 2011).

[12] Sage-grouse habitat availability and selection during winter is influenced by snow conditions (e.g., depth, hardness) and topography (elevation, aspect) in addition to sagebrush height and cover and can vary widely depending on winter severity (Connelly et al. 2011). The intent is to manage habitats for a mosaic of sagebrush stands across a variety of topographic conditions as windswept ridges with low-stature sagebrush and/or draws with tall sagebrush can provide access to sagebrush above snow for sage-grouse during any given winter.

[13] BLM synthesis of research on the impacts invasive annual grasses have on sage-grouse habitat suitability (**Attachment 8-1**)

[14] BLM synthesis of research on the impact conifer have on sage-grouse habitat suitability (**Attachment 8-2**)

8.3 USING THE HABITAT INDICATORS TABLE(S)

The Habitat Indicators Tables are to be used as follows:

- To inform habitat suitability at one point in time, as defined by the processes described in the Habitat Assessment Framework and BLM HAF Implementation Guidelines.
- To inform measurable project objectives during implementation-level planning for BLM-permitted and BLM-initiated actions in HMAs, as applicable.
- To inform agency decision-makers regarding consideration of whether a project or proposal should be approved, denied, or modified based on how it would affect an area's existing habitat suitability status.

Additional guidance on the use of the Habitat Indicators Table and the associated products is available in the Habitat Assessment Framework (Stiver et al. 2015, BLM TR 6710-1, as revised) and BLM Sage-grouse HAF Implementation Guidelines.

When assessing seasonal habitat suitability, the BLM will summarize and report the number of monitoring locations, or amount of seasonal habitat in the analysis area, that are suitable, marginal, or unsuitable. Based on the monitoring locations rated as suitable, marginal, or unsuitable and the documentation of conditions across the entire analysis area such as ecological site potential (using appropriate ecological site descriptions, State and Transition Models, reference sheets, etc.), weather, and land ownership patterns, the BLM will determine if a given seasonal habitat is a limiting factor for sage-grouse. All rationale will be documented in a HAF summary report.

Relationship of the Habitat Indicators Table to other assessment and planning tools

The indicators and benchmarks in the Habitat Indicators Table are meant to inform the wildlife and/or sensitive species component of the Land Health Standards evaluation process (LHS, 43 CFR 4180.2; **Figure 8-1**). The Habitat Indicators are not land health standards and do not replace land health assessments. The indicators relating to vegetative cover are assessed using AIM methodology (Herrick et al. 2021). The HAF, GRSG Monitoring Framework (see **Appendix 7**), and land health assessments all incorporate AIM data to monitor existing conditions and track changes over time. The Land Use Plan (LUP) indicators use AIM methods to measure several of the GRSG habitat indicators.

Table 8-2. Relationships of LUP, HAF, LHS, and MF relative to the GRSG Habitat Objectives

Land Health Standards (LHS) Evaluation	Land Use Plan (LUP)	GRSG Habitat Assessment Framework (HAF)	GRSG Monitoring Framework (MF)
Evaluates if the sage-grouse portion of the Special Status Species Land Health Standard is achieved or significant progress towards achievement is made. These evaluations utilize HAF results along with other data.	Sets GRSG habitat objective(s) and Identifies the GRSG habitat indicators (see **Tables 8-1.A-G** above) and benchmarks from best available science for evaluating progress toward meeting the objective	Provides methods to assess GRSG habitats using the LUP indicators and benchmarks from this appendix (see **Tables 8-1.A-G** above)	Provides framework for reporting progress toward achieving the objective(s) of the LUP

8.4 INAPPROPRIATE USES OF THE HABITAT INDICATORS TABLE

- Using the indicator value(s) as default desired conditions to inform LUP effectiveness without considering the current state compared to ecological potential of the site and relevant local information where measurements were taken.
- Using a single measured indicator value to determine sage-grouse habitat suitability.
- Using a single indicator as a criterion to modify grazing management or any other use.
- Adjusting use authorizations based on measured indicator values without adequate monitoring data.
- Adjusting use authorizations before determining whether the change will help move towards suitable habitat.

8.5 LITERATURE CITED

Aldridge, C. L., and M. S. Boyce. 2007. "Linking occurrence and fitness to persistence: Habitat-based approach for endangered greater sage-grouse." Ecological Applications 17(2):508-526.

Barnett, J. K., and J. A. Crawford. 1994. "Pre-laying nutrition of sage grouse hens in Oregon." Journal of Range Management 47(2):114-118.

Baruch-Mordo, S., J. S. Evans, J. P. Severson, D. E. Naugle, J. D. Maestas, J. M. Kiesecker, M. J. Falkowski, C. A. Hagen, and K. P. Reese. 2013. "Saving sage-grouse from the trees: A proactive solution to reducing a key threat to a candidate species." Biological Conservation 167:233-241.

Bates, J. D., and K. W. Davies. 2014. Wyoming big sagebrush associations of eastern Oregon; Vegetation attributes. USDA-ARS, Burns, Oregon, ARS-Burns-Report-1-2015, 15 p.

Beers, A. T., and S. N. Frey. 2022. "Greater sage-grouse habitat selection varies across the marginal habitat of its lagging range margin." Ecosphere 13(7):e4146

Berkeley, L., J. Smith, and M. Szczypinski. 2013. Evaluating Sage-Grouse and Habitat Responses to Sage-Grouse Friendly Livestock Grazing Strategies: 3-yr Preliminary Findings. Montana Fish, Wildlife and Parks.

Blomberg, E. J., J. S. Sedinger, M. T. Atamian, and D. V. Nonne. 2012. "Characteristics of climate and landscape disturbance influence the dynamics of greater sage-grouse populations." Ecosphere 3(6):55

Bruce, J. R., W. D. Robinson, S. L. Petersen, and R. F. Miller. 2011. "Greater sage-grouse movements and habitat use during winter in central Oregon." Western North American Naturalist 71(3):418-424.

Bureau of Land Management (BLM). 1997. Record of Decision for Standards for Rangeland Health and Guidelines for Livestock Grazing Management Final Environmental Impact Statement for Montana and North and South Dakota. BLM Montana State Office, Billings, Montana. August 1997.

_____. 2015a. Research Natural Areas vegetation monitoring report summaries: 2014. BLM Oregon/Washington State Office, Portland, Oregon.

_____. 2015b. Ecological Site Inventory data summary, BLM, Vale District Office, Vale, Oregon.

Cagney, J., E. Bainter, B. Budd, T. Christiansen, V. Herren, M. Holloran, B. Rashford, M. Smith, and J. Williams. 2010. Grazing influence, objective development, and management in Wyoming's greater sage-grouse habitat. Cooperative Extension Service Bulletin B-1203, University of Wyoming, Laramie.

Casazza, M. L., P. S. Coates, and C. T. Overton. 2011. "Linking habitat selection to brood success in greater sage-grouse." In: Ecology, Conservation, and Management of Grouse (M. K. Sandercock, K. Martin, and G. Segelbacher, editors). University of California Press, Berkeley. Pp. 151-168

Coates, P. S., and D. J. Delehanty. 2010. "Nest predation of greater sage-grouse in relation to microhabitat factors and predators." Journal of Wildlife Management 74(2):240-248.

Coates, P. S., M. L. Casazza, E. J. Blomberg, S. C. Gardner, S. P. Espinosa, J. L. Yee, L. Wiechman, B. J. and Halstead. 2013. "Evaluating greater sage-grouse seasonal space use relative to leks: Implications for surface use designations in sagebrush ecosystems." Journal of Wildlife Management 77:1598-1609.

Coates, P. S., M. L. Casazza, B. E. Brussee, M. A. Ricca, K. B. Gustafson, and E. Sanchez-Chopitea. 2016. Spatially Explicit Modeling of Annual and Seasonal Habitat for Greater Sage-Grouse (*Centrocercus urophasianus*) in Nevada and Northeastern California—An Updated Decision-Support Tool for Management: US Geological Survey Open-File Report 2016-1080.

Coates, P. S., B. E. Brussee, M. A. Ricca, J. E. Dudko, B. G., Prochazka, S. P. Espinosa, M. L. Casazza, and D. J. Delehanty. 2017a. Greater sage-grouse (*Centrocercus urophasianus*) nesting and brood-rearing microhabitat in Nevada and California—Spatial variation in selection and survival patterns: U.S. Geological Survey Open-File Report 2017–108.

Coates, P. S., B. G. Prochazka, M. A. Ricca, G. T. Wann, C. L. Aldridge, S. E. Hanser, K. E. Doherty, M. S. O'Donnell, D. R. Edmunds, and S. P. Espinosa. 2017b. Hierarchical population monitoring of greater sage-grouse (Centrocercus urophasianus) in Nevada and California—Identifying populations for management at the appropriate spatial scale: U.S. Geological Survey Open-File Report 2017-108 [Also available at https://doi.org/10.3133/ofr20171089]

Coggins, K. A. 1998. "Relationship between habitat changes and productivity of sage grouse at Hart Mountain National Antelope Refuge, Oregon." Master's thesis, Oregon State University, Corvallis.

Colorado Greater Sage-grouse Steering Committee. 2008. Colorado greater sage-grouse conservation plan. Colorado Division of Wildlife, Denver, Colorado, USA.

Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. "Guidelines to manage sage grouse populations and their habitats." Wildlife Society Bulletin 28(4):967-985.

Connelly, J. W., K. P. Reese, and M. A. Schroeder. 2003. "Monitoring of Greater sage-grouse habitats and populations." University of Idaho College of Natural Resources Experiment Station Bulletin, Bulletin 80. University of Idaho, Moscow, Idaho.

Connelly, J. W., C. A. Hagen, and M. A. Schroeder. 2011. "Characteristics and dynamics of greater sage-grouse populations." In Greater sage-grouse: Ecology and conservation of a landscape species and its habitats (S. T. Knick and J. W. Connelly, editors). Studies in Avian Biology 38:53-67. University of California Press, Berkeley.

Crawford, J. A., and L. A. Carter. 2000. Habitat use by sage grouse on the Beatys Butte Allotment. Final Report. Oregon State University, Corvallis.

Dahlgren, D. K., T. A. Messmer, B. A. Crabb, M. T. Kohl, S. N. Frey, E. T. Thacker, R. T. Larsen, and R. J. Baxter. 2019. "Sage-grouse breeding and late brood-rearing habitat guidelines in Utah." Wildlife Society Bulletin 43(4):576-589

Dickard, M., M. Gonzalez, W. Elmore, S. Leonard, D. Smith, S. Smith, J. Staats, P. Summers, D. Weixelman, and S. Wyman. 2015. Riparian area management: Proper functioning condition assessment for lotic areas. 2nd ed. Technical Reference 1737-15. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, Colorado.

Doescher, P. S., R. F. Miller, S. R. Swanson, and A. H. Winward. 1986. "Identification of the *Artemisia tridentata* ssp. *wyomingensis*/*Festuca idahoensis* habitat type in eastern Oregon." Northwest Science 60(1):55–60.

Doherty, K. E. 2008. "Sage-grouse and energy development: Integrating science with conservation planning to reduce impacts." Doctoral dissertation, the University of Montana, Missoula. https://scholarworks.umt.edu/etd/855

Doherty, K. E., D. E. Naugle, B. L. Walker, and J. M. Graham. 2008. "Greater sage-grouse winter habitat selection and energy development." Journal of Wildlife Management 72(1):187-195.

Doherty, K. E., D. E. Naugle, and B. L. Walker. 2010. "Greater sage-grouse nesting habitat: The importance of managing at multiple scales." Journal of Wildlife Management 74(7):1544-1553.

Doherty, K. E., J. L. Beck, and D. E. Naugle. 2011. "Comparing ecological site descriptions to habitat characteristics influencing greater sage-grouse nest site occurrence and success." Rangeland Ecology and Management 64(4):344-351.

Doherty, K. E., D. E. Naugle, J. D. Tack, B. L. Walker, J. M. Graham, and J. L. Beck. 2014. "Linking conservation actions to demography: Grass height explains variation in greater sage-grouse nest survival." Wildlife Biology 20(6):320-325.

Drut, M. S. 1992. "Habitat use and selection by sage grouse broods in southeastern Oregon." Master's thesis, Oregon State University, Corvallis.

Drut, M. S., W. H. Pyle, and J. A. Crawford. 1994. "Diets and food selection of sage grouse chicks in Oregon." Journal of Range Management 47(1):90-93.

Foster, M. A., J. T. Ensign, W. N. Davis, and D. C. Tribby. 2014. Greater sage-grouse in the southeast Montana sage-grouse core area. Final Report. Montana Fish, Wildlife and Parks, in partnership with USDI Bureau of Land management, Miles City, Montana.

Freese, M. T. 2009. "Linking greater sage-grouse habitat use and suitability across spatiotemporal scales in central Oregon." Master's thesis, Oregon State University, Corvallis.

Gibson, D., E. Blomberg, and J. Sedinger. 2013. Dynamics of greater sage-grouse (*Centrocercus urophasianus*) populations in response to transmission lines in central Nevada. Progress Report: Final. University of Nevada, Reno. December 2013.

Gonzalez, M. A., and S. J. Smith. 2020. Riparian area management: Proper functioning condition assessment for lentic areas. 3rd ed. Technical Reference 1737-16. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, Colorado.

Gregg, M. A., J. A. Crawford, M. S. Drut, and A. K. DeLong. "Vegetational cover and predation of sage grouse nests in Oregon." Journal of Wildlife Management 58(1):162-166.

Hagen, C. A., J. W. Connelly, and M. A. Schroeder. 2007. "A meta-analysis of greater sage-grouse *Centrocercus urophasianus* nesting and brood rearing habitats." Wildlife Biology 13(sp1):42-50.

Hagen, C. A. 2011. Greater sage-grouse conservation assessment and strategy for Oregon: A plan to maintain and enhance populations and habitats. Oregon Department of Fish and Wildlife, Bend. April 22, 2011.

Hanf, J. M., P. A. Schmidt, and E. B. Groshens. 1994. Sage grouse in the high desert of central Oregon: Results of a study, 1988-1993. Bureau of Land Management, Prineville District Office, Prineville, Oregon.

Hanser, S.E., P. A. Deibert, J. C. Tull, N. B. Carr, C. L. Aldridge, T. C. Bargsten, T. J. Christiansen, P. S. Coates, M. R. Crist, K. E. Doherty, E. A. Ellsworth, L. J. Foster, V. A. Herren, K. H. Miller, A. Moser, R. M. Naeve, K. L. Prentice, T. E. Remington, M. A. Ricca, D. J. Shinneman, R. L. Truex, L. A. Wiechman, D. C. Wilson, and Z. H. Bowen. 2018. Greater sage-grouse science (2015–17)—Synthesis and potential management implications. U.S. Geological Survey Open-File Report 2018–1017, 46 p., https://doi.org/10.3133/ofr20181017.

Herman-Brunson, K. M. 2007. "Nesting and Brood-rearing success and habitat selection of Greater Sage-Grouse and associated survival of hens and broods at the edge of their historic distribution." Master's thesis, South Dakota State University, Brookings.

Herrick, J. E., J. W. Van Zee, S. E. McCord, E. M. Courtright, J. W. Karl, and L. M. Burkett. 2021. Monitoring manual for grassland, shrubland, and savanna ecosystems, 2nd ed. Volume 1: Core methods. USDA-ARS Jornada Experimental Range, Las Cruces, New Mexico.

Holloran, M. J. and S. H. Anderson. 2005. "Spatial distribution of greater sage-grouse nests in relatively contiguous sagebrush habitats." Condor 107(4):742-752.

Holloran, M. J., B. J. Heath, A. G. Lyon, S. J. Slater, J. K Kuipers, and S. H. Anderson. 2005. "Greater sage-grouse nesting habitat selection and success in Wyoming." Journal of Wildlife Management 69(2):638-649.

Kachergis, E., N. Lepak, M. Karl, S. Miller, and Z. Davidson. 2020. Guide to using AIM and LMF data in Land Health Evaluations and Authorizations of Permitted Uses. Tech Note 453. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, Colorado.

Knick, S. T., S. E. Hanser, and K. L. Preston. 2013. "Modeling ecological minimum requirements for distribution of Greater Sage-Grouse leks: Implications for population connectivity across their western range, U.S.A." Ecology and Evolution 3(6):1539-1551.

Kolada, E. J., J. S. Sedinger, and M. L. Casazza. 2009a. "Nest site selection by greater sage-grouse in Mono County, California." Journal of Wildlife Management 73(8):1333–1340.

Kolada, E. J., M. L. Casazza, and J. S. Sedinger. 2009b. "Ecological factors influencing nest survival of greater sage-grouse in Mono County, California." Journal of Wildlife Management 73(8):1341-1347.

Lane, V. R. 2005. "Sage-grouse (*Centrocercus urophasianus*) nesting and brood rearing sagebrush habitat characteristics in Montana and Wyoming." Master's thesis, Montana State University, Bozeman.

Lockyer, Z. B., P. S. Coates, M. L. Casazza, S. Espinosa, and D. J. Delehanty. 2015. "Nest-site selection and reproductive success of greater sage-grouse in a fire-affected habitat of northwestern Nevada." Journal of Wildlife Management, 79(5):785–797.

Manier, D. J., Z. H. Bowen, M. L. Brooks, M. L. Casazza, P. S. Coates, P. A. Deibert, S. E. Hanser, and D. H. Johnson. 2014. Conservation buffer distance estimates for Greater Sage-Grouse—A review. U.S. Geological Survey Open-File Report 2014–1239. Internet website: https://dx.doi.org/10.3133/ofr20141239.

NRCS. 2015. Field Office Technical Guides. Internet website: http://www.nrcs.usda.gov/wps/portal/nrcs/main/national/technical/fotg/.

Prichard, D. 1998. Riparian area management: Process for assessing Proper Functioning Condition. Technical Reference 1737-9. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, Colorado.

Prichard, D., F. Berg, S. Leonard, M. Manning, W. Hagenbuck, R. Krapf, C. Noble, J. Staats, and R. Leinard. 1999. Riparian area management: a user guide to assessing proper functioning condition and the supporting science for lentic areas (TR 1737-16). Prepared for the United States Department of the Interior and the United States Department of Agriculture. BLM, National Applied Resource Sciences Center. Denver, Colorado.

Sant, E. D., G. E. Simonds, R. D. Ramsey, and R. T. Larsen. 2014. "Assessment of sagebrush cover using remote sensing at multiple spatial and temporal scales." Ecological Indicators 43:297-305.

Schroeder, M. A., J. R. Young, and C. E. Braun. 2020. Greater Sage-Grouse (*Centrocercus urophasianus*). In Birds of the World (A. F. Poole, and F. B. Gill, Editors). Cornell Lab of Ornithology, Ithaca, NY, USA. Internet website: Birds of The World Online: https://birdsoftheworld.org/bow/species/saggro/cur/introduction

Severson, J. P., C. A. Hagen, J. D. Maestas, D. E. Naugle, J. T. Forbes, and K. P. Reese. 2017, "Effects of conifer expansion on greater sage-grouse nesting habitat selection." Journal of Wildlife Management 81(1):86-95.

Slater, S. J. 2003. Sage-grouse (*Centrocercus urophasianus*) use of different-aged burns and the effects of coyote control in southwestern Wyoming. Master's thesis, University of Wyoming, Laramie.

State of Wyoming Executive Department. 2019. Greater sage-grouse Core Area Protection Executive Order 2019-3. Office of the Governor, Cheyenne, Wyoming.

Stevens, B. S. 2011. "Impacts of fences on greater sage-grouse in Idaho: Collision, mitigation, and spatial ecology." Master's thesis, University of Idaho, Moscow.

Stevens, B. S., S. B. Roberts, C. J. Conway, and D. K. Englestead. 2023. "Effects of large-scale disturbance on animal space use: Functional responses by greater sage-grouse after megafire." Ecology and Evolution 13(4):e09933 [Also available at https://doi.org/10.1002/ece3.9933]

Stiver, S. J., E. T. Rinkes, D. E. Naugle, P. D. Makela, D. A. Nance, and J. W. Karl (editors). 2015. Sage-Grouse Habitat Assessment Framework: A Multiscale Assessment Tool. Technical Reference 6710-1. Bureau of Land Management and Western Association of Fish and Wildlife Agencies, Denver, Colorado.

Stringham, T. K., Novak-Echenique, P., Snyder, D. K., Peterson, S., an Snyder, K A. 2016. Disturbance response grouping of ecological sites increases utility of ecological sites and state-and-transition models for landscape scale planning in the Great Basin. Rangelands. 38(6):371-378.

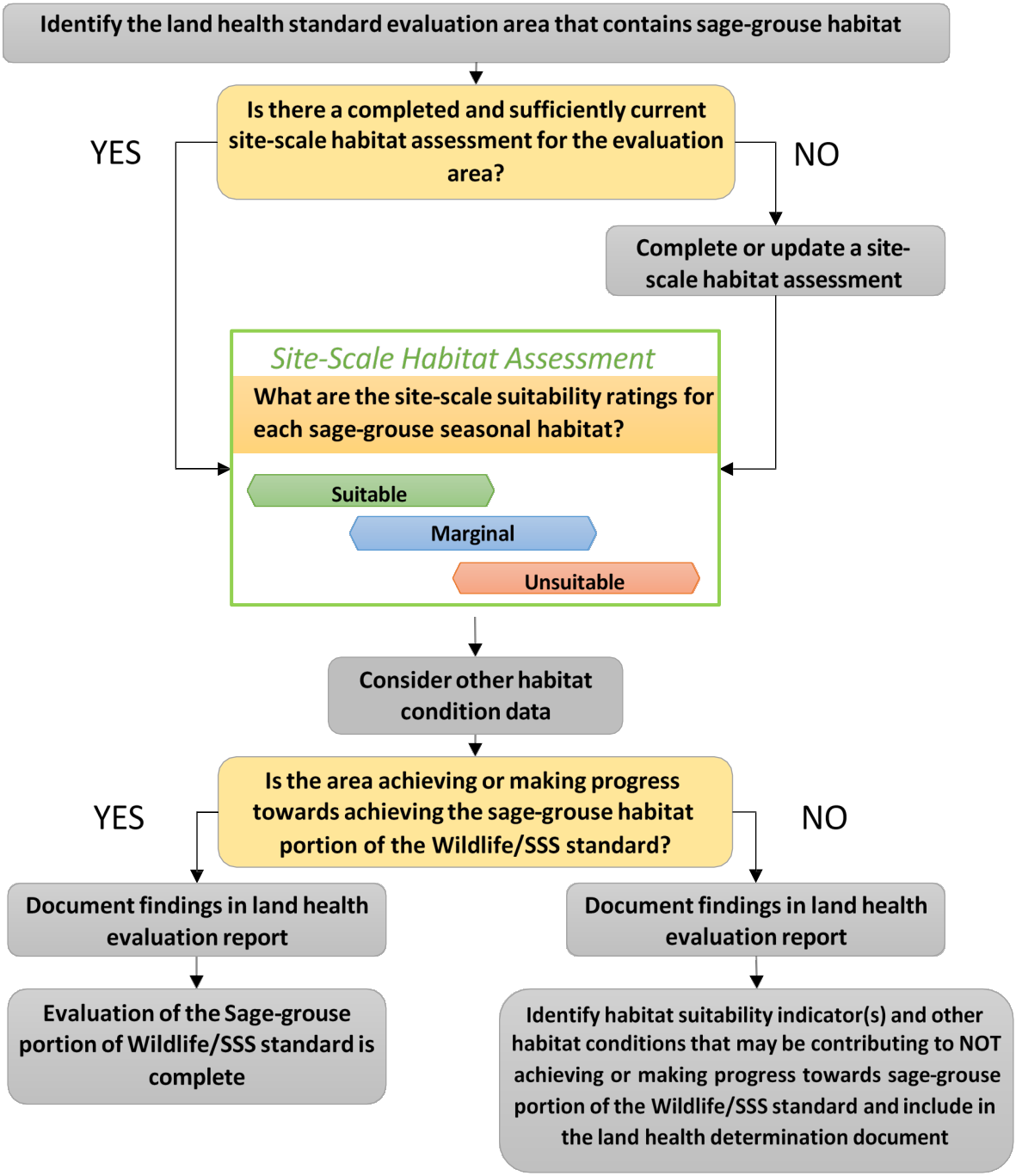
Swanson, C. C. 2009. "Ecology of greater sage-grouse in the Dakotas." Doctoral dissertation, South Dakota State University, Brookings.

Taylor, R. L., B. L. Walker, D. E. Naugle, and L. S. Mills. 2012. "Managing multiple vital rates to maximize greater sage-grouse population growth." Journal of Wildlife Management 76(2):336-347.

Wallestad, R. 1975. Life history and habitat requirements of sage grouse in central Montana. Game Management Division, Montana Department of Fish and Game, Helena.

Wright, P., and D. Wegner. 2008. Mapping land cover to estimate sage grouse habitat within the Cedar Creek Anticline and surrounding study area. Contract with Bureau of Reclamation. Technical Memorandum No. 86-68211-09-02. Remote Sensing and GIS Team, Technical Service Center, Bureau of Reclamation. Denver, Colorado.

Figure 8-1. Flowchart on Incorporating the Results of Site-Scale Sage-Grouse Habitat Assessment* into Wildlife/SSS Standard in the Land Health Assessments and Evaluations**



Acronyms:

SSS – Special Status Species
* Following the Sage-Grouse Habitat Assessment Framework (Stiver et al. 2015)

**For the complete land health standards evaluation and causal factor determination workflow, refer to: Kachergis, E., N. Lepak, M. Karl, S. Miller, and Z. Davidson. 2020. Guide to Using AIM and LMF Data in Land Health Evaluations and Authorizations of Permitted Uses. Tech Note 453. U.S. Department of the Interior, Bureau of Land Management, National Operations Center, Denver, CO.

Attachment 8-1. Justification for Invasive Annual Grass as a Habitat Suitability Indicator at the Sage-grouse Habitat Assessment Framework (HAF) Site-Scale

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Finalized on: October 12, 2023

BACKGROUND

Invasive annual grasses, such as cheatgrass, medusahead, and ventenata species, are a recognized threat to sagebrush ecosystems (Chambers et al. 2016, Remington et al. 2021, Rowland et al. 2019) causing reduced ecosystem function, displacement of native vegetation, increased fire risk and reduced rates of post-fire recovery (D'Antonio and Vitousek 1992, Bradely et al. 2018) all of which can lead to degradation and/or loss of sage-grouse habitat (Nelle et al. 2000, Wik et al. 2002, Coates et al. 2015, Coates et al. 2016, Lockyer et al. 2015, Steenvoorden et al 2019, Brussee et al. 2022, Poessel et al. 2022). The Bureau of Land Management (BLM) uses the Sage-grouse Habitat Assessment Framework (HAF; Stiver et al. 2015) to assess sage-grouse habitat suitability at multiple spatial scales (mid-, fine- and site-scale) by examining scale-specific indicators that represent both habitat requirements (i.e., food, water, cover, security) and threats to habitat (i.e., anthropogenic disturbances, proximity of trees to leks). However, invasive annual grasses are not included as an indicator of habitat suitability at any scale of the HAF (Stiver et al. 2015). This omission has been recognized by both authors and implementors of the HAF as a shortcoming that should be remedied, as supported by scientific literature.

The purpose of this document is to:

- Provide scientifically based rationale for including invasive annual grass cover as an additional indicator in HAF site-scale habitat assessments (Stiver et al. 2015, revised), and
- Recommend scale-specific benchmarks for invasive annual grass cover for HAF site-scale assessments based on scientific literature relevant to that scale.

RATIONALE

Research has shown that invasive annual grasses can reduce habitat suitability for sage-grouse, at the site-scale (i.e., microhabitat), by displacing native vegetation and altering habitat composition and structure (Chambers et al. 2016, Coates et al. 2017, Brussee et al. 2022). This degradation can cause sage-grouse to avoid areas with invasive annual grasses (Lockyer et al. 2015, Coates et al. 2017, Poessel et al. 2022) and can cause lower occupancy and survival rates in areas with invasive annual grasses (Wik et al 2002, Kirol et al. 2012, Lockyer et al. 2015). General speaking, studies have shown that greater sage-grouse will use areas with relatively low amounts of invasive annual grasses for nesting and brood-rearing; however, in areas with relatively higher amounts of invasive annual grasses, rates of occupancy and/or survival are lower (Coates et al. 2017, Dinkins et al. 2016, Lockyer et al. 2015, Schreiber et al. 2015, Stonehouse et al. 2015, Wik 2002).

For example, a study conducted in Nevada and California found that cheatgrass abundance was the single greatest micro-habitat feature distinguishing greater sage-grouse nest sites from random sites in the study area and that average cheatgrass cover at nest sites (7.1%; SE=1.0) was lower than at random sites (13.3%; SE=1.2) (Lockyer et al. 2015). A study in Idaho found that successful nests had lower average cheatgrass cover (1%) than unsuccessful nests (4%) while successful broods had lower average cheatgrass cover (2%) than unsuccessful broods (6%) (Wik et al. 2002). In Nevada and California, a study indicated that > 5% annual grass cover was unsuitable for GRSG during nesting and brood-rearing (Coates et al. 2017). They also recommended suitability categories for invasive annual grasses in nesting habitat specific to xeric sites (<2.5% invasive annual grass cover is suitable, 2.5 – 4.8% is marginal, >4.8% is unsuitable) and mesic sites (<2.5% invasive annual grass cover is suitable, 2.5 – 5.2% is marginal, >5.2% is unsuitable).

Although individual studies reported different values of invasive annual grass cover associated with sage-grouse site selection and nest/brood success, there was notable overlap. In studies that examined site selection (not success), they reported mean values ranging between <1% to 17% cover of invasive annual grasses at used sites (regardless of success), with most reporting <7% cover (**Table 1**). In studies that examined nest and/or brood success relative to invasive annual grasses, they reported mean values between 1% to 7% for successful sites (Wik et al. 2002, Lockyer et al. 2015) (**Table 1**). Of note, some studies have shown that sage-grouse exhibit maladaptive site selection to invasive annual grasses and other habitat indicators due to nest site fidelity (Coates et al. 2017, Brussee et al. 2022, Cutting et al. 2019) so nest/brood success may be a more accurate indicator of the impacts of invasive annual grasses to sage-grouse habitat suitability.

Collectively, this research indicates that invasive annual grasses can reduce habitat suitability for nesting and brood-rearing greater sage-grouse at the site-scale and that habitat suitability generally decreases as invasive annual grass cover increases. It is recommended that invasive annual grass cover be included as a habitat suitability indicator for sage-grouse habitat assessments conducted at the HAF site-scale, as described in the Recommendations section below.

Table 1. The table below lists and describes key aspects and findings from research that has examined the relationship of invasive annual grass cover to greater sage-grouse habitat selection and/or survival at the site-scale (i.e., microhabitat). Note that no studies specifically examined the potential impacts of invasive annual grasses on Gunnison sage-grouse.

Citation	State	Scale/ Extent	Season	Applicable Findings
Coates et al. 2017	NV	10m of nest	Nesting	Mean invasive annual grass cover at nests was 4.8% in xeric sites and 5.1% in mesic sites. Authors recommended suitability categories: • xeric sites (suitable is <2.5%, marginal is 2.5 – 4.8%, unsuitable is >4.8%) and • mesic sites (suitable is <2.5%, marginal is 2.5 – 5.2%, unsuitable is >5.2%)
		10m of brood	Brood-rearing	Mean invasive annual grass cover at brood sites was 4.3% in xeric 4.79% in mesic. Authors recommended suitability categories: • xeric sites (suitable is <2.5%, marginal is 2.5 – 4.3%, unsuitable is >4.3%) and • mesic sites (suitable is <2.5%, marginal is 2.5 – 4.8%, unsuitable is >4.8%)

Citation	State	Scale/ Extent	Season	Applicable Findings
Dinkins et al. 2016	WY	5m of nest	Nesting	Mean invasive annual grass cover at nests 2.14% (SE=0.11) which was higher but similar to random sites with a mean of 1.75% (SE=0.10).
Kirol et al. 2012	WY	8m of nest	Nesting	Nest selection was negatively related to the presence of cheatgrass when compared to available habitat. "Cheatgrass occurred at 6% of the nest locations and 19% of the corresponding random locations."
Lockyer et al. 2015	NV/CA	0.01ha of nest	Nesting	Average cover of cheatgrass at nests and random sites was 7.1% (SE=1.0) and 13.3% (SE=1.2), respectively. Sites with >7.1% cheatgrass cover had lower nest success. Cheatgrass was the single greatest micro-habitat feature distinguishing nests from random sites.
Schreiber et al. 2015	WY	20m of brood	Brood-rearing	Cheatgrass cover was lower at early brood-rearing sites (0.55% +/-0.38%) than at random points (0.71% +/-0.30%) but similar. Cheatgrass cover was lower at late brood-rearing sites (1.44% +/-0.65%) than at random points (2.13% +/-0.72%) but similar.
Stonehouse et al. 2015	WA		Nesting	Mean cover of invasive annual grasses at nest sites was 13% (SE=1); random sites were not assessed.
Wik et al. 2002	ID	20m of nest	Nesting	All nests had an average of 3% cover. Successful nests had lower average cheatgrass cover (1% in 20m transect) than unsuccessful nest (4% in 20m transect).
		20 m of brood	Brood-rearing	All broods had average of 5% cheatgrass. Unsuccessful broods has lower cheatgrass (2% in 20m) at use-sites than successful broods (6% in 20m).
Wing et al. 2014	UT	15m of nest	Nesting	All nest, brood, and non-brooding use sites had cheatgrass which was similar in cover to random sites. Cheatgrass cover means: Nest mean = 17.6% (0.8), Brood mean = 15.6% (0.8), non-brood females and males = 14.3% (0.7), random sites mean = 15.9% (0.8).

RECOMMENDATIONS

Based on the findings of the research summarized above (**Table 1**), invasive annual grass cover should be assessed as a habitat indicator for nesting/early brood-rearing, late brood-rearing, and wintering habitat during a HAF site-scale assessment using the following benchmarks, adjusted as warranted by best available science. Note that these benchmarks were based more heavily on research that examined nest and brood *success* relative to invasive annual grass cover (more so than research that examined *use versus availability* of habitat) because sage-grouse have been shown to exhibit maladaptive site selection (Coates et al. 2017, Brussee et al. 2022, Cutting et al. 2019). Invasive annual grasses are not assessed at the site-scale for leks because the AIM strategy does not include leks in its sampling strategy; however, invasive annual grasses are assessed for lekking habitat at the HAF *fine-scale*. There was not sufficient research to suggest different benchmarks for winter habitat due to a lack of research on winter habitat as compared to nesting and brood-rearing. If future research indicates otherwise, benchmarks may be adjusted accordingly.

Table 2. Recommended habitat suitability benchmarks for assessing invasive annual grass at the HAF site-scale.

Habitat Indicator	Metric	Benchmarks		
		Suitable	Marginal	Unsuitable
Invasive Annual Grass	% cover	<2%	2 – 5%	>5%

LITERATURE CITED

Bradley, B. A., Curtis, C. A., Fusco, E.J., Abatzoglou, J. T., Balch, J. K., Dadashi, S., Tuanmu, M., 2018, Cheatgrass (Bromus tectorum) distribution in the intermountain Western United States and its relationship to fire frequency, seasonality, and ignitions: Biological Invasions (2018) 20:1493–1506.

Brussee, B.E., Coates, P.S., O'Neil, S.T., Casazza, M.L., Espinosa, S.P., Boone, J.D., Ammon, E.M., Gardner, S.C., and Delehanty, D.J., 2022. Invasion of annual grasses following wildfire corresponds to maladaptive habitat selection by a sagebrush ecosystem indicator species: Global Ecology and Conservation, e02147, 19 p.

Chambers, J.C., Beck, J.L., Campbell, S., Carlson, J., Christiansen, T.J., Clause, K.J., Dinkins, J.B., Doherty, K.E., Griffin, K.A., Havlina, D.W., Mayer, K.F., Hennig, J.D., Kurth, L.L., Maestas, J.D., Manning, M., Mealor, B.A., McCarthy, C., Perea, M.A., and Pyke, D.A., 2016. Using resilience and resistance concepts to manage threats to sagebrush ecosystems, Gunnison sage-grouse, and greater sage-grouse in their eastern range—A strategic multi-scale approach: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station, General Technical Report RMRS-GTR-356, 143 p.

Coates, P.S., Ricca, M.A., Prochazka, B.G., Doherty, K.E., Brooks, M.L., and Casazza, M.L., 2015, Long-term effects of wildfire on greater sage-grouse-Integrating population and ecosystem concepts for management in the Great Basin: U.S. Geological Survey Open-File Report 2015-1165, 42 p.

Coates, P.S., Casazza, M.L., Brussee, B.E., Ricca, M.A., Gustafson, K.B., Sanchez-Chopitea, E., Mauch, K., Niell, L., Gardner, S., Espinosa, S., and Delehanty, D.J., 2016, Spatially explicit modeling of annual and seasonal habitat for greater sage-grouse (Centrocercus urophasianus) in Nevada and northeastern California-An updated decision-support tool for management: U.S. Geological Survey Open-File Report 2016-1080, 160 p.

Coates, P.S., Brussee, B.E., Ricca, M.A., Dudko, J.E., Prochazka, B.G., Espinosa, S.P., Casazza, M.L., and Delehanty, D.J., 2017, Greater sage-grouse (Centrocercus urophasianus) nesting and brood-rearing microhabitat in Nevada and California-Spatial variation in selection and survival patterns: U.S. Geological Survey Open-File Report 2017-1087, 79 p.

Cutting, K. A., Rotella, J. J., Schroff, S. R., Frisina, M. R., Waxw, J. A., Nunlist, E., Bok, S. F., 2019. Maladaptive nest-site selection by a sagebrush dependent species in a grazing-modified landscape: Journal of Environmental Management (236)622-630.

D'Antonio, C. M and Vitousek, P. M., 1992, Biological invasions by exotic grasses, the grass/fire cycle, and global change: Annual Review of Ecological Systems (1992)23:63-87.

Dinkins, J.B., Smith, K.T., Beck, J.L., Kirol, C.P., Pratt, A.C., and Conover, M.R., 2016, Microhabitat conditions in Wyoming's sage-grouse core areas-Effects on nest site selection and success: PLoS ONE, v. 11, no. 3, article e0150798, 17 p.

Ketcham, M., Laurence-Traynor, A., Lepak1, N., Nelson, J., Pattison, R., and Tyson, A., 2023, An Application of Technical Note 453: Using Terrestrial AIM Data to Set Benchmarks in the Vale District Office, Oregon, Bureau of Land Management Report.

Kirol, C. P., Beck, J.L, Dinkins, J.B., and Conover, M. R. 2012. Microhabitat selection for nesting and brood-rearing by the Greater Sage-grouse in xeric big sagebrush: *The Condor* 114(1):75–89.

Lockyer, Z.B., Coates, P.S., Casazza, M.L., Espinosa, S., and Delehanty, D.J., 2015, Nest-site selection and reproductive success of greater sage-grouse in a fire-affected habitat of northwestern Nevada: Journal of Wildlife Management, v. 79, no. 5, p. 785-797.

Nelle, P. J., Reese, K. P., and Connelly, J. W., 2000, Long-Term Effects of Fire on Sage Grouse Habitat: Journal of Range Management 53(6):586- 591.

Poessel, S.A., Barnard, D.M., Applestein, C., Germino, M.J., Ellsworth, E.A., Major, D., Moser, A., and Katzner, T.E., 2022, Greater sage-grouse respond positively to intensive post-fire restoration treatments: Ecology and Evolution, v. 12, no. 3, p. e8671.

Remington, T.E., Deibert, P.A., Hanser, S.E., Davis, D.M., Robb, L.A., and Welty, J.L., 2021, Sagebrush conservation strategy—Challenges to sagebrush conservation: U.S. Geological Survey Open-File Report 2020-1125, 327 p.

Rowland, M.M., 2019, The effects of management practices on grassland birds - Greater Sage-Grouse (Centrocercus urophasianus), chap. B of Johnson, D.H., Igl, L.D., Shaffer, J.A., and DeLong, J.P., eds., The effects of management practices on grassland birds: U.S. Geological Survey Professional Paper 1842, p. 50.

Schreiber, L.A., Hansen, C.P., Rumble, M.A., Millspaugh, J.J., Gamo, R.S., Kehmeier, J.W., and Wojcik, N., 2015. Microhabitat selection of brood-rearing sites by greater sage-grouse in Carbon County, Wyoming: Western North American Naturalist, v. 75, no. 3, p. 348-363.

Steenvoorden, J., Meddens, A.J.H., Martinez, A.J., Foster, L.J., and Kissling, W.D., 2019, The potential importance of unburned islands as refugia for the persistence of wildlife species in fire-prone ecosystems: Ecology and Evolution, DOI: 10.1002/ece3.5432.

Stiver, S.J., E.T. Rinkes, D.E. Naugle, P.D. Makela, D.A. Nance, and J.W. Karl, eds. 2015. Sage-Grouse Habitat Assessment Framework: A Multiscale Assessment Tool. Technical Reference 6710-1. Bureau of Land Management and Western Association of Fish and Wildlife Agencies, Denver, Colorado.

Stonehouse, K.F., Shipley, L.A., Lowe, J., Atamian, M.T., Swanson, M.E., and Schroeder, M.A., 2015, Habitat selection and use by sympatric, translocated greater sage-grouse and Columbian sharp-tailed grouse: Journal of Wildlife Management, v. 79, no. 8, p. 1308-1326.

Wik, P. A., 2002, Ecology of greater sage-grouse in south-central Owyhee County, Idaho: University of Idaho.

Wing, B. R., 2014, The Role of Vegetation Structure, Composition, and Nutrition in Greater Sage-Grouse Ecology in Northwestern Utah: Utah State University.

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Attachment 8-2. Justification for Conifer as a Habitat Suitability Indicator at the Sage-grouse Habitat Assessment Framework (HAF) Site-Scale

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Finalized on: October 12, 2023

BACKGROUND

Recent research has shown that conifer expansion into native sagebrush communities can reduce habitat suitability for sage-grouse (Nisbet et al 1983, Doherty et al. 2010, Fedy et al. 2014, Doherty et al. 2016, Westover et al. 2016, Baxter et al. 2017, Picardi et al. 2020, Saher et al. 2021, Brussee et al. 2022, Roth et al. 2022). The Bureau of Land Management (BLM) uses the Sage-grouse Habitat Assessment Framework (HAF; Stiver et al. 2015) to assess sage-grouse habitat suitability at multiple spatial scales (mid-, fine- and site-scale) by examining scale-specific indicators that represent both habitat requirements (i.e., food, water, cover, security) and threats to habitat (i.e., anthropogenic disturbances, predation risk). However, conifer cover is not included as an indicator of habitat suitability at any scale of the HAF (Stiver et al. 2015). This omission has been recognized by BLM personnel as a shortcoming of the HAF that should be remedied, as supported by scientific literature.

The purpose of this document is to:

- Provide scientifically based rationale for including conifer as an additional habitat indicator in HAF site-scale habitat assessments (Stiver et al. 2015, revised), and
- Recommend scale-specific thresholds for conifer for HAF site-scale assessments based on scientific literature relevant to that scale.

RATIONALE

Studies that examine site-scale sage-grouse habitat (also referred to as microhabitat) often do not report or analyze conifer as a habitat characteristic, likely because it is not a habitat requirement of sage-grouse but rather a deterrent, especially at such a small scale (e.g., within 10m of a nest site). In a review of over 40 peer-reviewed microhabitat studies on sage-grouse, no study reported conifer cover as a standard microhabitat characteristic for sage-grouse (such as sagebrush cover, grass height, forb cover) nor did they test for a relationship between conifer and sage-grouse. A few studies, such as Duvuvuei 2013 and Wing 2014, reported frequency of nests located under conifer in Utah (see **Table 1**). Wing 2014 reported that nesting under juniper was rare and that only one of those nests was successful. Duvuvuei 2013 showed that nests were commonly placed under junipers, especially by translocated females, but suggested that use of juniper for nesting was due to maladaptation caused by a lack of sagebrush cover and extensive juniper expansion into the study area.

Most studies that examine the potential impacts of conifer on sage-grouse and their habitat are conducted at landscape scales, typically estimating conifer cover near sage-grouse locations (e.g., within 1,000m of a nest site) using remotely sensed landcover data. These studies have established that conifer cover, even in low amounts (e.g., <2 % cover), can negatively impact sage-grouse across all seasons (lekking, nesting, brood-rearing and wintering) causing avoidance and/or reduced vital rates (Nisbet et al 1983, Doherty et al. 2010, Fedy et al. 2014, Doherty et al. 2016, Westover et al. 2016, Baxter et al. 2017, Picardi et al. 2020, Saher et al. 2021, Brussee et al. 2022, Roth et al. 2022). However, these findings are mostly applicable to HAF mid- and/or fine-scale assessments which are also landscape level.

Given the established negative impacts of conifer cover on sage-grouse at landscape scales and the lack of conifer being reported in microhabitat studies (i.e., suggesting avoidance of conifer at site-scales), it is recommended that conifer be included as a habitat suitability indicator for sage-grouse habitat assessments conducted at the HAF site-scale, as described in the Recommendations section below.

Table 1. The table below lists and describes key aspects and findings from research that has examined the relationship of conifer to greater sage-grouse habitat selection and/or survival at the site-scale (i.e., microhabitat). Note that no studies specifically examined the potential impacts of invasive annual grasses on Gunnison sage-grouse.

Name	Tree Type	State	Season	Applicable Findings
Wing 2014	Juniper	UT	Nesting	GRSG females rarely selected juniper as a nesting shrub (n=4) and only one nest was successful.
Duvuvuei 2013	Juniper	UT	Nesting	Translocated GRSG females (24%) nested under juniper but was accredited to lack of sagebrush cover and extensive conifer expansion in study area.

RECOMMENDATIONS

Based on the rationale above, conifer should be assessed as a habitat indicator during HAF site-scale assessments for nesting, brood-rearing, and wintering habitat. Conifer is not being added as an additional indicator in lek assessments because existing lek indicators already incorporate conifer and other trees. The metric used to assess conifer suitability is the count of conifer and, if available, the height of those conifer relative to surrounding sagebrush (or native shrubs, if used as a surrogate), using the benchmarks shown below (adjusted as warranted by best available science). Percent conifer is not recommended as the primary metric for conifer suitability because there is insufficient science to support a benchmark at the site-scale; however, percent conifer cover may still be used as ancillary information, as interpreted by local experts, to support assessment of conifer as a habitat suitability indicator.

Table 2. Recommended habitat suitability benchmarks for assessing conifer at the HAF site-scale.

Habitat Indicator	Metric	Benchmarks		
		Suitable	**Marginal**	**Unsuitable**
Conifer	Count	• 0 trees (absence of conifer)	If height is unknown: • 1 tree If height is known: • 1 tree that is taller than local average sagebrush height, and/or • <=3 trees that are not taller than local average sagebrush height	If height is unknown: • >1 tree If height is known: • >1 tree that is taller than local average sagebrush height, and/or • >3 trees that are not taller than local average sagebrush height

LITERATURE CITED

Baxter, J.J., R.J. Baxter, D.K. Dahlgren, and R.T. Larsen, 2017. Resource selection by greater sage-grouse reveals preference for mechanically-altered habitats: Rangeland Ecology and Management, 70(4): 493-503.

Doherty, K.E., D.E. Naugle, and B.L. Walker. 2010. Greater Sage-Grouse Nesting Habitat: The Importance of Managing at Multiple Scales. Journal of Wildlife Management 74(7): 1544-1553.

Doherty, K.E., J.S. Evans, P.S. Coates, L.M. Juliusson, and B.C. Fedy. 2016. Importance of regional variation in conservation planning - A rangewide example of the greater sage-grouse: Ecosphere, 7(10), article e01462, 27 p.

Duvuvuei, O. V. 2013. Vital rates, population trends, and habitat-use patterns of a translocated Greater Sage-grouse Population: Implications for future translocations, Utah State University Digital Commons 5-2013.

Brussee, B. E., Coates, P. S., O'Neil, S. T., Casazza, M. L., Espinosa, S. P., Boone, J. D., Ammon, E. M., Gardner, S. C., Delehanty, D. J., 2022. Invasion of annual grasses following wildfire corresponds to maladaptive habitat selection by a sagebrush ecosystem indicator species. Global Ecology and Conservation, Volume 37, September 2022. https://doi.org/10.1016/j.gecco.2022.e02147

Fedy, Bradley C., Kevin E. Doherty, Cameron L. Aldridge, Micheal O'Donnell, Jeffrey L. Beck, Bryan Bedrosian, David Gummer, Matthew J. Holloran, Gregory D. Johnson, Nicholas W. Kaczor, Christopher P. Kirol, Cheryl A. Mandich, David Marshall, Gwyn Mckee, Chad Olson, Aaron C. Pratt, Christopher C. Swanson, and Brett L. Walker, 2014. Habitat prioritization across large landscapes, multiple seasons, and novel areas: An example using greater sage-grouse in Wyoming. The Wildlife Society, Wildlife Monograph, 190(1): 1-39. https://doi.org/10.1002/wmon.1014

Nisbet, R.A., S.H. Berwick, and K.L Reed, 1983. A spatial model of sage-grouse habitat quality. In Analysis of Ecological Systems: State-of-the-art in Ecological modeling Eds. W.K. Lauenroth, G.V. Skogerbee, and M. Flug. Elsevier Scientific p991.

Picardi, Simona, Terry Messmer, Ben Crabb, Michel Kohl, David Dahlgren, Nicki Frey, Randy Larsen, and Rick Baxter, 2020. Predicting greater sage-grouse habitat selection at the southern periphery of their range. Ecology and Evolution 10(23): 13451-13463. https://doi.org/10.1002/ece3.6950

Roth, C. L., O'Neil, S. T., Coates, P. S., Ricca, M. A., Pyke, D. A., Aldridge, C. L., Heinrichs, J. A., Espinosa, S. P., Delehanty, D. J., 2022, Targeting Sagebrush (Artemisia Spp.) Restoration Following Wildfire with Greater Sage-Grouse (Centrocercus Urophasianus) Nest Selection and Survival Models. Environmental Management 70, 288–306. https://doi.org/10.1007/s00267-022-01649-0

Saher, D. J, O'Donnell, M. S., Aldridge, C. L., Heinrichs, J. A. 2021. Balancing model generality and specificity in management-focused habitat selection models for Gunnison sage-grouse, Global Ecology and Conservation 35 (2022) e01935.

Westover, M., J. Baxter, R. Baxter, C. Day, R. Jensen, S. Petersen, and R. Larsen. 2016. Assessing greater sage-grouse selection of brood-rearing habitat using remotely-sensed imagery-Can readily available high-resolution imagery be used to identify brood-rearing habitat across a broad landscape? PLoS ONE, 11(5) article e0156290, 19 p.

Wing, B. R., 2014, The Role of Vegetation Structure, Composition, and Nutrition in Greater Sage-Grouse Ecology in Northwestern Utah, Utah State University Digital Commons 5-2014.

Appendix 9

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Appendix 9. Tables and Figures

9.1 CHAPTER 3 TABLES

Table 3-2. Vegetation Communities within GRSG HMAs By State

State HMA	Acres of Sagebrush	Acres of Sagebrush-Associated	Acres of Non-Sagebrush
California	1,993,000	185,000	7,188,000
Colorado	3,033,000	1,603,000	10,562,000
Idaho	14,950,000	1,631,000	22,973,000
Montana	16,204,000	19,160,000	37,762,000
Nevada	24,860,000	6,088,000	29,891,000
North Dakota	43,000	569,000	351,000
Oregon	14,027,000	1,793,000	15,855,000
South Dakota	550,000	6,573,000	4,177,000
Utah	8,490,000	6,398,000	33,289,000
Wyoming	24,981,000	8,905,000	20,142,000
Grand Total	**109,131,000**	**52,905,000**	**182,190,000**

Source: LANDFIRE 2023

Table 3-3. Wild Horse and Burro Herd Management Areas Populations by State

State	Acres of Wild Horse and Burro HMAs	Statewide "High" Allowable Management Level (AML)	Estimated Current Population	Percent Above AML
California	2,053,082	2,200	7,183	227%
Colorado	365,988	827	1,322	60%
Idaho	383,894	617	489	0%
Montana	27,094	120	198	65%
Nevada	14,032,947	12,811	38,023	197%
Oregon	2,733,577	2,700	5,154	91%
Utah	2,154,458	1,956	4,305	120%
Wyoming	3,644,013	3,795	10,264	170%
Total	**25,395,053**	**25,026**	**66,938**	**167%**

Source: BLM 2024a

Table 3-4. Acres of Wild Horse and Burro Herd Management Areas in GRSG Habitat Management Areas

State	PHMA Acres
California	601,000
Colorado	384,000
Idaho	418,000
Montana	38,000
Nevada	13,850,000
Oregon	2,820,000
Utah	2,473,000
Wyoming	4,781,000
Total	**25,365,000**

Source: BLM GIS 2023

Table 3-5. Count of Allotments with at least 15% PHMA in Alternative 1 by Land Health Standard Category

Land Health Evaluation Reporting Category	Total # Allotments	% of Total
Total number of allotments evaluated (Category E)	7,027	72.69%
Category A: Rangelands meeting all standards or making significant progress toward meeting the standard	5,140	53.17%
Category B: Rangelands not meeting all standards or making significant progress toward meeting the standards, but appropriate action has been taken to ensure significant progress toward meeting the standards (livestock is a significant factor)	911	9.42%
Category C: Rangelands not meeting standards or making significant progress toward meeting the standards, and no appropriate action has been taken to ensure significant progress toward meeting the standards (livestock is a significant factor)	95	0.98%
Category D: Rangelands not meeting all standards or making significant progress toward meeting the standards due to causes other than livestock grazing	742	7.68%
Category F: Rangelands not meeting standards or making significant progress, but determination of causal factor(s) has not been completed	139	1.44%
Unevaluated: Rangelands that have not been evaluated.	1,958	20.25%
No information available: Allotments not found in master land health status dataset	682	7.05%

Source: BLM GIS 2023

Table 3-6. Estimated Acres of Disturbance Associated with Transmission Lines, Railroads, and Roads in the Planning Area

State	Transmission Lines	Railroads[1]	Roads[1]
Colorado	**33,000**	**2,000**	**158,000**
PHMA	3,700	100	22,600
GHMA	5,000	300	18,900
LCHMA	2,500	100	4,200
UDH	100	0	400
Outside of HMAs	22,000	1,600	111,600
Idaho	**109,000**	**5,900**	**354,000**
PHMA	5,600	100	21,200
GHMA	16,000	400	25,000
IHMA	9,800	200	22,900
Outside of HMAs	77,000	5,200	241,000
Montana	**124,000**	**9,900**	**482,000**
PHMA	6,900	200	39,100
GHMA	29,000	1,700	95,700
RHMA	800	0	2,000
Outside of HMAs	87,000	7,900	348,000
Nevada	**91,000**	**5,400**	**268,000**
PHMA	8,400	200	37,000
GHMA	7,400	600	240,100
OHMA	9,000	500	22,100
Outside of HMAs	66,000	4,000	186,000
North Dakota	**2,300**	**100**	**8,700**
PHMA	1,000	100	3,900
GHMA	600	0	2,200
Outside of HMAs	700	0	2,600
California	**21,000**	**2,200**	**137,600**
PHMA	600	0	3,900
GHMA	2,900	200	12,000
OHMA	3,800	500	12,900
Outside of HMAs	14,000	1,600	108,400
Oregon	**45,000**	**3,100**	**362,000**
PHMA	3,800	0	49,600
GHMA	7,200	0	60,900
Outside of HMAs	34,000	3,000	252,000
South Dakota	**23,000**	**1,500**	**100,000**
PHMA	200	0	5,300
GHMA	700	0	5,200
Outside of HMAs	22,000	1,500	78,200
Utah	**111,000**	**7,700**	**402,000**
PHMA	11,000	600	43,800
GHMA	5,300	400	18,700
Outside of HMAs	95,000	6,700	338,000
Wyoming	**120,000**	**8,800**	**377,000**
PHMA	21,000	600	82,500
GHMA	75,000	5,500	205,000
Outside of HMAs	24,000	2,700	89,800
Total	**679,300**	**46,600**	**2,649,300**

Source: BLM GIS 2023

[1]Acres have been calculated per the direct area of influence in **Table 7-4** in **Appendix 7**.

Table 3-7. Acres of Solar Facilities and ROWs in the Planning Area

State[1]	Acres of Solar Facilities[2]	Acres of Solar ROWs[2]
Idaho	**1,000**	**0**
PHMA	0	0
GHMA	0	0
Outside of HMAs	1,000	0
Nevada	**1,200**	**3,600**
PHMA	0	0
GHMA	0	0
Outside of HMAs	1,200	3,600
Oregon	**300**	**0**
PHMA	0	0
GHMA	0	0
Outside of HMAs	300	0
Utah	**800**	**6,200**
PHMA	0	0
GHMA	0	10
Outside of HMAs	800	6,190
Wyoming	**0**	**500**
PHMA	0	0
GHMA	0	500
Outside of HMAs	0	0

Source: BLM GIS 2023

[1] States for which there are no solar facilities or solar ROWs are not included in the table.

[2] Acres have been calculated per the direct area of influence in **Table 7-4** in **Appendix 7**.

Table 3-8. Acres of Wind Turbines and ROWs in the Planning Area

State[1]	Acres of Wind Turbines[2]	Acres of Wind ROWs[2, 3]
Idaho	1,600	40
PHMA	0	0
IHMA	0	40
GHMA	100	0
Outside of HMAs	1,500	0
Montana	2,200	0
PHMA	300	0
GHMA	300	0
RHMA	100	0
Outside of HMAs	1,500	0
Nevada	210	8,500
PHMA	0	0
GHMA	40	1,900
OHMA	130	5,400
Outside of HMAs	40	1,200
North Dakota	40	0
PHMA	40	0
GHMA	0	0
Outside of HMAs	0	0
Oregon		100
PHMA	20	0
GHMA	190	100

State[1]	Acres of Wind Turbines[2]	Acres of Wind ROWs[2, 3]
Outside of HMAs	1,920	0
South Dakota	120	0
PHMA	0	0
GHMA	60	0
Outside of HMAs	60	0
Utah	530	6,900
PHMA	0	0
GHMA	10	0
Outside of HMAs	520	6,900
Wyoming	4,300	34,400
PHMA	0	700
GHMA	3,900	33,700
Outside of HMAs	400	0

Source: BLM GIS 2023

[1] States for which there are no acres of wind turbines or wind ROWs are not included in the table.

[2] Acres have been calculated per the direct area of influence in **Table 7-4** in **Appendix 7**.

[3] Wind energy testing (Type 2) ROWs are not included; Development (Type 3) ROWs are included.

Table 3-9. Wind Potential in the Planning Area

Wind Speed (meters per second)	Acres within Planning Area
Greater than 5.8	36,243,000
Less than 5.8	33,740,000

Source: BLM GIS 2023

Table 3-10. Solar PEIS - Reasonably Foreseeable Development Scenarios

State	Estimated BLM-Administered Acres Developed by 2045 under RFDs	Estimated Non-BLM-Administered Acres Developed by 2045 under RFDs
Arizona	198,210	66,070
California*	109,972	413,706
Colorado	45,207	15,069
Idaho	89,574	29,858
Montana	5,387	1,796
Nevada	48,119	16,040
New Mexico	11,123	3,708
Oregon	51,387	17,129
Utah	39,793	13,264
Washington	71,781	23,927
Wyoming	27,255	9,085
TOTAL	**697,809**	**326,865**

Source: BLM 2024

* To account for exclusion of the Desert Renewable Energy Conservation Plan (DRECP) area in California, the proportion of BLM-administered lands outside of the DRECP area (28%) was applied to the estimated RFDs development acres. It is estimated that 282,787 acres of BLM-administered land within the DRECP planning area would be developed by 2045 under the RFDs.

Table 3-11. Locatable Mineral Types in the Planning Area*

States	Precious and Base Metals	Industrial Minerals
Colorado	Gold, Molybdenum, and Uranium	Gypsum
Idaho	Gold, Silver, Copper, Lead, Iron, Molybdenum, Beryllium, Uranium, and Vanadium	Limestone, Bentonite, High-alumina clay, and Gypsum
Nevada	Gold, Silver, Copper, Lithium, Galena, Iron, Zinc, Cobalt, Vanadium, Tungsten, Antimony, and Molybdenum	Gypsum, Limestone, Diatomite, Bentonite, Silica Sand, Magnesium, and Barite
Montana	Gold, Silver, Mercury	Bentonite, Diamonds
Oregon	Gold, Silver, Lead-silver-zinc, Copper, Uranium, Iron, Arsenic	Borax, Dimension stone, Mercury, Limestone, Diatomaceous earth, Zeolites, Kaolinite, Perlite, Gemstones, and Bentonite
Utah	Gold, Silver, Copper, Lead, Iron, Molybdenum, Beryllium, Uranium, and Vanadium	Limestone, Bentonite, High-Alumina Clay, and Gypsum
Wyoming	Uranium, Gold, Titanium, Lithium, Rare earths	Limestone, Marble, Bentonite, Jade

Source: Bureau of Land Management and Forest Service 2015, Muntean et. al 2022, USGS 2023a, USGS 2023b
*This list includes locatable minerals commonly known to exist in the planning area, it is not an exhaustive list of all locatable minerals in the planning area. Inclusion on this list does not imply that these metals and minerals are being developed or extracted.

Table 3-12. Vegetation Types Found in the 15 Oregon Key RNAs[1]

Vegetation Type	Research Natural Area
Cool-Moist Sagebrush	East Fork Trout Creek, Fish Creek Rim, Mahogany Ridge, Rahilly-Gravelly, South Bull Canyon, Spring Mountain, Toppin Creek Butte
Ecotone between Cool-Moist and Warm-Dry Sagebrush	Black Canyon, Mahogany Ridge, North Ridge Bully Creek, South Bull Canyon, South Ridge Bully Creek,
Warm-Dry Sagebrush	Black Canyon, Dry Creek Bench, Foley Lake, Foster Flat, Guano Creek-Sink Lakes, Lake Ridge, North Ridge Bully Creek, Rahilly-Gravelly, South Bull Canyon, South Ridge Bully Creek, Spring Mountain, Toppin Creek Butte
Shallow-Dry Sagebrush	Black Canyon, Dry Creek Bench, Fish Creek Rim, Foley Lake, Foster Flat, Guano Creek-Sink Lakes, Rahilly-Gravelly, Spring Mountain
Mountain Brush	Dry Creek Bench, East Fork Trout Creek, Fish Creek Rim, Mahogany Ridge, Rahilly-Gravelly, Spring Mountain
Riparian-Wetland	Black Canyon, East Fork Trout Creek, Fish Creek Rim, Guano Creek-Sink Lakes, Lake Ridge, Spring Mountain
Playa	Foley Lake, Foster Flat, Guano Creek-Sink Lakes, Toppin Creek Butte

[1] Table 4-3 from the 2018 Oregon GRSG RMP Amendment FEIS.

Table 3-13. Vegetation Types Found in the 15 Oregon Key RNAs That Are Important Habitats to Greater Sage-Grouse at Some Point in Their Life Cycle (e.g. Nesting and Brood Rearing) [2]

Vegetation Type	Plant Communities
Cool-Moist Sagebrush	Mountain big sagebrush/Idaho fescue Mountain big sagebrush-antelope bitterbrush/Idaho fescue Mountain big sagebrush-mountain mahogany/slender wheatgrass-bluebunch wheatgrass Mountain big sagebrush-antelope bitterbrush-mountain snowberry/Thurber's needlegrass Mountain big sagebrush-mountain snowberry/Idaho fescue Low sagebrush/Idaho fescue Wyoming big sagebrush-antelope bitterbrush/Idaho fescue
Ecotone between Cool-Moist and Warm-Dry Sagebrush	Mountain big sagebrush/bluebunch wheatgrass Wyoming big sagebrush/Idaho fescue Wyoming big sagebrush-antelope bitterbrush/bluebunch wheatgrass Wyoming big sagebrush-threetip sagebrush/Idaho fescue Wyoming big sagebrush-wild crab apple/Idaho fescue Wyoming big sagebrush-threetip sagebrush/bluebunch wheatgrass Threetip sagebrush/Idaho fescue Threetip sagebrush-wild crab apple/Idaho fescue Threetip sagebrush/bluebunch wheatgrass
Warm-Dry Sagebrush	Basin big sagebrush/Nevada bluegrass Basin big sagebrush/bluebunch wheatgrass Basin big sagebrush-Wyoming big sagebrush/bluebunch wheatgrass Wyoming big sagebrush/Idaho fescue-bottlebrush squirreltail Wyoming big sagebrush/needle-and-thread Wyoming big sagebrush/Thurber's needlegrass Low sagebrush/bottlebrush squirreltail-Idaho fescue Low sagebrush/bluebunch wheatgrass Low sagebrush/Idaho fescue-Thurber's needlegrass Low sagebrush/Thurber's needlegrass
Shallow-Dry Sagebrush	Low sagebrush/Sandberg bluegrass Stiff sagebrush/Sandberg bluegrass Black sagebrush/Sandberg bluegrass
Mountain Brush	Mountain mahogany-mountain snowberry/Idaho fescue Mountain mahogany-mountain big sagebrush/Idaho fescue Serviceberry-snowberry-mountain big sagebrush Snowberry-bittercherry complex Mountain big sagebrush-mountain snowberry/Idaho fescue Mountain mahogany-Oregon grape Mountain big sagebrush-mountain snowberry-wild crab apple Mountain mahogany-chokecherry scrub

[2] Table 4-4 from the 2018 Oregon GRSG RMP Amendment FEIS

Vegetation Type	Plant Communities
Riparian-Wetland	Willow-mixed shrub
	Scouler's willow-aspen
	Wet meadow
	Aspen-white fir-ponderosa pine
	Willow
	Pond
Playa	Silver sagebrush/Sandberg bluegrass
	Silver sagebrush/Nevada bluegrass
	Sliver sagebrush-green rabbitbrush
	Silver sagebrush/Baltic rush
	Silver sagebrush-basin wildrye

Table 3-14. Criteria Air Pollutant Nonattainment Areas within the Planning Area

State	Pollutant[1]	Nonattainment Area	Classification[2,3,4,5]	Date of Designation
California	8-Hour Ozone (2015)	Nevada County (western part)	Serious	8/3/2018
Colorado	8-Hour Ozone (2015)	Larimer County portion of the Denver-Boulder-Greeley-Ft. Collins nonattainment area	Moderate	7/20/2012
	8-Hour Ozone (2008)	Larimer County portion of the Denver/North Front Range nonattainment area	Severe-15	6/3/2018
Idaho	PM_{10} (1987)	Fort Hall Indian Reservation (parts of Bannock and Power Counties)	Moderate	11/15/1990
Montana	PM_{10} (1987)	Rosebud County (part)	Moderate	11/15/1990
Utah	8-Hour Ozone (2015)	Northern Wasatch Front nonattainment area (Davis and Salt Lake Counties and part of Tooele and Weber Counties)	Moderate	6/3/2018
		Southern Wasatch Front nonattainment area (Part of Utah County)	Marginal	6/3/2018
		Uinta Basin nonattainment area (Parts of Duchesne and Uintah Counties)	Marginal	6/3/2018
	24-hour $PM_{2.5}$ (2006)	Provo (Part of Utah County)	Serious	12/14/2009
		Salt Lake City nonattainment area (David, Salt Lake Counties and part of Box Elder, Tooele, and Weber Counties)	Serious	12/14/2009
	Sulfur Dioxide (1971)	Salt Lake County and part of Tooele County	—	
Wyoming	8-Hour Ozone (2008)	Upper Green River Basin nonattainment area (Sublette County and part of Lincoln and Sweetwater Counties)	Marginal	07/20/2012

Source: EPA 2023a

[1] Shows the pollutant and the year of the final rule/decision that established the standard that was exceeded. In 2015, the EPA changed the 8-hour ozone standard from the 2008 standard of 0.075 parts per million to 0.070 parts per million.

[2] Classifications of 8-hour ozone (2008) – Extreme: Area has a design value of 0.175 ppm and above; Severe 17: Area has a design value of 0.119 up to but not including 0.175 ppm; Severe 15: Area has a design value of 0.113 up to but not including 0.119 ppm; Serious: Area has a design value of 0.100 up to but not including 0.113 ppm; Moderate: Area has a design value of 0.086 up to but not including 0.100 ppm; Marginal: Area has a design value of 0.076 up to but not including 0.086 ppm.

[3] Classifications of 8-hour ozone (2015) – Extreme: Area has a design value of 0.163 ppm and above; Severe 17: Area has a design value of 0.111 up to but not including 0.163 ppm; Severe 15: Area has a design value of 0.105 up to but not including 0.111 ppm; Serious: Area has a design value of 0.093 up to but not including 0.105 ppm; Moderate: Area has a design value of 0.081 up to but not including 0.093 ppm; Marginal: Area has a design value of 0.071 up to but not including 0.081 ppm.

[4] Classifications of PM_{10} (1987) – Extreme: Area has a design value of 0.175 ppm and above; Severe 17: Area has a design value of 0.119 up to but not including 0.175 ppm; Severe 15: Area has a design value of 0.113 up to but not including 0.119 ppm; Serious: Area has a design value of 0.100 up to but not including 0.113 ppm; Moderate: Area has a design value of 0.086 up to but not including 0.100 ppm; Marginal: Area has a design value of 0.076 up to but not including 0.086 ppm.

[5] Classifications of 24-hour $PM_{2.5}$ (2006) – Extreme: Area has a design value of 0.175 ppm and above; Severe 17: Area has a design value of 0.119 up to but not including 0.175 ppm; Severe 15: Area has a design value of 0.113 up to but not including 0.119 ppm; Serious: Area has a design value of 0.100 up to but not including 0.113 ppm; Moderate: Area has a design value of 0.086 up to but not including 0.100 ppm; Marginal: Area has a design value of 0.076 up to but not including 0.086 ppm.

Table 3-15. Criteria Air Pollutant Maintenance Areas within the Planning Area

State	Pollutant[1]	Maintenance Area	Date of Redesignation
Colorado	PM_{10} (1987)	Pitkin County (part)	07/14/2003
		Routt County (part)	11/24/2004
Idaho	Carbon Monoxide (1971)	Ada County (part)	12/27/2002
	PM_{10} (1987)	Ada County (part)	11/26/2003
		Bannock County (part)	08/14/2006
		Bonner County (part)	05/03/2013
		Power County (part)	08/14/2006
	$PM_{2.5}$ (2006)	Franklin County (part)	06/21/2021
Montana	CO (1971)	Billings (Part of Yellowstone County)	04/22/2002
	Sulfur Dioxide (1971)	Billings (Part of Yellowstone County)	06/09/2016
Nevada	Carbon Monoxide (1971)	Lake Tahoe (Parts of Carson City, Douglas, and Washoe Counties)	02/13/2004
		Reno area (Part of Washoe County)	08/04/2008
	PM_{10} (1987)	Reno planning area (Part of Washoe County)	01/07/2016
	Sulfur Dioxide (1971)	Central Steptoe Valley (Part of White Pine County)	06/11/2002
Oregon	PM_{10} (1987)	Lake County (part)	07/19/2006
		Union County (part)	07/19/2006
Utah	Carbon Monoxide (1971)	Salt Lake City (Part of Salt Lake County	03/22/1999
		Provo (Part of Utah County)	01/03/2006
		Ogden (Part of Weber County)	05/08/2001
	24-hour $PM_{2.5}$ (2006)	Logan, Utah-Idaho (Part of Cache County)	06/18/2021
	PM_{10} (1987)	Salt Lake County	03/27/2020
		Utah County	03/27/2020
		Ogden (Part of Weber County)	03/27/2020
Wyoming	PM_{10} (1987)	Sheridan County (part)	05/04/2018

Source: EPA 2023a

[1] Shows the pollutant and the year of the final rule/decision that established the standard that was exceeded. In 2015, the EPA changed the 8-hour ozone standard from the 2008 standard of 0.075 parts per million to 0.070 parts per million.

Table 3-16. Ozone, PM_{10}, and $PM_{2.5}$ Air Quality Monitoring Data by Planning Area County (2020-2022)

State	Planning Area County	8-hour Ozone (ppm) *(Standard: 0.070 ppm)*			24-hour PM_{10} ($\mu g/m^3$) *(Standard: 150 $\mu g/m^3$)*			Annual $PM_{2.5}$ / 24-Hour $PM_{2.5}$ *(Standard: 12.0 ($\mu g/m^3$ / 35 $\mu g/m^3$)*		
		2020	**2021**	**2022**	**2020**	**2021**	**2022**	**2020**	**2021**	**2022**
California	Nevada	**0.078**	**0.090**	–	–	–	–	–	8.7 / **65**	–
	Placer	**0.083**	**0.085**	**0.075**	**213**	137	–	**12.4 / 93**	11.3 / **57**	–
	Plumas	–	–	–	–	–	–	**12.5 / 40**	**16.4 / 70**	–
Colorado	Boulder	**0.076**	**0.082**	**0.072**	74	51	–	10.1 / **52**	10.8 / **54**	6.8 / 25
	Garfield	0.063	0.065	–	–	–	–	–	–	–
	Larimer	**0.075**	**0.085**	**0.073**	–	–	–	8.1 / **47**	8.5 / 29	6.5 / 17
	Mesa	0.065	0.068	–	50	40	72	6.1 / 20	6.2 / 18	5.2 / 15
	Rio Blanco	0.065	0.070	0.062	–	–	–	8.4 / 23	9.5 / 26	–
	Routt	–	–	–	69	69	–	–	–	–
Idaho	Ada	0.065	0.069	0.068	95	84	–	5.7 / 17	6.4 / 20	–
	Bannock	0.059	0.069	0.057	90	147	–	–	–	–
	Butte	0.056	0.070	0.060	–	–	–	–	–	–
	Canyon	–	–	–	96	97	–	7.8 / 23	–	–
	Caribou	–	–	–	–	–	–	–	–	–
	Franklin	–	–	–	–	–	–	5.2 / 15	5.7 / 19	–
	Lemhi	–	–	–	–	–	–	8.6 / 28	7.1 / 20	–
Montana	Custer	–	**–**	0.058	–	–	–	–	–	–
	Fergus	0.057	**0.073**	0.057	35	27	–	3.7 / 11	4 / 10	–
	Gallatin	–	–	–	–	–	–	2.3 / **40**	5.7 / 34	–
	Phillips	0.052	0.064	0.051	150	57	–	–	–	–
	Powder River	0.060	0.069	0.059	–	–	–	5.6 / 14	5.5 / 12	–
	Richland	0.054	0.070	0.054	–	72	–	4.1 / 10	4.2 / 11	–
	Rosebud	0.059	0.066	–	–	–	–	–	–	–
	Silver Bow	–	–	–	55	64	–	6.5 / 21	7.5 / 22	–
	Yellowstone	–	–	–	–	–	–	5.8 / 13	7 / 16	–
Nevada	Carson City	0.069	0.067	–	–	–	–	5.6 / 28	5.9 / 27	–
	Churchill	0.065	0.066	–	**210**	–	–	–	–	–
	Douglas	–	–	–	–	–	–	5.7 / 23	6.3 / 26	–
	Elko	–	–	–	120	120	–	–	–	–
	Lyon	0.066	–	–	–	–	–	–	–	–
	Nye	–	–	–	130	123	–	–	–	–
	Washoe	**0.079**	**0.08**	**0.074**	**220**	**284**	–	11.1 / **75**	**12.4 / 105**	–
	White Pine	0.070	0.068	0.061	–	–		–	–	–

State	Planning Area County	8-hour Ozone (ppm) *(Standard: 0.070 ppm)*			24-hour PM_{10} (µg/m³) *(Standard: 150 µg/m³)*			Annual $PM_{2.5}$ / 24-Hour $PM_{2.5}$ *(Standard: 12.0 (µg/m³ / 35 µg/m³)*		
		2020	**2021**	**2022**	**2020**	**2021**	**2022**	**2020**	**2021**	**2022**
Oregon	Harney	–	–	–	–	–	–	11.9 / **61**	11.2 / **47**	–
	Umatilla	0.056	0.065	0.064	–	–	–	–	–	–
	Union	–	–	–	39	42	–	–	–	–
South Dakota	Bookings	0.064	0.070	–	95	119	–	4.4 / 16	6/7 / 29	–
	Brown	–	–	–	75	89	–	5.6 / 15	6.7 / 30	–
	Clay	–	–	0.062	–	–	–	–	–	–
	Codington	0.057	0.066	0.066	129	143	–	6.7 / 16	9.2 / 29	–
	Custer	0.063	0.065	–	55	59	–	3.3 / 16	4.8 / 22	–
	Hughes	–	–	–	–	–	–	4 / 13	3.8 / 17	–
	Jackson	0.061	0.054	0.065	43	77	–	4.2 / 17	5.9 / 22	–
	Meade	0.062	**0.072**	0.059	63	63	–	–	–	–
	Minnehaha	0.064	0.065	–	71	–	–	6.8 / 17	–	–
	Pennington	–	–	–	124	**168**	–	6.8 / 23	8.1 / **168**	–
	Union	0.063	0.065	–	88	–	–	6.1 / 17	–	–
Utah	Davis	**0.08**	**0.082**	**0.075**	52	77	53	8.9 / 33	9.4 / **36**	7.2 / 27
	Duchesne	0.064	**0.072**	0.066	–	–	97	7.5 / 23	7.5 / 27	6.2 / 21
	Garfield	0.060	0.069	–	–	–	–	–	–	–
	Iron	0.061	0.065	0.061	–	–	–	5.4 / 17	6.5 / 21	5.7 / 12
	Salt Lake	**0.08**	**0.087**	0.076	106	103	152	10.5 / **37**	11 / **49**	9.9 / **40**
	Tooele	0.070	**0.075**	0.070	–	–	–	6.7 / 24	8.1 / **37**	6.8 / 28
	Uintah	0.066	**0.072**	0.064	–	–	–	6.6 / 22	7.3 / 27	5.1 / 17
	Utah	0.070	**0.077**	**0.074**	90	100	88	9.1 / 32	8.2 / **36**	7.2 / 25
	Weber	**0.074**	**0.077**	**0.071**	77	86	67	6.7 / 22	8.1 / 32	6.7 / 27

State	Planning Area County	8-hour Ozone (ppm) *(Standard: 0.070 ppm)*			24-hour PM_{10} (µg/m^3) *(Standard: 150 µg/m^3)*			Annual $PM_{2.5}$ / 24-Hour $PM_{2.5}$ *(Standard: 12.0 (µg/m^3 / 35 µg/m^3)*		
		2020	**2021**	**2022**	**2020**	**2021**	**2022**	**2020**	**2021**	**2022**
Wyoming	Albany	0.066	**0.072**	0.067	**184**	**230**	–	4.9 / 25	–	–
	Big Horn	0.058	0.067	0.057	–	–	–	–	–	–
	Campbell	0.061	**0.075**	0.061	149	154	–	–	–	–
	Carbon	–	–	–	83	–	–	–	–	–
	Converse	0.070	**0.080**	0.059	68	125	–	–	–	–
	Johnson	0.064	**0.074**	0.058	67	64	–	–	–	–
	Laramie	0.060	**0.075**	–	127	63	–	4.2 / 21	5.1 / 27	–
	Lincoln	–	–	–	91	97	–	–	–	–
	Natrona	0.066	**0.071**	0.060	56	–	–	4.1 / 17	4.5 / 21	–
	Sheridan	–	–	–	52	–	–	6.7 / 34	–	–
	Sublette	0.069	**0.071**	0.062	63	59	–	2.8 / 17	4.4 / 24	–
	Sweetwater	0.063	0.070	0.061	**301**	**162**	–	–	–	–
	Teton	0.066	0.067	0.058	34	–	–	4.5 / **48**	5.1 / **36**	–
	Uinta	0.066	–	–	47	–	–	–	–	–
	Weston	0.066	0.068	0.058	–		–	–	–	–

Source: EPA 2023b

Values in bold are above the level of the respective air quality standard; exceptional events have been excluded.

= no monitoring data collected

Table 3-17. 2020 Emissions Inventory by Source (tons per per year)

Source	Carbon Monoxide	Nitrogen Oxides	PM_{10}	$PM_{2.5}$	Sulfur Dioxide	VOCs
Area source (excluding livestock production)[1]	611,136	46,391	625,555	168,916	6,679	292,114
Livestock production and waste	0	0	148,799	30,225	0	15,972
Oil and gas[2]	20,933	18,993	870	868	1,173	129,634
Mobile sources[3]	1,169,806	239,286	834,905	94,381	495	108,615
Point source[4]	126,082	147,845	50,532	22,005	68,623	89,468
Biogenics[5]	373,990	117,066	0	0	0	1,939,722
Wildfires	6,126,624	71,800	612,720	519,254	42,434	1,442,166
Total	**8,428,571**	**641,381**	**2,273,381**	**835,650**	**119,404**	**4,017,692**

Source: EPA 2023c

[1] Area sources are stationary sources that are too small or too numerous to be treated as individual point sources. Source categories include agricultural and prescribed burning, outdoor grilling and residential wood combustion, trains and commercial marine vessels, and other sources not covered by the point source category.

[2] Oil and Gas includes oil and exploration and production.

[3] Mobile sources include off-road equipment and vehicles (e.g., construction, agriculture, industrial, lawn and garden, commercial, logging, recreational vehicles, some recreational marine vehicles, and underground mining equipment) that do not operate on roads; on-road highway vehicles; and fugitive dust from paved and unpaved roads.

[4] Point sources include individual facilities such as large energy and industrial sites (e.g., petroleum refineries, electric generating utilities, and manufacturing facilities), smaller point sources included voluntarily by state, local, and Tribal agencies (e.g., crematoria, dry cleaners, and gas stations), airport operation and aircraft landing and take-off emissions, and locomotive missions within railyards.

[5] Natural (nonanthropogenic) emissions from forests, vegetation, and soils

Table 3-18. Climate Trends and Projections for Planning Area States

State	Climate Trends
California	The average annual temperatures in California have increased by nearly 3°F since the beginning of the 20th century. Multiple record warm years have been recorded in the last decade, and the most recent 10-year period (2011-2020) was the warmest on record. Since 1995, California has experienced a below normal number of cold nights and its highest number of very warm nights over the historical record (NOAA 2022). The record warmth, in combination with multiple years of below average precipitation, including the driest year, led to the most severe drought of the past 1,200 years (Griffin and Anchukaitis 2014). Precipitation and snowpack vary greatly from year to year. Statewide April 1 snowpack has averaged about 10% lower during the first two decades of the 21st century as compared with the last two decades of the 20th century, with 2015 likely featuring the lowest snowpack in the Sierra Nevada in the last 500 years (Belmecheri et al. 2015).
Colorado	The rugged topography of western Colorado causes large variations in climate within short distances, and few climatic generalizations apply to the whole area. Temperatures in Colorado have risen about 2.5°F since the beginning of the 20th century and have remained above the long-term average since 1998. Six of the eight warmest years on record have occurred since 2012, and warming has been seen in all four seasons. Long-term average annual precipitation has been variable. Unlike many areas of the United States, Colorado has not seen an increase in the frequency of heavy precipitation events (NOAA 2022).
Idaho	Idaho experiences dramatic seasonal temperature differences due to its northerly latitude and interior location, with cold winters and warm summers. Temperatures have risen almost 2°F since the beginning of the 20th century. For the 126-year record, there has been significant variation in precipitation across the state, but no overall trend. However, since 2000, the number of 1-inch extreme precipitation events has been increasing and has been above average for the last 16 years. Snowfall is highly variable from year to year and has generally decreased since the middle of the 20th century. Extreme weather and weather-related events in Idaho include severe winter storms, wildfires, floods, droughts, and heat and cold waves (NOAA 2022).

State	Climate Trends
Montana	Due to its diverse geography and extensive altitudinal range, Montana experiences significant climatic variations. Since the turn of the century, temperatures in Montana have increased by almost 2.5°F. Warming has occurred in most parts of the state and during all seasons. Montana's topographic variety generates significant regional variances in precipitation; however, there is no clear long-term trend in precipitation. Frequent thunderstorms during the summer months can produce hail, lightning, and strong winds. Precipitation events in the spring can cause severe flooding (NOAA 2022). Rising temperatures and recent droughts have killed many trees by drying out soils, increasing the risk of forest fires, or enabling outbreaks of forest insects (BLM 2020).
Nevada	Nevada is mostly a dry state with a wide range of elevations and a very variable climate. Since the beginning of the 20th century, temperatures in Nevada have increased by about 2.4°F. The total annual precipitation has been around or below the average since 2000, but there has been no overall trend over the 126-year period of record. Throughout the state, there are different seasonal patterns of precipitation, but in most places, the winter is when it rains the most. Drought poses a serious climatic threat to Nevada. Since 2004, the state has experienced multiple severe wildfire and flooding events (NOAA 2022).
North and South Dakota	The Dakotas have significant temperature extremes as a result of their location in the middle of the North American continent, distant from the oceans' climate-moderating influence. Temperatures in North Dakota have risen more than 2.6°F since the beginning of the 20th century, while temperatures in South Dakota have risen almost 2°F. Most precipitation falls between late spring and early summer, when the number of thunderstorms is at its peak. The strongest thunderstorms have the potential to create hail, tornadoes, or destructive straight-line winds that reach 75 mph. Compared to other northern states, North Dakota receives less annual snowfall. Conversely, South Dakota is particularly vulnerable to heavy snowfall, strong winds, and low wind chill temperatures, although, snowfall totals are highly variable from year to year. Both North and South Dakota are highly prone to the hazards of flooding and drought (NOAA 2022).
Oregon	Oregon's climate varies widely from the eastern to western regions of the state. Since the beginning of the 20th century, temperatures in Oregon have increased by around 2.5°F, with the highest temperatures recorded in the last 30 years. The amount of precipitation differs considerably from year to year and across the state, with areas west of the Cascades also experiencing significant seasonal variations in rainfall. Compared to many other parts of the country, Oregon has not seen an increase in the frequency of extreme precipitation events (NOAA 2022; Fleishman 2023).
Utah	With forested, alpine, and desert areas, Utah has a diverse geographic landscape contributing to its variable climate. Utah has had a temperature increase of over 2.5°F since the turn of the century, and the early 21st century has been the warmest period on record. The past three decades have seen a decrease in the frequency of very cold nights and an increase in very warm nights (NOAA 2022). There has been no statistically significant trend in precipitation. As the state has warmed, the percentage of precipitation falling as snow during the winter has decreased, as has snow depth and snow cover (BLM 2020).
Wyoming	Wyoming's interior, mid-latitude location and exposure to sporadic storm systems results in a primarily semiarid climate. Temperatures have increased by around 2.5°F since the beginning of the 20th century. Warming is most noticeable during winter, as seen by a generally below-average number of extremely cold days since 2000 (NOAA 2022). There is no long-term trend in annual mean precipitation. Summer thunderstorms are common, which can bring about hail, lightning, and powerful winds, and the state is prone to the effects of winter storm systems, such as significant snowfall, strong winds, and low wind chill temperatures (BLM 2020; NOAA 2022).

Sources: BLM 2020; NOAA 2022; Fleishman 2023; Griffin and Anchukaitis 2014; Belmecheri et al. 2015

Table 3-19. Greenhouse Gas Emission by Economic Sector (million metric tons per year)

Source	Methane	CO2	N2O	CO_2e^*
Livestock grazing[1]	0.0	64.9	3.8	2,970.2
Other agriculture[2]	10.0	3.9	74.3	20,403.4
Commercial[3]	50.1	16.4	5.0	1,899.7
Industry[4]	352.9	48.0	5.2	3,207.0
Residential[5]	60.9	0.8	0.1	118.7
Transportation[6]	301.8	0.3	1.9	837.1
Total	**775.7**	**134.2**	**90.3**	**29,436.1**

Source: EPA 2024

* 100-year time horizon global warming potentials applied are CO_2 = 1; methane = 29.8; nitrous oxide = 273, from the IPCC Sixth Assessment Report (IPCC 2021).

1 Enteric fermentation and manure management.

2 All agriculture (e.g., agricultural field burning, fertilization, soil management, cultivation, and other fuel combustion) excluding livestock grazing.

3 Composting, landfills, stationary combustion, and wastewater treatment.

4 Electric power industry, mining (including oil and gas development), and production.

5 Stationary combustions.

6 Mobile combustion and non-energy use of fuels.

Table 3-20. Federally Recognized Native American Tribes Associated with the Planning Area

Tribe
Alturas Indian Rancheria
Assiniboine and Sioux Tribes of the Fort Peck Indian Reservation
Battle Mountain Band of the Te-Moak Tribe of Western Shoshone Indians
Blackfeet Tribe
Burns Paiute Tribe
Cedarville Rancheria
Chippewa Cree
Cheyenne River Sioux Tribe
Cheyenne-Arapaho Tribes of Oklahoma
Coeur d'Alene Tribe
Confederated Salish and Kootenai Tribes
Confederated Tribes of the Colville Reservation
Confederated Tribes of the Goshute Indian Reservation
Confederated Tribes of the Umatilla Indian Reservation
Confederated Tribes of the Warm Springs Reservation
Crow Creek Sioux Tribe
Crow Tribe
Duckwater Shoshone Tribe
Eastern Shoshone Tribe of the Wind River Reservation
Elko Band of the Te-Moak Tribe of Western Shoshone Indians
Ely Shoshone Tribe
Flandreau Santee Sioux Tribe
Fort Belknap Indian Community
Fort Bidwell Indian Community
Fort McDermitt Paiute and Shoshone Tribes
Greenville Rancheria

Tribe
Hopi Tribe of Arizona
Kaibab Band of Paiute Indians
Klamath Tribes
Kootenai Tribe
Lovelock Paiute Tribe
Lower Brule Sioux Tribe
Lower Sioux Indian Community
Mandan, Hidatsa & Arikara Nation
Modoc Tribe of Oklahoma
Navajo Nation
Nez Perce Tribe
Northern Arapaho Tribe
Northern Cheyenne Tribe
Northwestern Band of Shoshoni Nation
Oglala Sioux Tribe
Omaha Tribe of Nebraska
Paiute Indian Tribe
Paiute-Shoshone Tribe of the Fallon Reservation
Pit River Tribe
Pyramid Lake Paiute Tribe
Reno-Sparks Indian Colony
Rosebud Sioux Tribe
Santee Sioux Nation
Shoshone-Bannock Tribes of the Fort Hall Reservation
Shoshone-Paiute Tribes of the Duck Valley Reservation
Sisseton-Wahpeton Oyate
Skull Valley Band of Goshute Indians
South Fork Band of the Te-Moak Tribe of Western Shoshone Indians
Southern Ute Indian Tribe
Spirit Lake Tribe
Standing Rock Sioux Tribe
Summit Lake Paiute Tribe
Susanville Indian Rancheria
Te-Moak Tribe of Western Shoshone Indians
Turtle Mountain Band of Chippewa Indians
Upper Sioux Community
Ute Indian Tribe of the Uintah and Ouray Reservation
Ute Mountain Tribe
Walker River Paiute Tribe
Washoe Tribe
Wells Band of the Te-Moak Tribe of Western Shoshone Indians
White Earth Band of the Minnesota Chippewa Tribe
Winnemucca Indian Colony
Yankton Sioux Tribe
Yerington Paiute Tribe
Yomba Shoshone Tribe

Source: BLM GIS 2023

9.2 CHAPTER 4 TABLES

Table 4-2. Average Annual Criteria Air Pollutant and HAP Emissions from Oil and Gas Development in the Planning Area (tons per year)

State	Carbon Monoxide	Nitrogen Oxides	PM_{10}	$PM_{2.5}$	Sulfur Dioxide	VOCs	HAPs
Alternative 1							
Colorado[1]	10,514	12,119	390	370	368	16,423	2,570
Montana	957	797	18	18	81	4,652	483
North Dakota	378	149	13	12	118	1,406	144
South Dakota	136	293	45	45	3	304	178
Utah	52	22	1	1	3	2,650	165
Wyoming	4,382	6,537	255	255	3,189	34,272	2,732
Total	**16,419**	**19,917**	**722**	**701**	**3,762**	**59,707**	**6,272**
Alternative 2							
Colorado[1]	10,591	12,207	393	373	371	16,542	2,589
Montana	957	797	18	18	81	4,652	483
North Dakota	378	149	13	12	118	1,406	144
South Dakota	136	293	45	45	3	304	178
Utah	52	22	1	1	3	2,650	165
Wyoming	4,382	6,537	255	255	3,189	34,272	2,732
Total	**16,495**	**20,005**	**725**	**704**	**3,765**	**59,826**	**6,291**
Alternative 3							
Colorado[1]	7,607	8,899	288	273	273	10,960	1,845
Montana	555	436	10	10	56	3,013	299
North Dakota	320	126	11	10	100	1,190	121
South Dakota	134	289	45	45	3	300	176
Utah	47	20	1	1	2	2,413	150
Wyoming	2,791	4,107	163	163	1,993	19,581	1,655
Total	**11,454**	**13,877**	**518**	**502**	**2,427**	**37,457**	**4,246**

State	Carbon Monoxide	Nitrogen Oxides	PM_{10}	$PM_{2.5}$	Sulfur Dioxide	VOCs	HAPs
Alternative 4							
Colorado[1]	10,944	12,570	405	384	381	17,403	2,680
Montana	957	797	18	18	81	4,652	483
North Dakota	378	149	13	12	118	1,406	144
South Dakota	136	293	45	45	3	304	178
Utah	52	22	1	1	3	2,650	165
Wyoming	3,545	5,260	207	207	2,561	26,607	2,168
Total	**16,012**	**19,091**	**689**	**667**	**3,147**	**53,022**	**5,818**
Alternative 5							
Colorado[1]	10,944	12,570	405	384	381	17,403	2,680
Montana	957	797	18	18	81	4,652	483
North Dakota	378	149	13	12	118	1,406	144
South Dakota	136	293	45	45	3	304	178
Utah	52	22	1	1	3	2,650	165
Wyoming	4,245	6,327	247	247	3,085	32,985	2,638
Total	**16,712**	**20,158**	**729**	**707**	**3,671**	**59,400**	**6,288**
Alternative 6							
Colorado[1]	10,944	12,570	405	384	381	17,403	2,680
Montana	957	797	18	18	81	4,652	483
North Dakota	378	149	13	12	118	1,406	144
South Dakota	136	293	45	45	3	304	178
Utah	52	22	1	1	3	2,650	165
Wyoming	4,220	6,288	246	246	3,066	32,716	2,620
Total	**16,687**	**20,119**	**728**	**706**	**3,652**	**59,131**	**6,270**

State	Carbon Monoxide	Nitrogen Oxides	PM_{10}	$PM_{2.5}$	Sulfur Dioxide	VOCs	HAPs
Proposed RMP Amendment							
Colorado[1]	10,944	12,570	405	384	381	17,403	2,680
Montana	957	797	18	18	81	4,652	483
North Dakota	378	149	13	12	118	1,406	144
South Dakota	136	293	45	45	3	304	178
Utah	52	22	1	1	3	2,650	165
Wyoming	4,220	6,288	246	246	3,066	32,716	2,620
Total	**16,687**	**20,119**	**728**	**706**	**3,652**	**59,131**	**6,270**

Source: Based on scaled emissions relative to circa 2032 modeled emissions from BLM Western US Photochemical Air Quality Modeling (Ramboll 2023). For a detailed methodology, see **Appendix 12, Section 12.11**, Air Pollutant and Greenhouse Gas Emission Calculation.

[1] Colorado emissions were scaled based on the high RFD scenario.

Table 4-3. Average Annual GHG Emissions from Oil and Gas Development in the Planning Area (metric tons per year)

State	CO_2	Methane	Nitrous Oxide	20-Year CO_2e*	100-year CO_2e**
Alternative 1					
Colorado[1]	2,237,202	25,200	40	4,327,122	2,999,082
Montana	208,696	30,488	3	2,724,775	1,118,057
North Dakota	108,023	1,488	1	231,056	152,638
South Dakota	302,425	681	6	360,246	324,357
Utah	13,756	1,420	0	130,906	56,072
Wyoming	1,720,872	34,650	32	4,588,233	2,762,178
Total	**4,590,974**	**93,927**	**82**	**12,362,338**	**7,412,384**
Alternative 2					
Colorado[1]	2,253,497	25,384	40	4,358,597	3,020,860
Montana	208,696	30,488	3	2,724,775	1,118,057
North Dakota	108,023	1,488	1	231,056	152,638
South Dakota	302,425	681	6	360,246	324,357
Utah	13,756	1,420	0	130,906	56,072
Wyoming	1,720,872	34,650	32	4,588,233	2,762,178
Total	**4,607,269**	**94,111**	**82**	**12,393,813**	**7,434,162**
Alternative 3					
Colorado[1]	1,633,345	18,105	29	3,134,925	2,180,791
Montana	123,377	17,767	2	1,589,701	653,380
North Dakota	91,388	1,259	1	195,529	129,179
South Dakota	299,077	672	6	356,155	320,741
Utah	12,455	1,279	0	117,973	50,569
Wyoming	1,095,347	21,770	20	2,896,832	1,749,553
Total	**3,254,989**	**60,852**	**58**	**8,291,115**	**5,084,213**

State	CO_2	Methane	Nitrous Oxide	20-Year CO_2e*	100-year CO_2e**
Alternative 4					
Colorado[1]	2,323,606	26,284	42	4,503,502	3,118,335
Montana	208,696	30,488	3	2,724,775	1,118,057
North Dakota	108,023	1,488	1	231,056	152,638
South Dakota	302,425	681	6	360,246	324,357
Utah	13,756	1,420	0	130,906	56,072
Wyoming	1,391,629	27,880	26	3,698,827	2,229,551
Total	**4,348,135**	**88,241**	**78**	**11,649,312**	**6,999,010**
Alternative 5					
Colorado[1]	2,323,606	26,284	42	4,503,502	3,118,335
Montana	208,696	30,488	3	2,724,775	1,118,057
North Dakota	108,023	1,488	1	231,056	152,638
South Dakota	302,425	681	6	360,246	324,357
Utah	13,756	1,420	0	130,906	56,072
Wyoming	1,666,940	33,536	31	4,442,123	2,674,776
Total	**4,623,446**	**93,897**	**83**	**12,392,608**	**7,444,235**
Alternative 6					
Colorado[1]	2,323,606	26,284	42	4,503,502	3,118,335
Montana	208,696	30,488	3	2,724,775	1,118,057
North Dakota	108,023	1,488	1	231,056	152,638
South Dakota	302,425	681	6	360,246	324,357
Utah	13,756	1,420	0	130,906	56,072
Wyoming	1,657,218	33,331	30	4,415,216	2,658,672
Total	**4,613,724**	**93,692**	**82**	**12,365,701**	**7,428,131**

State	CO_2	Methane	Nitrous Oxide	20-Year CO_2e*	100-year CO_2e**
Proposed RMP Amendment					
Colorado[1]	2,323,606	26,284	42	4,503,502	3,118,335
Montana	208,696	30,488	3	2,724,775	1,118,057
North Dakota	108,023	1,488	1	231,056	152,638
South Dakota	302,425	681	6	360,246	324,357
Utah	13,756	1,420	0	130,906	56,072
Wyoming	1,657,218	33,331	30	4,415,216	2,658,672
Total	**4,613,724**	**93,692**	**82**	**12,365,701**	**7,428,131**

Source: Based on scaled emissions relative to circa 2032 modeled emissions from BLM Western US Photochemical Air Quality Modeling (Ramboll 2023). For a detailed methodology, see **Appendix 12, Section 12.11**, Air Pollutant and Greenhouse Gas Emission Calculation.

[1] Colorado emissions were scaled based on the low RFD scenario.

*100-year time horizon global warming potentials applied are CO_2 = 1; methane = 29.8; nitrous oxide = 273, from the IPCC Sixth Assessment Report (IPCC 2021).

**20-year time horizon global warming potentials applied are CO_2 = 1; methane = 82.5; nitrous oxide = 273, from the IPCC Sixth Assessment Report (IPCC 2021).

Table 4-4. OHV Designations in Colorado, Idaho, Montana/Dakotas, and Wyoming[1,2]

OHV Designation	Colorado	Idaho	Montana/ Dakotas	Wyoming
Open	1,757,000	57,000	1,000	19,000
Limited	2,776,000	20,438,000	7,982,000	20,780,000
Closed	330,000	2,174,000	87,000	1,963,000
Total:	*4,863,000*	*22,669,000*	*8,069,000*	*22,762,000*

[1] Acres of OHV designations do not change across alternatives for these states

[2] Acres represent the entire planning area for each state

Source: BLM GIS 2024

Table 4-5. Nevada/California OHV Designations by Alternative[1]

OHV Designation	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Open	26,530,000	27,658,000	24,153,000	32,826,000	28,736,000	28,736,000	28,717,000
Limited	21,471,000	18,424,000	26,363,000	21,603,000	19,139,000	19,139,000	19,157,000
Closed	2,847,000	2,444,000	2,847,000	2,847,000	2,847,000	2,847,000	2,847,000
Total:	*50,847,000*	*48,526,000*	*53,363,000*	*57,275,000*	*50,721,000*	*50,721,000*	*50,721,000*

[1] Acres represent the entire planning area for Nevada/California
Source: BLM GIS 2024

Table 4-6. Oregon OHV Designations by Alternative[1]

OHV Designation	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Open	1,204,000	1,204,000	739,000	739,000	600,000	600,000	600,000
Limited	11,042,000	11,077,000	11,568,000	11,568,000	11,707,000	11,707,000	11,707,000
Closed	367,000	332,000	335,000	335,000	335,000	335,000	335,000
Total:	*12,613,000*	*12,613,000*	*12,641,000*	*12,641,000*	*12,642,000*	*12,642,000*	*12,642,000*

[1] Acres represent the entire planning area for Oregon
Source: BLM GIS 2024

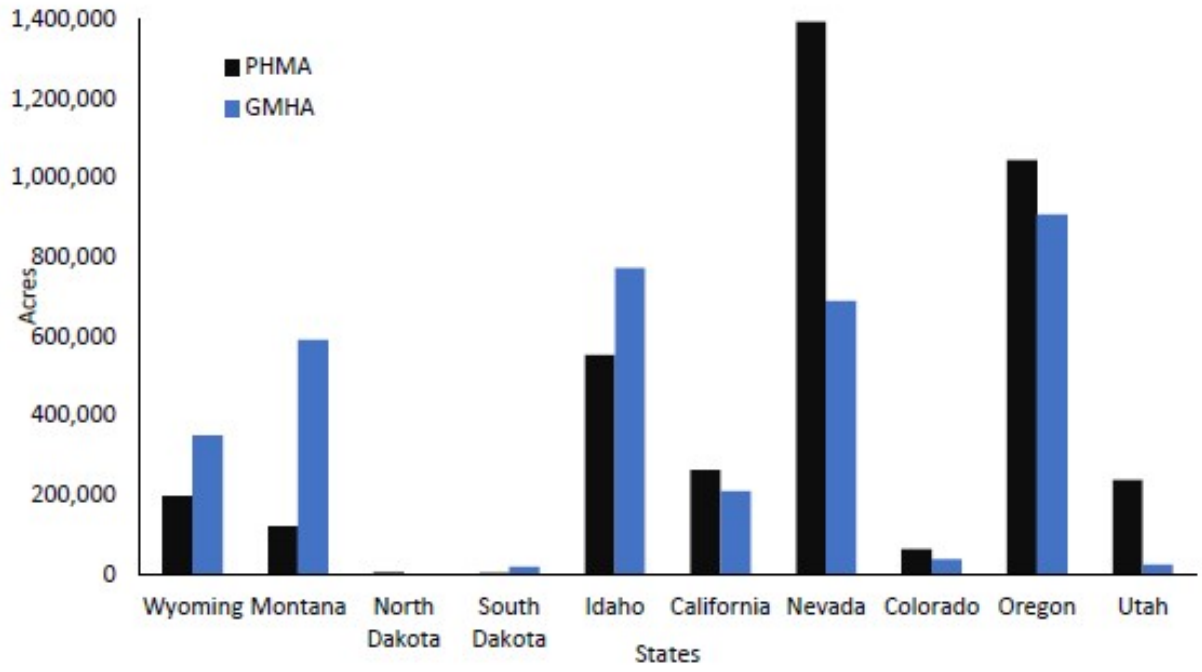
Table 4-7. Utah OHV Designations by Alternative[1]

OHV Designation	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Open	6,227,000	6,227,000	5,763,000	5,851,000	6,139,000	6,139,000	5,932,000
Limited	18,549,000	18,549,000	19,055,000	18,925,000	18,651,000	18,651,000	18,857,000
Closed	2,854,000	2,854,000	2,854,000	2,854,000	2,854,000	2,854,000	2,854,000
Total:	27,630,000	27,630,000	27,632,000	27,630,000	27,643,000	27,643,000	27,642,000

[1] Acres represent the entire planning area for Utah
Source: BLM GIS 2024

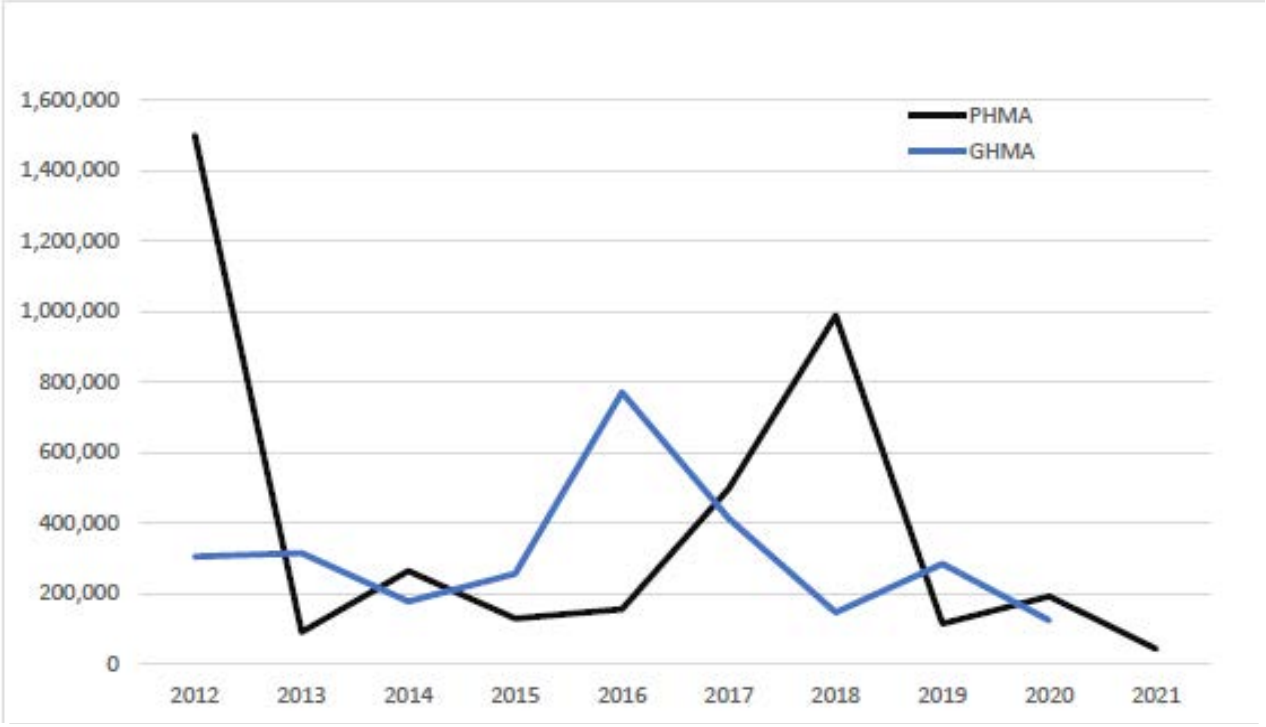
9.3 CHAPTER 3 FIGURES

Figure 3.1 Cumulative Acres Burned by State within the Planning Area, Alternative 1 (2012-2021)



Source: NIFC GIS 2023

Figure 3.2 Acres Burned by Year within the Planning Area, Alternative 1 (2012-2021)



Source: NIFC GIS 2023

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Appendix 10

Chapter 4 Methodology, Assumptions, Indicators, and Environmental Consequences for Alternatives 1-6

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Appendix 10. Chapter 4 Methodology, Assumptions, Indicators, and Environmental Consequences for Alternatives 1-6

10.1 Introduction

This section provides an overview of the general methodology used to analyze impacts, discusses incomplete or unavailable information, outlines the analytical assumptions applied, and provides the environmental consequences for Alternatives 1-6 for each resource analyzed in this EIS.

10.1.1 General Methodology for Analyzing Impacts

The discussion of impacts is based on best available data. Knowledge of the planning area and decision area and professional judgment, based on observation and analysis of conditions and responses in similar areas, are used for environmental impacts where data are limited. Acreage figures and other numbers used in the analyses are approximate projections for comparison and analytic purposes only. Readers should not infer that they reflect exact measurements or precise calculations. Potential impacts are described in terms of type, context, duration, and intensity, which are generally defined below.

Type of impact—The analysis discloses impacts, both beneficial and adverse. Because types of impacts can be interpreted differently by different people, this chapter seeks to avoid differentiation between beneficial and adverse impacts. Notable exceptions are cases where such characterization is required by law, regulation, or policy. The presentation of impacts for key planning issues is intended to provide the BLM decision maker and reader with an understanding of the multiple use trade-offs associated with each alternative.

Context—This describes the area or location (site-specific, local, planning area-wide, or regional) in which the impact would occur. Site-specific impacts would occur at the location of the action, local impacts would occur within the general vicinity of the action area, planning area-wide impacts would affect a greater portion of decision area lands, and regional impacts would extend beyond the planning area boundaries. Refer to **Chapter 1** for a description of the planning area and decision area.

Duration—This describes the continuance of an effect, which can be classified as short term or long term. Short-term is defined as anticipated to begin and end within the first 5 years after the action is implemented; long term is defined as lasting beyond 5 years to the end of or beyond the life of this RMPA.

Intensity—Rather than categorize impacts by subjective intensity rankings (e.g., major, moderate, or minor), this analysis discusses the intensity of impacts using quantitative data wherever possible.

Direct, indirect, and cumulative impacts—Direct impacts are caused by an action or implementation of an alternative and occur at the same time and place; indirect impacts result from implementing an action or alternative but usually occur later in time or are removed in distance and are reasonably certain to occur. Cumulative impacts are effects on the environment that result from the impact of implementing any one of the alternatives in combination with other actions, either within the planning area or adjacent to it, regardless of who is taking or has taken that other action. Cumulative effects analysis is provided in **Section 4.21**, Cumulative Impacts.

10.1.2 Incomplete or Unavailable Information

The CEQ established implementing regulations for NEPA that require federal agencies to identify relevant information that may be incomplete or unavailable for evaluating reasonably foreseeable significant adverse impacts in an EIS (40 CFR Section 1502.21). If the information is essential to a reasoned choice among alternatives, it must be included or addressed in an EIS. Knowledge and information is, and will always be, incomplete, particularly with infinitely complex ecosystems considered at various scales.

The BLM used the best available information pertinent to the decisions to be made in developing the RMPA. The BLM made a considerable effort to acquire and convert resource data into digital format for use in the RMPA, both from the BLM and from outside sources.

Under the FLPMA, the inventory of public land resources is ongoing and continuously updated. However, a comprehensive inventory of wildlife and special status species habitat and condition has not been completed across the planning area, and as such, discussions of impacts on potential habitat are included.

For resources where there is incomplete or unavailable information, estimates were made concerning the number, type, and significance of these resources based on previous surveys and existing knowledge. In addition, some impacts cannot be quantified, given the proposed management actions. Where this gap occurs, impacts are projected in qualitative terms or, in some instances, are described as unknown. Subsequent project-level analysis would provide the opportunity to collect and examine site-specific inventory data to determine appropriate application of RMP-level guidance. In addition, the BLM and other agencies continue to update and refine information used to implement this RMPA.

GIS data was used to perform acreage calculations, and to generate the maps in **Appendix 1**. Calculations are dependent upon the quality and availability of data. Given the scale of the analysis, the compatibility constraints between datasets, and lack of data for some resources, all calculations are approximate and serve for comparison and analytic purposes only. Likewise, the maps in **Appendix 1** are provided for illustrative purposes and subject to the limitations discussed above. No warranty is made by the BLM as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

10.1.3 Analytical Assumptions

Several overarching assumptions were made to facilitate the analysis of the project impacts. These assumptions set guidelines and provide reasonably foreseeable projected levels of development that would occur in the planning area during the planning period. These assumptions should not be interpreted as constraining or redefining the management objectives and actions proposed for each alternative, as described in **Chapter 2**.

The following general assumptions apply to all resource categories. Any specific resource assumptions are provided in the methods and assumptions section for that resource.

- Sufficient funding and personnel would be available for implementing the decision.
- Implementing actions from any of the RMPA alternatives would comply with all federal regulations, BLM policies, and other requirements.
- Implementation-level actions necessary to execute the decisions in this RMPA would be subject to further environmental review, including that under the NEPA, as appropriate.
- Most direct and indirect impacts of implementing the RMPA would primarily occur on BLM-administered lands in the planning area. However, indirect impacts are also likely, such as limiting

development on BLM-administered land that may redirect development to other adjacent and nearby non-BLM-administered land.

- Local climate patterns of historic record and related conditions for plant growth may change. Changes to the timing, type, and amount of precipitation will likely occur over the life of this plan.
- In the future, as tools for predicting climate changes in a management area improve and changes in climate affect resources, the BLM would be able to better incorporate climate change into the implementation of projects.
- Restrictions (such as siting, design, and mitigation measures) would apply, where appropriate, to surface-disturbing activities associated with land use authorizations and permits issued on BLM-administered lands.
- When used in the EIS, the terms "mineral development" or "mineral resource development" refer broadly to development of a range of minerals, including fluid minerals, nonenergy leasable minerals, saleable minerals, and locatable minerals. Elsewhere, the analysis specifies a given type of mineral as applicable.
- Removal of livestock grazing on BLM-administered lands may require fences to separate BLM-administered lands from adjacent lands under different surface land ownership to prevent trespass.

10.2 GREATER SAGE-GROUSE

10.2.1 Methods and Assumptions

Methodology

Impacts on GRSG would primarily result from management actions described in **Chapter 2** that result in habitat removal, fragmentation, or other alteration, and actions that result in injury or mortality, displacement, or other disturbance. The types of actions that can result in these impacts are discussed in more detail in **Section 4.2.1**, Nature and Type of Effects. For management actions not specifically described below, the effects would remain as described in the 2015 and/or 2019 plans.

Indicators

Indicators of impacts on GRSG are as follows:

- Acres of habitat management area within the planning area.
- Habitat loss/degradation – Likelihood for habitat impacts caused by the loss of habitat function or value, including connectivity, and the extent to which it may influence lek and population persistence/ viability.
- Behavioral disturbance to individuals – Likelihood of impacts on survival or reproduction due to direct or indirect effects, including habitat avoidance, and the extent to which it may influence lek and population persistence/viability.

Assumptions

In addition to the assumptions in **Section 4.1.1**, Analytical Assumptions, this analysis includes the following assumptions:

- GRSG habitat management area designations are assumed to represent habitat adequate to maintain GRSG populations in the planning area.
- Seasonal ranges of migratory and nonmigratory GRSG are largely encompassed within GRSG habitat management area designations.

- GRSG habitat management area designations encompass adequate habitat for providing connectivity within populations and subpopulations. Connectivity is considered by incorporating population area information in the design and implementing restoration projects.
- If adverse impacts are identified, mitigation measures could be implemented to reduce the impacts. If analysis indicates remaining residual impacts, compensatory mitigation may be required. If monitoring reveals that mitigation is unsuccessful in reducing or eliminating impacts, measures to prevent further impacts would be implemented as appropriate to the species affected.
- Short-term effects would occur over a timeframe of 5 years or less, and long-term effects would occur over longer than 5 years.
- BMPs, COAs, and SOPs are used for analysis and would be implemented to reduce impacts on GRSG. These are subject to modification based on subsequent guidance and new science.
- Ground-disturbing activities could modify habitat and cause loss or gain of individuals, depending on the size of the area disturbed, the nature of the disturbance (e.g., development vs. habitat restoration), and the location of the disturbance. For example, habitat restoration treatments in sagebrush steppe disturb the ground but are assumed to positively modify habitat quality and quantity in the long term. Roads, transmission lines, pipelines, and other infrastructure generally cause fragmentation of habitat that can impact lek persistence, lek attendance, winter habitat use, recruitment, chick survival, yearling annual survival rate, and female nest site choice (Holloran 2005; Aldridge and Boyce 2007, Walker et al. 2007a; Doherty et al. 2008; Holloran et al. 2010; Hagen et al. 2007; Johnson et al. 2011; Taylor et al. 2012).
- Because GRSG are highly sensitive to habitat fragmentation, development, and changes in habitat conditions and require large, intact habitat patches, alternatives proposing to protect the most GRSG habitat from disturbance are considered of greatest beneficial impact to the species. These impacts can be described both qualitatively and quantitatively.

10.2.2 Alternative 1

Habitat Designation and Management

Rangewide Environmental Consequences

Under Alternative 1, GRSG habitat is separated into SFAs, PHMA, GHMA, and other HMAs for certain states (see **Table 2-3**). Restrictions to land use and surface-disturbing activities would occur within each HMA and SFA, depending on the classification (see **Chapter 3**). Corresponding management actions, including lek buffers, required design features, fluid mineral leasing prioritization, and habitat objectives, would provide a hierarchy of potential conditions to minimize effects in HMAs. Withdrawal from location and entry under the US mining laws, subject to valid existing rights, would be recommended for lands within SFAs to promote protection of GRSG and its habitat. If the Secretary approves the proposed withdrawal, management for SFAs would provide the highest level of protection to GRSG. The lack of WEMs in SFAs, even for actions that would benefit GRSG, could limit habitat improvements. In general, restrictions to land use and surface-disturbing activities in HMAs and SFAs reduce the likelihood for habitat loss, fragmentation, and direct disturbance to GRSG. Effects from specific restrictions associated with each resource use are described in the sections below. However, restrictions to development on BLM lands might push development onto private land, which could result in indirect impacts as described under *Nature and Types of Effects*. In most cases management actions for state-specific HMA (IHMA, OHMA, etc.) would be consistent with those for PHMA; where differences occur, they are analyzed under *State-Specific Environmental Consequences*. Alternative 1 includes lek buffers for all HMAs. These buffers are consistent with the lek buffer distances identified in the USGS Report, *Conservation Buffer Distance Estimates for Greater Sage-Grouse - A Review* (a 1-mile buffer would be used as the minimum threshold in Colorado). Modifications to

the buffer distances are allowed if they meet the criteria outlined in the report. Lek buffers would reduce disruption to GRSG, minimize habitat loss, and reduce habitat degradation, and should contribute to maintaining nesting habitat effectiveness and brood survival.

Alternative 1 incorporates an adaptive management strategy composed of soft and hard triggers based on population and habitat changes. BLM would rely on data from several sources to track and identify population changes to assess the population trigger in the adaptive management approach. Triggers would be determined by population area, making the strategy more locally responsive than if triggers were determined on a sub-regional or statewide basis. Responses to soft triggers may require adjustment of future project level/plan implementation activities, as consistent with the individual site-specific NEPA analyses. Soft trigger responses can come in the form of terms, conditions, RDFs, or site-specific mitigation measures. Hard triggers mean that immediate action is necessary to stop a severe deviation from conservation objectives set forth in the Proposed RMP Amendment. If new scientific information becomes available demonstrating that the hard-wired response would be insufficient to stop a severe deviation from sage-grouse conservation objectives set forth in the ARMPA, BLM will implement interim management direction to ensure conservation options are not foreclosed. BLM will also undertake plan amendments or revisions if necessary. The use of adaptive management would benefit GRSG by allowing flexible resource management decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. If management changes are successful, they would reduce impacts to GRSG by limiting disturbances and improving habitat conditions. BLM would require and ensure mitigation that achieves a net conservation gain in all HMA types and in all states (except WY GHMA). Mitigation should offset any loss of GRSG habitat resulting from land use activities.

Under Alternative 1, all states would include language to maintain and enhance sagebrush habitats with the intent of conserving GRSG populations. Habitat objectives would be considered when authorizing activities in GRSG habitat. The exact language varies by state, but in general, inclusion of specific habitat objectives could result in increased certainty and greater levels of consistency when considering implementation-level actions. Following these objectives could prevent activities such as improper grazing practices and result in increased habitat quality. Improved habitat conditions would increase nest success, chick survival, and GRSG persistence over the long term.

State-Specific Environmental Consequences

There could be impacts to GRSG in WY GHMA associated with land use activities as described under *Nature and Types of Effects*. No mitigation would be required in WY GHMA.

In CO, ID, NV/CA, OR, and UT, a 3% disturbance cap would apply to land use activities (except wildfire and agriculture) at both biologically significant unit (BSU)-scale and at proposed project analysis area within PHMA. In ID, the same cap would apply but it could be exceeded in utility corridors if it benefits GRSG. Calculating disturbance at the project-level may prevent some development that could occur if disturbance is only calculated at a coarser scale. Disturbance would also be calculated for each BSU. The definition of a BSU would vary by state, but in general, a BSU is defined as a spatial area that contains relevant and important GSRG habitats and is used for comparative calculations to support evaluation of changes to habitat. Including caps at both project and BSU scales would reduce disturbance on both the local and landscape scales, therefore, provide protection for both the larger population and individual leks and their surrounding habitat.

Excluding wildfire and agriculture from the disturbance calculation for those states listed above may result in a higher level of disturbance overall. Since wildfire was the primary source of habitat loss in previous years (Herren et al. 2021), this may contribute to continued declining habitat trends. Wildfire and agriculture are

factored into the soft and hard habitat triggers and included as part of the HAF boundary and 70% sagebrush cover habitat objective; if these disturbances lead to the trip of a trigger, adaptive management would be applied to reverse the trends. In PHMA and IHMA, the Anthropogenic Disturbance Screening Criteria would apply stringent criteria to any proposed projects. No disturbance cap would apply in GHMA or GRSG brood-rearing habitat and migration corridors.

Managing RHMA in MT would add protections to GRSG in those areas. Management actions in RHMA would emphasize restoration for the purpose of restoring habitat to provide the ability for establishing or enhancing GRSG populations to sustainable, dense levels. Management in RHMA that leads to restrictions to land use and surface-disturbing activities would reduce the likelihood for habitat loss, fragmentation, and direct disturbance to GRSG. The restoration focus in RHMA would further improve GRSG habitat. The higher disturbance cap in MT, WY, and the Dakotas could lead to greater levels of anthropogenic disturbance within a project area, and therefore greater potential for habitat loss and alterations as well as direct disturbance to GRSG, depending on the degree to which wildfire and agriculture contribute to disturbance in a given area. Disturbance will only be calculated at the project level, so cumulative disturbance over a larger area could potentially occur at levels that influence GRSG populations within a BSU. In areas with reduced habitat due to wildfire and/or agriculture, additional anthropogenic development would be limited, reducing the combination of threats and habitat degradation.

Although all states would include an adaptive management strategy, the metrics, thresholds, timeframes, and spatial scales for evaluating and responding to triggers would vary state by state. As a result, there would be no consistency in how triggers are calculated across the range and responses may not be implemented across an area that encompasses an entire population group and/or seasonal habitats needed throughout the year. If management changes do not apply to all populations and habitats being affected, some individuals and/or habitat areas may improve while others remain impacted.

In UT, the GHMA identified in Alternative 1 generally comprises poor-quality habitat on the periphery of larger PHMA. The extent to which some of these GHMA areas may provide connectivity, be used as corridors, or provide certain seasonal habitat during portions of a bird's life cycle is largely unknown due to limited telemetry. Most of these GHMA areas are predominantly private, Tribal, and TLA lands, and because of the limited regulatory discretion (other than split estate where BLM administers the mineral estate) that the BLM has on resources in these areas impacts on GRSG from development are likely to continue at current rates. Only 6 of the 13 leks in GHMA are in areas affected by BLM management, with the other 7 in areas predominantly managed by USFS, tribal, or private entities. Development could still occur in UT GHMA potentially resulting in alteration, direct loss, and fragmentation of seasonal GRSG habitats. Fragmentation could further limit the amount of usable habitat available for the small and declining population of GRSG that occupy GHMA.

Minerals Management

Rangewide Environmental Consequences

Leasing of fluid minerals would be allowed in PHMA and ID IHMAs, subject to NSO stipulations and/or seasonal restrictions. This would increase HMA acres subject to effects from fluid mineral development compared to alternatives in which PHMA would be closed to leasing. In SFAs, there would be no exceptions, waivers, or modifications allowed. In PHMA outside of SFAs, no waivers or modifications would be allowed but exceptions could be considered on a very limited basis, and only in circumstances where granting an exception would have either have no impacts or would reduce impacts on GRSG.

NSO stipulations on new leases would protect PHMA from surface-disturbing activities on BLM lands. In large contiguous areas primarily managed by the BLM, GRSG exposure to disruption would be limited to the human activity that accompanies construction, development, or production activities. Access to fluid mineral deposits would require horizontal drilling from outside the boundaries of the NSO area. In areas of mixed ownership, impacts could still occur due to directional/horizontal drilling NSO on BLM lands may encourage co-location of leases, which could help prevent fragmentation and preserve connectivity between leks by concentrating effects outside of PHMA.

PHMA in all states would be closed to saleable mineral development (except where authorized in MT and open subject to restrictions in WY), but open for new free use permits (except ID). PHMA in all states and ID IHMAs would be closed to nonenergy mineral development, but they could consider expansion of existing leases. Most states would include minimization measures for saleable mineral and nonenergy mineral development in GHMA, but they were not recommended for withdrawal. These are described in the 2015 EISs for CA, CO, ID, MT/DK, NV, OR, UT, and WY (BLM 2015a-2015h). SFAs in all states were recommended for withdrawal from location and entry under the United States mining laws, subject to valid existing rights. Following publication of the RODs, the BLM applied for a withdrawal of the SFAs, pursuant to section 204 of FLPMA. The Secretary accepted the BLM's application and the BLM initiated the withdrawal process for those lands; the EIS for the withdrawal is underway. These restrictions would reduce the HMA acres affected and potential impacts to GRSG and habitat within PHMA and GHMA, such as disturbance and habitat alterations. Indirect effects on wildlife include noise, dust, and light impacts resulting from locatable mineral development and associated transportation.

State-Specific Environmental Consequences

In WY, applying an NSO within 0.6 miles of occupied GRSG leks in PHMA would protect fewer areas than in other states. Buffer distances from 0.5 to two miles from oil and gas infrastructure have been shown to be inadequate to prevent declines of birds from leks (Walker et al. 2007a). Studies have shown that greater distances, anywhere from two to four miles, are required for viable GRSG populations to persist (Walker et al. 2007a).

In WY and MT PHMA, fluid mineral development in areas that are already leased (and thus are exempt from NSO stipulations) would also be subject to density and disturbance limits, which would limit the extent of development and associated impacts. GHMA would be subject to NSO stipulations for fluid mineral development within 2 (CO), 1 (OR) or 0.25 (WY) miles of leks. GHMA in UT would also be subject to NSO stipulations but the distance varies by BLM office. PHMA and GHMA in CO and GHMA in OR would be closed to fluid mineral development within 1 mile of leks; this would provide increased protections to GRSG and contribute to lek persistence because no development (surface or subsurface) could occur. Fluid mineral development would be subject to Controlled Surface Use (seasonal restrictions and/or buffers) stipulations in ID, NV/CA OR, and WY GHMA. MT-DK would include a 0.6-mi NSO in GHMA and seasonal limitations (breeding, nesting, early brood-rearing & winter habitat) and CSU (density and disturbance) for the rest of the GHMA. Applying these restrictions to fluid mineral development would reduce potential impacts to GRSG associated with fluid mineral development.

Development of fluid mineral resources in GHMA would still result in the localized direct loss and fragmentation of seasonal habitats and displacement of GRSG from current use areas outside of the applicable lek buffers. The general effects of fragmentation, habitat loss, and displacement are discussed in *Nature and Types of Effects*. Application of lek buffers as required conservation measures or COAs would protect lekking, most nesting, and some brooding habitat; however, nesting and brooding habitat located

outside of the buffer would be afforded no specific protections other than the restrictions associated with management of PHMA and GHMA. Impacts of development outside buffer areas could be offset by mitigation because operators would be required to mitigate impacts until there is a net conservation gain. Mitigation may be conducted off-site if it would provide greater benefit to GRSG as a whole in the planning area, thus potentially resulting in unmitigated impacts on local populations in GHMA.

In CO, ID, ND, NV/CA, OR, UT, WY, and parts of MT/DK (Billings, HiLine, Miles City, ND, SD), priority would be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA, or within the least impactful areas within PHMA and GHMA if avoidance is not possible. Leasing outside of HMAs would reduce potential for impacts associated with horizontal drilling (in PHMA which would be NSO) and with fluid mineral leasing, exploration, and development in GHMA. The prioritization objective could potentially result in temporarily deferring a parcel in PHMA from leasing to a later sale. There would be no similar objective in the Lewistown or Butte Field Offices, and therefore, potential for impacts would be greater.

For both saleable mineral and nonenergy mineral development, WY PHMA would be subject to seasonal restrictions, while WY and MT PHMA would be subject to density and disturbance limits. These additional restrictions would reduce potential impacts to GRSG associated with saleable mineral development, but to a lesser extent than if they were completely closed to development. In Idaho, IHMA would be open to nonenergy mineral development in Known Phosphate Lease Areas, and similar impacts (e.g., displacement and habitat impacts from loss, disturbance, and erosion could occur from open pit mining) could occur in areas open to development.

PHMA in CO, MT/DK, UT, and WY would be considered "essential habitat" for coal unsuitability evaluation. This would likely lead to PHMA in these states being considered unsuitable for coal development and would limit the potential for impacts associated with coal development. ID, NV/CA, and OR would not address coal development due to absence of the mineral.

The oil and gas lease stipulations summarized in **Appendix 2** would be applied in MT/DK; these stipulations would reduce the potential for impacts associated with fluid mineral leasing.

In CO PHMA and within 4 miles of an active lek, siting criteria would be applied to guide development of the lease or unit that would result in the fewest impacts possible to GRSG. Criteria include consideration of location of proposed lease activities in relation to critical GRSG habitat areas, and evaluation of the potential threats from proposed lease activities, and an evaluation of the proposed lease activities, including design features, in relation to the site-specific terrain and habitat features. To authorize an activity based on these criteria, the environmental record of review must show no significant direct disturbance, displacement, or mortality of GRSG.

Lands and Realty Management

Rangewide Environmental Consequences

Under Alternative 1, PHMA in all states, ID IHMAs, and some MT RHMAs would be identified as ROW avoidance areas to allow for management flexibility (except for minor ROWs in WY, as described under state analysis). PHMA would be exclusion areas for wind and solar (utility scale solar only in ID, NV/CA and OR) development (with exceptions in WY, OR, and ID IHMA, see state-specific analysis). Classifying PHMA as exclusion or avoidance areas would decrease the potential for impacts associated with ROW development, such as disturbance and increased potential for predation GHMA in all states would be open to minor ROWs with mitigation measures (WY does not require mitigation, see state-specific analysis).

Impacts associated with ROW development, such as disturbance and increased potential for predation, could occur in these areas if developed, but mitigation measures would help to offset the impacts.

New ROWs in PHMA would not be allowed except in accordance with the Anthropogenic Disturbance Screening Criteria outlined in Alternative 1. The BLM would collocate new ROWs with existing infrastructure when possible. Alternative 1 would apply at implementation a protective buffer from disturbance around leks in PHMA, IHMA and GHMA, depending on the type of disturbance and based on the latest science. BLM would retain management flexibility to route ROWs to minimize overall impacts on GRSG habitat. Existing ROW corridors are preferred for collocation of new ROWs but could not be widened more than 50% greater than the original footprint. These measures would protect GRSG and their habitats from fragmentation, disturbance and predation, and other impacts.

State-Specific Environmental Consequences

In IHMA new ROWs could be considered if in accordance with the IHMA Anthropogenic Disturbance Development Criteria. PHMA in WY would be open to minor ROWs with buffers and mitigation. Effects from ROWs could occur; buffers and mitigation would help offset the impacts, but to a lesser extent than ROW exclusion/avoidance. GHMA in WY would be open to minor ROWs and no mitigation measures would be required. There would be a greater potential for impacts associated with ROWs in these areas.

CO, NV/CA, and OR GHMA would be identified as avoidance areas for major ROWs, which would reduce impacts. ID and UT GHMA would be open to major ROWs with minimization measures, while WY GHMA would be open to major ROWs. In ID and UT, minimization measures would help reduce the impacts, but to a lesser extent than ROW exclusion/avoidance.

Classifying GHMA in CO, NV/CA, and OR as avoidance areas for major ROWs would decrease the potential for impacts associated with ROW development. Opening UT and ID GHMA to major ROWs with minimization measures, would increase the potential for impacts, such as disturbance and increased potential for predation, but mitigation measures would help to offset the impacts. Opening GHMA in WY to major ROWs would also increase the potential for impacts, and there would be no mitigation measures to offset the impacts.

Renewable Energy Management

Rangewide Environmental Consequences

Under Alternative 1, PHMA in all states would be exclusion areas for wind and solar (utility scale solar only in ID, NV/CA and OR) development (with exceptions in WY, OR, and ID IHMAs; see state-specific analysis). Within the exclusion areas, this would eliminate direct impacts from potential renewable energy development on GRSG in PHMA. As a result, GRSG would experience reduced potential for disturbance, habitat alterations, and habitat fragmentation.

State-Specific Environmental Consequences

In WY, PHMA would be avoidance areas for wind development or open if it can be sufficiently demonstrated that development would not result in population declines. ID IHMAs would be avoidance areas for utility-scale solar and wind development. PHMA in OR would be avoidance areas for wind and solar development in Lake, Harney, and Malheur Counties. Classifying PHMA as avoidance areas would decrease the potential for impacts, but to a lesser extent than exclusion areas.

Classifying GHMA in CO, MT/DK, NV/CA, and OR as avoidance areas for wind development, GHMA in CO, MT/DK and OR as avoidance areas for solar development, and GHMA in NV/CA and UT as exclusion

areas for solar development, would decrease the potential for impacts associated with wind and/or solar development. GHMA in ID, UT and WY would be open to wind development and GHMA in ID and WY are open to solar development, so there would be a greater potential for impacts *s*.

Depending upon the potential for renewable energy development and the size and location of permitted development in GRSG habitat, there could be impacts ranging from discountable in less important habitats to decreasing the population growth rate if placed in important habitats. COAs could be applied to reduce impacts on GRSG, but they would not be consistently applied across the decision area. Renewable energy development in GRSG habitat would be expected to result in habitat loss, degradation, fragmentation, and direct disturbance to the birds. Based on previous research (e.g., LeBeau 2012), nests and broods near wind facilities would have a lower rate of success and such declines in these vital rates, especially impacts on nest success, would decrease the population growth rate in these populations and may lead to loss of the population over time (Taylor et al. 2012).

Livestock Grazing Management

Rangewide Environmental Consequences

Under Alternative 1, PHMA and GHMA in all states, and ID IHMA, and would be available for domestic livestock grazing. Impacts to GRSG and habitat from grazing, such as habitat alterations, could occur in PHMA, GHMA, and ID IHMAs.

Priority for review and processing of grazing permits/leases would be in SFAs, followed by PHMA outside of SFAs. Precedence would be given to existing permits/leases in these areas not meeting land health standards, with focus on those containing riparian areas, including wet meadows. Prioritization would help LM identify issues that may be associated with improper grazing and implement corrective actions in the areas that have the greatest habitat value. Management changes, if required, would be tailored to meet land health standards and GRSG habitat objectives. BLM would also require thresholds and responses to address and respond to future conditions in new fully processed permits. The review process described above would reduce impacts to GRSG from grazing if review leads to adjustments to existing permits/leases that improve land health standards.

State-Specific Environmental Consequences

In MT/DK, BLM would use applicable RDFs to mitigate potential impacts from West Nile virus when developing or modifying water developments. This would reduce potential for impacts to GRSG from disease spread associated with livestock subsidies.

Under Alternative 1 all or portions of 13 key RNAs in Oregon would be unavailable for livestock grazing (see **Appendix 17** for further analysis). In key RNAs, 21,959 acres would be unavailable to livestock grazing (**Table 3-25**, Oregon Key RNA Acreages). Two key RNAs (Foster Flat and Guano Creek-Sink Lakes) would remain unavailable to livestock grazing. **Tables 4-2** and **4-3** provide corrections and updates to the vegetation communities with the various key RNAs and are based on new, site-specific information gathered or generated by the Lakeview, Vale, and Burns districts in Oregon. Under Alternative 1, fencing would be present in and adjacent to key RNAs in Oregon. The ability to distribute livestock would generally be maintained, and impacts would be limited from these actions (BLM 2015a, p. 4-203). Making portions of RNAs that contain plant communities important to GRSG unavailable to grazing could provide the BLM with areas for baseline vegetation monitoring without the influence of BLM-permitted activities. Whether removal of grazing would reduce the risk of invasive plant spread into the key RNAs is uncertain.

Wild Horse and Burro Management

Rangewide Environmental Consequences

Under Alternative 1, wild horse and burro populations would continue to be managed for AMLs and in balance with other resource uses. Wild horse and burro gathers would be prioritized based on escalating or potential emergencies, public safety, nuisance animals, court orders, population growth suppression, and resource impacts associated with monitoring data, which is generally based on wild horse and burro population inventories, wild horse and burro condition, availability of sufficient water and forage resources, rangeland health, use levels of upland habitats, and riparian resource conditions. Evaluation of land health assessments in wild horse and burro HMAs could identify vegetation conditions that could prompt gathers, reducing wild horse numbers and the associated impacts on GRSG habitats.

Predation Management

Rangewide Environmental Consequences

Under Alternative 1, following more specific vegetation objectives and reducing opportunities for predators may, in some cases, improve the quality of habitat and decrease opportunities for predation. Improved habitat conditions and decreases in predation would increase nest success, chick survival, and GRSG persistence over the long term.

State-Specific Environmental Consequences

In NV/CA, UT, and WY, habitat objectives to minimize human resource subsidies, and coordinate with other partners on predator management would likely reduce exposure of predatory birds to GRSG nests and chicks, thereby ensuring GRSG persistence until habitat conditions improve (O'Neil et al 2018). Similarly, habitat management in CO, NV/CA, and UT to provide GRSG concealment from predators may help reduce predation and increase GRSG persistence.

ACEC Designation

Alternative 1 would not result in any impacts from ACEC designation since it does not include designation or management for ACECs.

10.2.3 Alternative 2

Habitat Designation and Management

Rangewide Environmental Consequences

Impacts from designating GRSG habitat as SFAs, PHMA, IHMAs, and GHMA and associated management would be similar to those described for Alternative 1 (**Table 2-3**). The overall acreage would be slightly less with less than 1% fewer acres of PHMA and approximately 1.5% fewer acres of GHMA. Some SFAs would be removed in states as described under state impacts. Impacts from language to maintain and enhance sagebrush habitats would be the same as described for Alternative 1. Additionally, habitat objectives would be the same as described for Alternative 1.

State-Specific Environmental Consequences

Removing SFAs in CA, ID, NV, UT, and WY would reduce protections to GRSG and habitat. However, previous management area classifications (e.g., PHMA, GHMA) would remain, but protections may be lower under some of those other classifications. Reducing restrictions to land use and surface-disturbing activities could increase the likelihood for habitat loss, fragmentation, and direct disturbance to GRSG. Habitats in these areas would likely be reduced in quality due to impacts associated with mineral development. If protections are lacking from adjacent lands and the lands are developed, this could lead to habitat fragmentation due to large, contiguous areas of habitat losing habitat suitability. Protections to GRSG and

habitat from restrictions to land use and surface-disturbing activities would continue in SFAs in MT and OR, and impacts would be as described under Alternative 1. Management of RHMA would be the same as described for Alternative 1.

Under Alternative 2, the GHMA designation in UT would be removed with all its corresponding management actions from the 2015 plan amendments. Removal of GHMA and their associated management actions would likely incentivize development in areas formally identified as GHMA and could therefore lead to GRSG habitat loss and alterations.

Requirements for mitigation that achieves a net conservation gain in all HMA types would apply in MT/DK, NV/CA, and OR, and impacts would be the same as described for Alternative 1. CO and ID would enforce mitigation resulting in no net loss in HMAs. This would help offset impacts associated with land use activities, but to a lesser extent than Alternative 1, in which a net conservation gain would be required. In UT and WY, the net conservation gain requirement would be removed. Although the BLM would not require compensatory mitigation in HMAs, it would enforce state mitigation policies and programs. In CO, ID, NV/CA, OR, UT, and WY HMAs, compensatory mitigation would be voluntary unless required by laws or by the State. As a result, the potential for impacts from land use activities would be greater relative to Alternative 1.

Impacts from applying a 3% (CO, ID, NV/CA, OR, UT, and the Dakotas) or 5% (MT, WY, and the Dakotas) disturbance cap in PHMA would be similar to those described for Alternative 1. In UT and ID the cap could be exceeded if it would benefit GRSG. The cap would be applied at the BSU and project scale, except in ID which would only apply it at the BSU scale. Consequently, some additional development could occur in ID, which may increase potential for habitat loss and alterations, particularly for individual leks and their surrounding habitat.

The ability to exceed the disturbance and density caps could result in loss and degradation of GRSG habitat and impacts on local GRSG populations. Exceedances to the caps would only be allowed if site-level analysis indicates that the project, in combination with all voluntary and required design features, will improve the condition of GRSG habitat. The risk in allowing this exceedance is the possible loss of a specific type of habitat that mitigation may not address because it does not require compensation for the exact same habitat value. Consequently, it is possible that while the required habitat improvement will occur, it may not address the loss of a specific habitat type. This may result in a long-term impact on GRSG in the project area.

Impacts from including an adaptive management strategy would be similar to those described for Alternative 1. Some states would include the addition of "un-triggers", meaning that the management change implemented to reverse a trigger could be revoked and the original management would be reimplemented once the issue is resolved. Reverting back to the original management that resulted in the trigger being tripped could lead to additional population declines and/or habitat degradation that could cause the trigger to be tripped again.

In Idaho, BLM would apply the lek buffer distances for certain land uses from the 2019 Idaho GRSG ARMPA, or Alternative 2, and as described in **Appendix 19**. In general, the buffer distances would vary by HMA type, with buffer distances in PHMA being the largest followed by IHMA, then GHMA. Buffer exception criteria would be included for IHMA/GHMA as described in the appendix. Under Alternative 2, buffer distances in PHMA and IHMA are based upon the 'lower end of the interpreted range' and mostly the 'literature minimum', respectively, as summarized in the USGS Report, *Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review* (Manier et al. 2014). Buffers would reduce disruption to GRSG, minimize

habitat loss, and reduce habitat degradation, which should result in maintaining nesting habitat effectiveness and brood survival. Protections would be greatest in PHMA, followed by IHMA, then GHMA. This approach would encourage development outside of the best habitat and into lesser quality or non-habitat.

In UT, the GHMA designations would be removed with all its corresponding management actions from the 2015 plan amendments. Alternative 2 prioritizes the importance of management prescriptions on PHMA to protect the seasonal habitats that support over 95% of GRSG populations in Utah. Impacts would likely accelerate the effect on resources in the former GHMA since those acres will be removed from management consideration. GRSG management would revert to the management in place prior to the 2015 ARMPA; therefore, some protections such as lek buffers, seasonal restrictions may still be applied depending on the GRSG resource present.

Minerals Management

Rangewide Environmental Consequences

Impacts from fluid mineral management in PHMA and GHMA would be the same as described for Alternative 1, except in CO PHMA and CO GHMA.

Impacts from saleable mineral management in PHMA and GHMA would be the same as described for Alternative 1, except in ID IHMAs and NV/CA PHMA.

Impacts from nonenergy mineral management in PHMA and GHMA would be the same as described for Alternative 1, except in NV/CA PHMA.

Impacts from coal management in PHMA and GHMA would be the same as described for Alternative 1, except in UT PHMA.

Removing the recommendation for locatable mineral withdrawal in SFAs in all states (except in MT/DK, which did not have a 2019 amendment) has no impact. The Secretary proposes and makes withdrawals through a separate process pursuant to section 204 of FLPMA not through BLM land use planning.

State-Specific Environmental Consequences

Removing the closure of CO PHMA to fluid mineral development would increase potential for disturbance and habitat alterations/degradation since mineral development activities could occur in previously closed areas and potentially result in impacts described under *Nature and Types of Effects*. Changing GHMA from closed to fluid mineral development to NSO would likely have minimal impacts since the stipulation would avoid potential for disturbance and habitat alterations/degradation from surface-disturbing activities.

Impacts from prioritizing fluid mineral leasing outside of HMAs in CO, ID, OR, and MT/DK offices would result in the same impacts in these states as described under Alternative 1. Removing the objective in UT and NV/CA would increase the potential for impacts because land in PHMA and GHMA could be leased. Removal of the fluid mineral leasing prioritization objective would not increase threats, since the NSO stipulation would still be in effect. In WY, fluid mineral leasing would be allowed in PHMA, which would increase the potential for impacts. If BLM has a backlog of Expressions of Interest for leasing, the BLM would prioritize work first in non-habitat followed by lower habitat management areas (e.g., GHMA). For fluid mineral development on existing leases that could adversely affect GRSG populations or habitat, the BLM would work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts consistent with lessees' rights.

Adding exception criteria to saleable and nonenergy mineral closures for NV/CA PHMA and allowing consideration of new free use permits for saleable minerals in ID IHMA and NV/CA PHMA would increase the potential for associated impacts.

Identifying essential habitat in UT PHMA as part of future coal unsuitability criteria would likely lead to these areas being considered unsuitable for coal development and would limit the potential for associated impacts.

In CO PHMA and within 4 miles of an active lek, impacts from applying siting criteria for fluid mineral development would be the same as those described for Alternative 1.

Lands and Realty Management

Rangewide Environmental Consequences

Impacts from ROW management would be the same as described for Alternative 1 (with additional exception criteria in NV/CA, see state-specific analysis).

State-Specific Environmental Consequences

There would be additional exception criteria for ROW development in NV PHMA and for wind development in NV/CA GHMA. This could increase the potential for impacts associated with ROW and renewable energy development.

Renewable Energy Management

Rangewide Environmental Consequences

Impacts from renewable energy management would be the same as described for Alternative 1 (with additional exception criteria in NV/CA).

State-Specific Environmental Consequences

There would be additional exception criteria for ROW and wind/solar development in NV/CA PHMA and for wind development in NV/CA GHMA. This could increase the potential for impacts associated with ROW and renewable energy development.

Livestock Grazing Management

State-Specific Environmental Consequences

Impacts from domestic livestock grazing management would be the same as described for Alternative 1, with the following exceptions. The removal of review prioritization and processing of grazing permits in UT, WY, and NV/CA, may have minimal impacts as BLM still has the authority to prioritize staff time and budget to identify areas that aren't meeting land health standards and implement corrective actions in areas with the greatest GRSG habitat value.

In Oregon, all or portions of 13 key RNAs would be available to livestock grazing, consistent with all applicable regulations and policies. The 13 key RNAs available for livestock grazing would be Black Canyon, Dry Creek Bench, East Fork Trout Creek, Fish Creek Rim, Foley Lake, Lake Ridge, Mahogany Ridge, North Ridge Bully Creek, Rahilly-Gravelly, South Bull Canyon, South Ridge Bully Creek, Spring Mountain, and Toppin Creek Butte (BLM 2019a, p. 1-6). The key RNAs would be required to meet land health standards and other applicable BLM regulations and policies and would remain subject to management, including regulation of grazing, to maintain and promote the characteristics of the RNAs (BLM 2018, p. 4-6). Grazing impacts would vary within and among the key 13 RNAs, depending on site productivity, timing of grazing, stocking intensity, and duration of grazing (Oregon Greater Sage-Grouse Proposed RMPA/Final EIS 2018, p. 4-6). Alternative 2 would result in 21,959 fewer undisturbed acres within Oregon available for additional

research in plant communities important to GRSG (Oregon Greater Sage-Grouse Proposed RMPA/Final EIS 2018, p. 4-7). The small size of the RNAs likely limit any impacts of livestock grazing on larger GRSG populations. Two key RNAs (Foster Flat and Guano Creek-Sink Lakes) would remain unavailable to livestock grazing.

In MT/DK, impacts from using applicable RDFs to mitigate potential impacts from West Nile virus when developing or modifying water developments would be the same as described for Alternative 1.

Wild Horse and Burro Management

Rangewide Environmental Consequences

Impacts from wild horse and burro management would be the same as described for Alternative 1.

Predation Management

Rangewide Environmental Consequences

Impacts from objectives to reduce opportunities for predators would be the same as described for Alternative 1.

State-Specific Environmental Consequences

Impacts from state-specific predation management objectives in CO, NV/CA, and WY would be the same as described for Alternative 1. Adding specific language to address corvid nests in UT may reduce human subsidies that attract corvids, which would reduce predation levels (Coates et al. 2015; O'Neil et al 2018).

ACEC Designation

Alternative 2 would not result in any impacts from ACEC designation since it does not include designation or management for ACECs.

10.2.4 Alternative 3

Habitat Designation and Management

Rangewide Environmental Consequences

Under Alternative 3, all HMAs would be managed as PHMA, over double the acreage of PHMA compared with Alternatives 1 and 2 (**Table 2-3**). Management actions for PHMA, such as lek buffers, required design features, fluid mineral leasing prioritization, and habitat objectives, would be more restrictive. Managing previously designated GHMA as PHMA would minimize potential impacts to GRSG. Expanding PHMA in some states to include areas of adjacent non-habitat, unoccupied historic habitat, or areas with potential to become habitat as PHMA would decrease potential for disturbance to birds and habitat alterations because management restrictions associated with PHMA would occur over a larger area.

There are no SFAs under this alternative, but their absence would likely not reduce protections to GRSG habitat rangewide. Although management actions for PHMA would be less restrictive than those for SFAs, management restrictions in PHMA under this alternative would be more restrictive than Alternatives 1 and 2 and applied to a greater overall area, designed to promote GRSG conservation and reduce potential impacts from land-use activities. Management restrictions would only be applied to development associated with valid existing rights as no new activities would be authorized.

Impacts from mitigation would be similar to Alternative 1 as BLM would require and ensure mitigation that achieves a net conservation gain in all HMA types. Compensatory mitigation would need to fully offset any residual effects on habitat function and value at the scale necessary to meet the RMP GRSG goals and objectives. These requirements reduce the potential for impacts from land use activities such as habitat loss

or alterations. Maintaining habitat function and value would help increase nesting success and brood survival, thereby contributing to the species' persistence.

BLM would apply a 3% cap for pre-existing authorizations or disturbances (including infrastructure, wildfire, and agriculture) at the project scale and within HAF fine scale habitat selection area (for all states except WY, which does not have fine scale HAFs) while honoring valid existing rights. The disturbance cap would not be applicable to new authorizations since all PHMA would be closed to new infrastructure projects. If disturbance from existing infrastructure developments exceeds 3% of habitat at the project scale or HAF fine scale area, new infrastructure associated with pre-existing authorizations would be deferred. The smaller size of most HAF fine-scale areas compared to BSU-scales might result in the cap being reached more quickly. This may prevent some development and associated impacts to GRSG. Fine scale HAFs represent an individual's home range and are determined in part by the quality and juxtaposition of resources within and between seasonal habitats, so reducing disturbance in these areas may help ensure that habitat function and quality remains to support seasonal movements. There would be no disturbance cap exceptions under this alternative, which may result in a lower level of disturbance overall. Including wildfire and agriculture as part of the overall disturbance cap would also result in a lower level of disturbance, particularly since wildfire was the cause of most of the habitat loss between 2012 and 2018 (Herren et al. 2021).

Currently, the percentage of disturbance in PHMA/IHMA within fine scale HAF boundaries is well below 3% and below 1% in most areas (BLM GIS 2023), yet population and habitat trends are still declining (Herren et al. 2021). Implementing a 3% disturbance may result in a continuation of these trends, but to a lesser extent than if the disturbance cap were higher (or non-existent). Habitat connectivity is important to maintaining gene flow and ensuring genetic diversity and distribution (Row et al. 2018), so limiting fragmentation by adhering to disturbance caps would help maintain population connectivity.

BLM would include an adaptive management strategy for habitat loss due to development under this alternative. Management is already restrictive, so additional management would be limited to proactive measures, which are dependent on budget and staffing.

Effects from habitat management and conservation would be similar to those described for Alternative 1. Alternative 3 would include additional objectives to maintain existing connectivity between GRSG populations. This would contribute to GRSG persistence and viability by continuing to facilitate gene flow and allowing for genetic variation (Row et al. 2018). Genetic variation and connectivity are necessary for GRSG resilience as described under the affected environment.

State-Specific Environmental Consequences

In Wyoming, BLM would apply a 3% cap (including infrastructure, wildfire, and agriculture) at the project scale and within neighborhood cluster boundaries. Clusters are used in place of fine scale HAF boundaries as HAF boundaries have not been delineated for Wyoming. Two of the Wyoming clusters (D-151 and D-147) are currently exceeding the 3% disturbance cap, and therefore, no more development could occur in these areas. Disturbance levels on the remaining 110 clusters are below 2% (BLM GIS 2023).

In Montana and the Dakotas, allowing treatments in PHMA to conserve, enhance or restore GRSG habitat and re-establishment of sagebrush cover and desirable understory plants would improve habitat quality and quantity, which would potentially contribute to GRSG persistence and viability. Lek buffers would apply to all surface disturbing activities associated with pre-existing authorizations and disturbances, and would therefore, reduce GRSG habitat loss and lek disturbance.

In NV/CA, lek-buffer protections included in 2015 and 2019 ARMPAs applies to all active or pending active leks regardless of HMA designation (see **Appendix 4** for lek definitions). This change is consistent with FLPMA (43 United States Code (USC) 1701 Sec. 201) and BLM Manual 6840 in that it provides protections for special status species. Impacts to discretionary surface-disturbing activities include an increase in area where GRSG surveys are conducted beyond PHMA and adoption of no surface disturbance buffers within potential project areas. This would benefit GRSG by applying protective buffers to leks which otherwise might not be applied until an updated HMA model is available.

In Idaho, lek buffers would be applied to active and pending active leks according to Idaho's lek definitions (see **Appendix 4** for lek status definitions by state) with distances the same as those described under Alternative 1 (see **Appendix 19**). Lek buffers would apply to all surface disturbing activities. Since all HMA would be treated as PHMA, and PHMA would be closed to new infrastructure projects, buffers may provide limited additional protection for GRSG since PHMA allocations are more restrictive and are larger than areas protected by buffers.

In UT, all habitat would be PHMA, including GHMA from Alternative 1. PHMA would include some areas of unoccupied habitat, historic habitat where birds have not been observed in 20 years or more or may have never occurred (e.g., habitat west of Sanpete Valley), areas of non-habitat (e.g., phase 3 pinyon-juniper, rock outcrops), and areas which are currently not habitat but could become habitat through significant restoration. Including these areas under the more restrictive management of Alternative 3 raises the concern that BLM would not use the least restrictive constraint to meet the resource protection objective in leasing restrictions for existing development rights. Under Alternative 3 in UT, all occupied leks are encompassed by PHMA.

Minerals Management

Closing PHMA to fluid mineral leasing, saleable minerals, and nonenergy minerals would reduce potential impacts to GRSG and habitat, such as disturbance and habitat alterations. Valid existing leases may be developed under this alternative. Impacts would be reduced to a greater extent than Alternatives 1 and 2 since areas closed to leasing could not be developed. Closing PHMA to mineral leasing and development would protect GRSG habitat from surface-disturbing activities and associated habitat fragmentation and maintain connectivity between leks. GRSG would not be exposed to disturbance associated with noise and human activity that accompanies construction, development, or production activities. Restrictions to development on BLM lands might push development onto private land, which could result in indirect impacts.

State-Specific Environmental Consequences

Impacts from managing coal in CO, MT/DK, UT and WY would be same as described for UT in Alternative 2. In UMRBNM in Montana, BLM land will not be disposed of other than by exchange, and only when necessary to further the protective purposes of the Monument. Protecting this area would also reduce impacts to GRSG and habitat by reducing surface disturbances associated with mineral resource management. In CO PHMA and within 4 miles of an active lek, impacts from applying siting criteria for fluid mineral development would be the same as those described for Alternative 1.

Lands and Realty Management

All PHMA would be excluded from new ROW authorizations. New linear ROWs would be allowed only in designated ROW corridors. This would decrease the potential for impacts associated with ROW development. The inability to site ROWs in PHMA could lead to longer ROW routes in order to bypass closed areas. Longer routes would increase surface disturbance and other impacts of ROW siting on GRSG

habitats outside of PHMA and may result in increased impacts on GRSG populations using habitat on adjacent state, tribal, or private lands.

Renewable Energy Management

PHMA in all states would be ROW exclusion areas for wind and solar energy development. Prohibiting wind energy development would eliminate the likelihood for habitat loss, degradation, fragmentation, and direct disturbance to birds in these areas. Alternative 3 would offer more protection from renewable energy development than under Alternatives 1 and 2 because more areas would be excluded from renewable energy development with no exceptions.

Livestock Grazing Management

Rangewide Environmental Consequences

All PHMA would be unavailable for domestic livestock grazing. Livestock would be removed from PHMA and impacts to GRSG and habitat associated with grazing, such as habitat alterations would be reduced. Removing livestock could lead to increases in herbaceous understories, which would increase forage availability and nesting habitat suitability for GRSG. Changes would depend on factors such as current conditions, climate, other land uses, etc. Removing livestock could also result in changes to the vegetation community composition, which could alter GRSG habitat suitability depending on the change.

Removing livestock from PHMA would reduce the potential for disease transmission assuming removal of man-made water sources to support livestock, such as water troughs, which may house vectors for diseases, such as West Nile virus (Naugle et al. 2004). Avian predators may be reduced if range improvements, including artificial water sources and fences, are also removed (Stevens et al. 2012; Manier et al. 2013, Coates et al. 2016). If livestock are removed on BLM, fences may be erected to fence out BLM lands from adjacent private grazing lands. If fencing increases in areas of mixed ownership, there would be increased potential for impacts such as injury or mortality from fence strikes and predation. removing livestock from BLM lands may also concentrate grazing on private lands, potentially leading to overgrazing and decreased GRSG habitat suitability where concentrated grazing occurs. There would be the possibility of increased wildfires without livestock to reduce fine fuels on a large portion of the landscape (see **Section 4.4**). If the potential for a large-scale wildfire were to increase, this could put large areas of GRSG habitat at risk of damage or loss.

State-Specific Environmental Consequences

In MT/DK, CHMA would be available for grazing. Impacts would occur in CHMA BLM would assess and modify as needed water features to reduce the risk of potential impacts from West Nile Virus or other disease outbreaks.

Impacts in key RNAs in Oregon would be the same as described for Alternative 1.

Wild Horse and Burro Management

Removing wild horses and burros in PHMA would increase total vegetation, grass abundance and cover, sagebrush canopy cover, species richness, and dominance of palatable forbs (Chambers et al. 2017). This would increase habitat quality for wildlife, including GRSG. Where range improvements, such as fences and water troughs are removed, it would decrease potential perch sites for avian predators and potential drowning hazards and/or potential for disease transmission. Gathers needed to remove wild horses and burros from herd management areas could disturb GRSG in the short term through human presence and noise. Additional fencing may be needed to keep wild horses off BLM-administered PHMA.

Predation Management

Under Alternative 3, the risk of predation may be reduced by reducing habitat disturbance, anthropogenic subsidies, and stopping or slowing the incursion of novel predators. Reduced predator numbers would help reduce predation levels and may increase GRSG persistence to a greater extent than Alternatives 1 and 2.

ACEC Designation

Under Alternative 3, all ACECs would be managed as PHMA. The management in ACECs under this alternative would be similar to management in PHMA, with the exception of ROW management and locatable minerals requirements. Managing ACECs as exclusion to ROWs both within and outside of designated corridors would expand protections to GRSG from ROW development compared to PHMA. Plans of operations for locatable mineral disturbances would reduce effects if measures were included to reduce disturbance to GRSG and habitat alterations.

10.2.5 Alternative 4

Habitat Designation and Management

Rangewide Environmental Consequences

Impacts from designating GRSG habitat as HMAs would be similar to those described for Alternative 1, although PHMA would increase by approximately 10% and GHMA would decrease by 1-2% (**Table 2-3**). Impacts from applying a 3% disturbance cap at the project scale and within HAF fine scale habitat selection area would be similar as to those described for Alternative 3, however, the cap would apply to both existing and proposed infrastructure authorizations (subject to valid existing rights). Wildfire and agriculture would not be included in the disturbance calculation, possibly resulting in more room for new authorizations and infrastructure projects. Since wildfire was the cause of the majority of habitat loss between 2012 and 2018 (Herren et al. 2021), the 3% cap would limit additional disturbance above habitat loss from wildfire.

Exceptions to the disturbance cap could allow for habitat fragmentation and an increased GRSG behavioral responses to the additional development. Habitat avoidance, changes in habitat use, and increased mortality risk from increased predators associated with developed areas, may have compounding adverse effects on GRSG populations. The exception would only be approved if site-specific NEPA analysis indicates that doing so will improve the condition of GRSG habitat in comparison to siting a project outside the designated corridor, so these effects are not anticipated. There would be no exceptions to the 3% PHMA (and IHMA) disturbance cap at the HAF fine scale habitat selection area, which would limit the overall level of disturbance at this scale.

BLM would include population-level adaptive management informed by the results of state wildlife management agency analysis and TAWS, a framework developed to inform anomalies in population trends (Coates et al. 2021). If one of these thresholds is tripped, it would allow management changes in response to population declines. Adaptive management could help slow or reverse negative trends that may reduce GRSG population persistence and viability. If more than 3% of GRSG habitat within a HAF fine scale habitat area is lost from non-anthropogenic (non-development) disturbances, a soft threshold would be met and future new infrastructure projects or permits would be deferred within these areas until habitat services (as indicated by sagebrush recovery) are restored. Inclusion of these non-anthropogenic losses will lessen future habitat declines from anthropogenic disturbances.

State-Specific Environmental Consequences

In Colorado, BLM would clarify the activity period for the leks being included in management allocations and decisions, increasing the amount of BLM-administered lands within buffer distances, and therefore, lands that

would be subject to more intensive management decisions for lek and habitat protection. Alternative 4 would also increase the acreage of GHMA in Colorado where NSO stipulations would be applied compared to Alternatives 1 and 2. The same acreage under major stipulation (NSO) in Alternative 4 would be under moderate stipulation (CSU). This would increase the area of GRSG habitat protected from surface disturbance.

CHMA in Montana and the Dakotas (**Table 2-31**) are areas of connectivity important to facilitate the movement of GRSG and maintain ecological processes, including between priority populations, adjacent states, and across international borders. Management in CHMA that leads to restrictions to land use and surface-disturbing activities would reduce the likelihood for habitat loss, fragmentation, and direct disturbance to GRSG. The restoration focus in RHMA would further improve GRSG habitat. Including more protective management in GHMA (such as ROW avoidance and utility scale solar and wind exclusion or avoidance in some areas) would make management more consistent with the state plan and reduce potential for GRSG impacts such as habitat alterations and disturbance.

In Idaho, lek buffer distances would be the same as under Alternative 1, but buffers would apply to 'active' and 'pending active' leks using the Idaho lek definitions (Cook et al. 2022; see **Appendix 4** for lek status definitions). Lek buffers would apply to a total of 1,254 leks (1,093 active; 161 pending active), where 76% of these leks are in PHMA, 19% of leks in IHMA and 4% of leks in GHMA. This change from Alternative 1 could increase the amount of BLM lands where lek buffers may apply but would depend on HMA type and buffer distance. For the largest buffer distance (3.1 miles), this could result in an increase of 14% of HMA with more restricted BLM management. Effects of this increase in acres of BLM lands where lek buffers may apply would be realized where allocations for resources are open or avoided in HMA, but not for those resources with closed or exclusion allocations in PHMA, such as wind or solar energy development, or nonenergy leasables or saleable minerals (**Table 2-4**).

In NV/CA, impacts from clarifying use of lek-buffer protections included in 2015 and 2019 ARMPAs applies to all active or pending active leks (see **Appendix 4**) regardless of HMA designation would be the same as described for Alternative 3. Of the 380 known occupied leks in Utah, 366 (96.3%) are in PHMA under Alternative 4. As a result, there would be no substantial effect of impacts on small populations in former GHMA.

Minerals Management

Rangewide Environmental Consequences

Leasing would be permitted in HMAs, which would increase the HMA acres affected and potential for impacts in most states. However, BLM would include management actions to minimize potential for conflict and associated impacts from subsequent development. BLM would also prioritize projects that avoid, minimize, reduce, rectify, and/or adequately mitigate direct and indirect impacts to PHMA/IHMAs, and include applicable and technical COAs. The 3% disturbance cap would apply at the fine scale HAF habitat selection area within PHMA/IHMA, which would help reduce overall disturbance and habitat impacts, including fragmentation. Applying an NSO stipulation within PHMA (except WY, see below), IHMA, and some RHMA would also decrease the potential for disturbance and habitat loss, alterations, and fragmentation. Reduced habitat fragmentation would help maintain habitat connectivity and population persistence and viability.

State-Specific Environmental Consequences

Expansion of the NSO stipulation to all PHMA in WY in an area that is already developed will only achieve the protections for new activities. Leks in PHMA would still be impacted by ongoing existing disturbances due to human presence. Greater protections would result where the NSO applies to leks not experiencing as much existing disturbance.

The oil and gas lease stipulations summarized in **Appendix 2** would be applied in MT/DK, limiting the potential for impacts associated with fluid mineral leasing. In all MT/DK HMAs management to refine, streamline, and make stipulations consistent would be applied. A CSU stipulation would be applied to all GHMA rather than just to a lek buffer. This would improve consistency among BLM offices and partner natural resource entities and provide clear and consistent direction to applicants and partners for cross-office boundary projects. Applying stipulations would reduce impacts to GRSG and habitat from fluid mineral resource management. Impacts from closing UMRBNM to mineral leasing and development would be the same as those described for Alternative 3.

In CO PHMA and GHMA, siting criteria would be applied to guide development of the lease or unit that would result in the fewest impacts to GRSG. The following criteria would apply: location of the proposed authorization was determined to be nonhabitat; topography/areas of non-habitat create an effective barrier to impacts; co-locating the proposed authorization with existing disturbance; and/or the proposed location would be an alternative to a similar action occurring on a nearby parcel. Applying these criteria would reduce the potential for impacts to GRSG. If the criteria do not apply but it can be demonstrated that the direct and indirect impacts of the proposed activity would be offset through compensatory mitigation, the authorized officer may consider permitting the action. Construction, drilling, and completion in CO PHMA or GHMA within 4 miles of an occupied lek during lekking, nesting, and early brood-rearing (March 1 to July 15) would be prohibited, but the TL may be adjusted based on application of the criteria described above.

In NV/CA PHMA, GHMA, and OHMA, management direction identifies six criteria used to grant exceptions to the allocation decisions (**Table 2-3**). The criteria narrow the use of mitigation to gain an exception to the allocation decisions. The changes are a benefit to GRSG by reducing consideration of surface disturbing projects that could remove GRSG habitat and/or disturb individuals, and a cost to proponent driven projects in that there would be fewer opportunities to gain exceptions.

All ID PHMA will be closed to new mineral materials development but continued use of existing pits would be allowed. New free use permits and expansion of existing pits may be allowed in certain circumstances and an exception would be possible for new free use permits in areas with existing anthropogenic disturbance. Impacts to GRSG would continue since the disturbance is already existing.

Lands and Realty Management

Rangewide Environmental Consequences

Impacts from managing PHMA in all states, ID IHMA, MT CHMA, and some MT RHMA as ROW avoidance areas would be similar to those described for Alternative 1. Where development cannot be avoided, breeding and nesting habitats, or in limiting/high value seasonal habitats would be avoided unless certain criteria are met. This would reduce the potential for impacts by precluding alteration to high value and seasonal habitats and disturbance to GRSG during important life history stages. Where major ROWs cannot be avoided, applying minimization measures (disturbance cap, seasonal constraints, tall structure limitations, RDFs, nest and perch deterrents, etc.) would also minimize potential for impacts. Residual direct and indirect

impacts would be offset through compensatory mitigation. The magnitude of impacts would not be expected to be of a level that would impact GRSG population and lek persistence or viability.

Managing GHMA as ROW avoidance areas within breeding, nesting habitats and other limited seasonal habitats would reduce the potential for impacts particularly by avoiding alteration to high value and seasonal habitats and disturbance to GRSG during important life history stages (breeding, migration). The potential for GRSG to be affected may vary in GHMA depending on the location and ability to relocate the ROW. Some areas, such as plains and prairies, may be more suitable for ROW development, whereas in may be less likely for ROWs to be sited in areas with mountainous or rugged topography.

Avoiding placement of ROWs within one-half mile of PHMA or IHMA would protect those areas from indirect impacts. Because all other areas would be managed as ROW open, impacts, such as habitat alteration and disturbance, could occur, however, compensation would be required.

State-Specific Environmental Consequences

Effects from applying an NSO stipulation within 0.6 miles of leks in PHMA in WY would have effects as described for Alternative 1.

In Colorado, a timing limitation would be expanded to include GHMA and added to leased areas as conditions of approval of the ROW; this would reduce impacts to GRSG and habitat.

In Idaho, lek buffers would be the same as under Alternative (**Appendix 19**). Lek buffers would protect leks from new disturbance and together with other restrictions in HMA, such as RDFs, Mitigation, Disturbance Cap, would serve to ensure responsible development.

Renewable Energy Management

Rangewide Environmental Consequences

Impacts from managing PHMA in all states and some MT RHMA as ROW exclusion areas for wind and solar energy development would be similar to those described for Alternative 3 (excludes IHMAs). Since PHMA would apply to a smaller area under this alternative, the extent of protection from disturbance associated with from renewable energy development would be less.

Managing GHMA as avoidance areas for wind and solar energy development in all states would decrease the potential for impacts associated with wind and/or solar development. Where avoidance is not possible, impacts to GRSG habitat would be minimized through measures such as avoiding surface use, occupancy, or placement of utility scale wind and solar facilities within one-half mile of PHMA, within one mile of active leks, and outside limited/high value seasonal habitats and movement corridors. Such measures would protect PHMA from indirect impacts; reduce potential for habitat alterations in breeding areas, migration corridors, and high value habitat; and minimize disturbance to breeding and migrating birds. Managing GHMA and MT CHMA as avoidance areas for wind and solar energy development would limit opportunities for development but reduce potential for GRSG disturbance and habitat alterations and fragmentation, in GHMA that are adjacent to PHMA.

State-Specific Environmental Consequences

Managing ID IHMAs as exclusion areas for wind and solar energy development within 3.1 miles from active leks and avoidance in the remainder of the IHMA would decrease the potential for impacts but to a lesser extent than if the entire IHMA were managed as an exclusion areas as there would be greater potential for development to occur outside of 3.1 miles from leks. Development outside of this buffer would likely not

disturb leks or alter lekking or nesting habitat. Infrastructure would be considered only if it would not impair habitat use by GRSG and will meet RMP GRSG goals and habitat objectives, so any alternations or disturbance would not impact lek or population persistence/ viability.

Surface use, occupancy, or placement of utility scale wind and solar facilities would be prohibited within one-half mile of PHMA, so adjacent PHMA would be protected from indirect impacts from development in IHMAs. This would limit opportunities for development but reduce potential for disturbance and habitat alterations adjacent to PHMA.

Livestock Grazing Management

Rangewide Environmental Consequences

The presence of GRSG HMAs would not affect whether an area is available for livestock grazing or change existing status of lands available or unavailable for livestock grazing, so impacts from domestic livestock grazing management would be similar to those described for Alternative 1. BLM would alter management objectives and actions to minimize, reduce, or correct for any impacts to GRSG and habitat, managing livestock grazing to meet or make progress toward meeting the GRSG habitat objectives. Adjustments to existing AUMs would be made based on site-specific conditions providing flexibility to adjust permits conditions to avoid or reduce impacts to GRSG or habitat. If land health assessment conditions are not met as indicated by an assessment specific to site capability, adjustments to grazing practices would be made to provide for suitable GRSG habitat at the HAF site scale. Range management improvements and existing infrastructure would be evaluated with respect to their effect on GRSG and GRSG habitat. This could help prevent impacts associated with grazing infrastructure such as increased predation and disease transmission (Coates et al. 2016). These management actions and objectives would help to minimize, reduce, or correct for GRSG disturbances and habitat alternations that could otherwise lead to impacts on population persistence and viability.

State-Specific Environmental Consequences

Impacts from permitting grazing in CHMA and from reducing the risk of potential impacts from West Nile Virus would be the same as described for Alternative 3. Impacts in key RNAs in Oregon would be the same as described for Alternative 1.

Wild Horse and Burro Management

Impacts from wild horse and burro management under Alternative 4 would be the same as described for Alternative 1.

Predation Management

Impacts from reducing opportunities for predators would be similar to those described for Alternative 1 with the exception that precluding new anthropogenic infrastructure new anthropogenic infrastructure would be avoided where possible. There would be a slightly greater potential for new infrastructure to occur, which could attract predators and increase predation on GRSG. Other measures to maintain predation at natural levels would be applied, so this is not expected to increase predation to a level that would influence lek or population persistence and viability.

ACEC Designation

Alternative 4 would not result in any impacts from ACEC designation since it does not include management for ACECs.

10.2.6 Alternatives 5 and 6

Habitat Designation and Management

Rangewide Environmental Consequences

Impacts from designating GRSG habitat as HMAs would be similar to those described for Alternative 1, though the BLM would manage approximately 7% more PHMA than Alternatives 1 and 2 and 10% fewer acres of GHMA (**Table 2-3**). Impacts from applying a 3% cap would be the same as described for Alternative 4, except in WY and MT (see State-Specific Environmental Consequences). Impacts from exceeding the 3% disturbance cap would be similar to those described for Alternative 4, but more exceptions would be allowed, which may result in increased development and disturbance to GRSG and habitat. Allowing a project to proceed before compensatory mitigation is in place would result in a time lag, during which GRSG habitat would be fragmented and reduced in carrying capacity by project impacts, so habitat and population trends may continue to decline to a greater extent compared to Alternative 4. Impacts from population and habitat adaptive management would be the same as described for Alternative 4.

State-Specific Environmental Consequences

Impacts from applying a 5% disturbance cap at the project scale in WY and MT would be similar to those described for Alternative 1. The 3% disturbance cap would still apply at the HAF fine scale habitat selection area, which may limit additional development reducing fragmentation of GRSG seasonal habitats and ensuring habitat function and quality remain to support seasonal movements. WY and MT would include wildfire and agriculture in the disturbance calculation, so the level of disturbance from other sources (energy development, roads, RPWs, etc.) would be relatively lower.

In Colorado, impacts from applying a 1-mile lek buffer as the minimum threshold would be the same as described for Alternative 1. These alternatives would allow for more flexibility in development while maintaining the BLM's ability to apply site-specific criteria for GRSG habitat protection. Alternative 6 also includes potential CSU stipulations to be applied in GHMA within 1 mile of PHMA. This would allow for increased flexibility while considering indirect effects that development in GHMA may have on PHMA.

Management in Wyoming SHMA would be consistent with GHMA restrictions, which would increase protections to GRSG and habitat.

Impacts from designating RHMA and CHMA in Montana and the Dakotas would be the same as described for Alternative 4. Including more protective management in GHMA (ROW avoidance within 1.2 miles of active leks and crucial winter range, and utility scale solar and wind exclusion or avoidance in some areas) would make management more consistent with the state plan and decrease potential for impacts such as habitat alterations and disturbance.

In Idaho, lek buffers would be similar as those under Alternative 2 and consistent with the 2021 Idaho Sage-grouse Plan (State of Idaho 2021). Buffers would apply to active and pending active leks (Cook et al. 2022; **Appendix 4**) resulting in a potential increase in the amount of BLM lands where lek buffers, similar to Alternative 4. Lek buffers would remain the same in PHMA, except for minor linear features where less PHMA would be protected (**Appendix 19**).

Compared to Alternative 2, buffer distances would increase in IHMA for major linear features and transmission line towers, resulting in more IHMA potentially protected from these disturbances (**Appendix 19**). Buffer distances would be decreased in IHMA for communication and meteorological towers in IHMA, and in GHMA for surface disturbances due to continuing human activities that alter or remove the natural

vegetation. These decreases in buffer distances would result in less IHMA and GHMA protected from these types of disturbances.

Compared to Alternatives 1, 3, and 4, Alternatives 5 and 6 would have reduced buffers in IHMA and GHMA (**Appendix 19**). Alternatives 5 and 6 would have buffer exception criteria, where BLM may approve actions within IHMA and GHMA if it is impracticable to locate the project outside of the buffer and impacts are avoided through project siting and design, to the extent reasonable. The reduced buffer distances in IHMA and GHMA would reduce restrictions while maintaining buffers for PHMA, and are in line with Idaho's three-tiered habitat approach. Since development and anthropogenic disturbance could occur closer to leks in IHMA and GHMA, some leks would be at higher risk of effects from development, such as avoidance behavior, reduced productivity, or decline in lek abundance. A more detailed analysis would occur during project-specific NEPA analysis.

In NV/CA, impacts from clarifying use of lek-buffer protections included in 2015 and 2019 ARMPAs applies to all active or pending active leks (see **Appendix 4** for lek definitions) regardless of HMA designation would be the same as described for Alternative 3.

In UT, Alternatives 5 and 6 would prioritize habitat management areas (PHMA and GHMA) that encompass 95.6% of the male GRSG counted on leks during 2023 surveys. This includes 2,740 (93.8%) males counted within PHMA, 54 (1.8%) counted in GHMA and 127 (4.3%) counted outside of any HMA. GHMA designations in Morgan-Summit, South Slope Uintah/Blue Bench, and Uintah Population Area (Deadman's Bench, East Bench, and Book Cliffs) would be removed, including any corresponding management actions. 90% of Utah's GRSG are supported by habitat in PHMA under these alternatives so there would be no substantial effect of accelerating impacts on the small populations in former GHMA.

Minerals Management

Rangewide Environmental Consequences

Impacts from mineral resource management would be similar as described for Alternative 4 with state-specific differences described below.

State-Specific Environmental Consequences

The oil and gas lease stipulations summarized in **Appendix 2** would be applied in MT/DK, limiting the potential for impacts associated with fluid mineral leasing. Applying a 5% disturbance cap at the project scale in MT and WY, and 3% disturbance cap at the HAF fine scale area could allow for more potential mineral development, which could increase disturbance and habitat alterations, including fragmentation (see **Table 2-3**). Allocations in PHMA in WY differ between Alternative 4 and Alternative 5.

Impacts from consistency in stipulations in MT/DK HMAs and from closing UMRBNM to mineral leasing and development would be similar to those described for Alternative 3.

Impacts from applying siting criteria for development in CO PHMA and GHMA would be similar to those described under Alternative 4. To grant an activity based on compensatory mitigation, the compensation project must be planned, funded, and approved in coordination with the State of Colorado.

In NV/CA, impacts from identifying criteria for granting exceptions to allocation decisions would be the same as described for Alternative 4.

Impacts from closing ID PHMA to new mineral materials development but allowing continued use of existing pits would be the same as described for Alternative 4. Impacts from reduced lek buffers in IHMA and GHMA

would provide for additional opportunities for mineral resource management, specifically saleable minerals and nonenergy leasables.

Lands and Realty Management

Rangewide Environmental Consequences

Impacts from managing PHMA in all states, ID IHMA, MT CHMA and some MT RHMA as ROW avoidance areas and applying minimization measures where major ROWs cannot be avoided would be similar to those described for Alternative 4. Micro-siting to avoid placement near leks or in connectivity corridors to avoid dividing breeding habitat from adjacent nesting or other seasonal habitats would reduce potential for alteration to high value and seasonal habitats and disturbance to GRSG during important life history stages (e.g., breeding, migration). Major ROWs that are located inside RMP designated ROW corridors would not need to comply with disturbance cap or compensatory mitigation requirements, so habitat alteration and disturbance could occur where these corridors overlap PHMA.

Managing GHMA in all states and WY SHMA as ROW open with minimization measures and compensation, to maintain habitat supporting GRSG populations consistent with state agency habitat designations and to preclude negative impacts to any adjacent PHMA habitats would reduce the potential for impacts. Reduction of impacts would be to a lesser extent than if managed as avoidance areas.

State-Specific Environmental Consequences

In Colorado, impacts from expanding a timing limitation to include GHMA for conditions of approval of the ROW would be the same as described for Alternative 4.

In Idaho, lek buffers would be similar as those under Alternative 2 and consistent with the 2021 Idaho Sage-grouse Plan (State of Idaho 2021). Lek buffers would be reduced in IHMA and further reduced in GHMA. Effects would be similar to those described under Minerals Resource Management under Alternatives 5 and 6. These effects would be analyzed in detail during the project-level NEPA analysis.

Renewable Energy Management

Rangewide Environmental Consequences

Classifying PHMA and IHMA as avoidance areas for wind and solar energy development but exclusion in breeding/nesting habitat and limited seasonal habitat would decrease the potential for impacts but to a lesser extent than if all HMA were exclusion areas. Solar and wind development would be considered on a case-by-case basis in avoidance areas. Development would not be allowed in breeding and nesting habitats, or in limited/high value seasonal habitats unless certain criteria are met (refer to **Table 2-10**), so the magnitude of impacts, such as disturbance and habitat alterations, would not be expected to be of a level that would influence lek or population persistence/ viability.

Managing GHMA and WY SHMA as open to wind and solar energy development would result in potential impacts. The inclusion of minimization measures and compensation to maintain habitat supporting GRSG populations consistent with state agency habitat designations (e.g., restoration, connectivity, seasonal, or other), and to preclude negative impacts to any adjacent PHMA habitats would reduce the potential for those impacts in high value and seasonal habitats.

State-Specific Environmental Consequences

In Idaho, PHMA and IHMA would be avoidance areas for utility scale wind and solar energy development (including met towers). Development would not be allowed in breeding and nesting habitats, or in limited/high value seasonal habitats unless one of the criteria below is met. Development would not be

allowed within breeding and nesting habitat inside lek buffers (**Appendix 3**), but breeding and nesting habitat outside of lek buffers would be avoidance areas.

Differences in effects between Alternatives 4, 5, and 6 are described under Greater Sage-grouse, Habitat Designation and Management and Minerals Resource Management, State-specific Circumstances, Alternatives 5 and 6 above. With the increased interest in renewable energy development including utility scale wind and solar energy development in Idaho, there may be increased impacts to GRSG leks in PHMA, IHMA and GHMA under Alternatives 5 and 6. Reduced lek buffers in IHMA and GHMA and a possible buffer exception could result in possible lek abandonment, avoidance behavior, or reduced productivity due to increased anthropogenic disturbance around a lek. The extent of impacts would depend on a variety of factors, including habitat type and condition, proximity to other leks, unique seasonal habitats, or connectivity, etc. Energy development would likely be limited by proximity to transmission line corridors and substations and would not extend to all PHMA, IHMA or GHMA. Leks in IHMA and GHMA would be at higher risk from effects from energy development due to the reduced buffers and buffer exception under Alternatives 5 and 6 than under Alternative 4.

Livestock Grazing Management

Rangewide Environmental Consequences

Impacts from livestock grazing management under Alternatives 5 and 6 would be the same as described for Alternative 4.

State-Specific Environmental Consequences

In Montana and Dakotas impacts from permitting grazing in CHMA and from reducing the risk of potential impacts from West Nile Virus would be the same as described for Alternative 3.

In Oregon, the 15 key RNAs in Oregon would be retained under Alternatives 5 and 6. Their associated areas allocated as unavailable to grazing are proposed to be retained, modified, or re-allocated to grazing based on district-generated, site-specific updated information since the 2015 ARMPA. The key RNAs would be required to meet land health standards and other applicable BLM regulations and policies and would remain subject to management, including regulation of grazing and invasive plant removal. The amount of land within key RNAs that would be made available to grazing is small relative to the size of the species' range and any impacts of livestock grazing on GRSG populations using these areas would likely be minimal and undetectable.

Although key RNA boundaries are not being modified (with the exception of data updates and clarifications), district site visits and analysis since the 2015 ARMPA have found vegetative communities that would not be consistent with why key RNA designations for sage-grouse habitats were made. They include mountain mahogany vegetation communities (Dry Creek Bench, Mahogany Ridge, Fish Creek Rim, and Spring Mountain Key RNAs) and the old-growth juniper (Black Canyon Key RNA) vegetation community.

Wild Horse and Burro Management

Impacts from wild horse and burro management under Alternatives 5 and 6 would be similar to those described for Alternative 1. Management within established AML could reduce impacts from wild horses and burros on GRSG in some areas.

Predation Management

Impacts from objectives to reduce opportunities for predators under Alternatives 5 and 6 would be the same as described for Alternative 4. That is, impacts from reducing opportunities for predators would be

similar to those described for Alternative 1 with the exception that precluding new anthropogenic infrastructure would be avoided where possible. There would be a slightly greater potential for new infrastructure to occur, which could attract predators and increase predation on GRSG. Other measures to maintain predation at natural levels would be applied, so this is not expected to increase predation to a level that would influence lek or population persistence and viability.

ACEC Designation

Alternative 5 would not result in any impacts from ACEC designation since it does not include management for ACECs.

Under Alternative 6, impacts would be as described for Alternative 5 except within ACECs as described below.

Impacts from mineral development could occur. Plans of operations for locatable mineral disturbances would reduce effects if measures were included to reduce disturbance to GRSG and habitat alterations.

Managing ACECs as open to fluid mineral leasing subject to NSO stipulations would decrease the HMA acres subject to effects from fluid mineral development. The NSO stipulation could protect these acres from surface-disturbing activities. Limiting surface disturbance would ensure that connectivity between leks would be preserved and not contribute to fragmentation. Including an exception/modification to allow occupancy if there are drainage concerns from adjacent development and if no direct or indirect impacts can be demonstrated is not expected to result in additional impacts.

Managing ACECs as closed to new or expansion of nonenergy minerals associated with existing operations (fringe leases) would reduce potential impacts to GRSG and habitat, such as disturbance and habitat alterations. Managing ACECs as closed to new saleable mineral/mineral material operations for all sale types except for free-use pits would reduce potential impacts to GRSG and habitat but to a lesser extent than if free use pits were also prohibited.

Managing ACECs as exclusion areas for major ROWs and avoidance areas for minor ROWs would reduce potential impacts to GRSG and habitat, such as disturbance, habitat alterations, and increased potential for predation. Managing ACECs as ROW exclusion areas for wind and solar energy development would eliminate the likelihood for GRSG impacts including habitat loss, degradation, fragmentation, and direct disturbance to birds in these areas.

10.3 VEGETATION

10.3.1 Methods and Assumptions

Methodology

Impacts on vegetation would primarily result from management actions described in **Chapter 2** that result in vegetation removal, fragmentation, or other alteration. The types of actions that can result in these impacts are discussed in more detail in **Section 4.3.1**, Nature and Type of Effects. For management actions not specifically described below, the effects would remain as described in the 2015 and/or 2019 plans.

Indicators

Indicators of impacts on vegetation are as follows:

Upland and Riparian Vegetation

- Acres and condition of vegetation communities
- Extent of sagebrush or riparian vegetation fragmentation

Noxious Weeds and Invasive Species

- Likelihood for noxious weed or invasive species introduction or spread
- Likelihood for conifer encroachment

Assumptions

This analysis includes the following assumptions:

- All plant communities would be managed toward achieving a diverse native species composition, cover, and age classes across the landscape.
- The degree of impact attributed to any one disturbance or series of disturbances would be influenced by several factors, including location in the watershed; the type, time, and degree of disturbance; existing vegetation; precipitation; and mitigating actions applied to the disturbance.
- Noxious and invasive weeds would continue to be introduced and spread because of ongoing vehicle traffic in and out of the planning area, recreational activities, wildland fire, wildlife and livestock grazing and movements, and surface-disturbing activities.
- Activities that would disturb soils could cause erosion, loss of topsoil, and soil compaction, which could affect the ability of vegetation to regenerate. Further, surface-disturbing activities could increase dust, which could cover existing vegetation and impair plant photosynthesis and respiration. Resulting impacts could include lowered plant vigor and growth rate, altered or disrupted pollination, and increased susceptibility to disease. These impacts may be reversed by wind or precipitation, which can remove dust from vegetation.
- Ecological health and ecosystem functioning depend on a number of factors, including to but not limited to vegetative cover, species diversity, nutrient cycling and availability, water infiltration and availability, and percent cover of weeds.
- Climatic fluctuation would continue to influence the health and productivity of plant communities on an annual basis.

10.3.2 Alternative 1

Greater Sage-Grouse Management

Rangewide Environmental Consequences

Under Alternative 1 restrictions on land use and surface-disturbing activities would occur within each HMA and SFA (**Table 2-3**) and would limit impacts to vegetation as described under *Nature and Type of Effects*. More restrictive management within SFAs emphasizes protection of GRSG in these areas and would provide the highest level of protection to vegetation. In general, restrictions on land use and surface-disturbing activities in HMA and SFAs would reduce the likelihood of vegetation loss, sagebrush or riparian vegetation fragmentation, and introduction and spread of invasive weeds.

Structural changes to sagebrush shrublands have caused an increase in encroachment of pinyon pine, juniper, and noxious weeds that are replacing native plant communities. Fire suppression, a major contributor to this expansion, has allowed these tree species to encroach more extensively into sagebrush habitats. Treatments designed to prevent encroachment of trees and nonnative species vary across the range and would alter the condition of native vegetation communities by changing the density, composition, and frequency of species within plant communities. Fuels treatments, where allowed, would result in either more open-forested conditions, which would improve the habitat for species selecting these habitats, or decreased encroachment of juniper and pinyon species, which would improve habitats for GRSG and other sagebrush-dependent

species. Habitat connectivity for GRSG could be increased over the planning time frame through vegetation manipulation designed to restore vegetation, particularly sagebrush overstory cover.

Alternative 1 would also incorporate an adaptive management strategy composed of soft and hard thresholds based on population and habitat changes. See **Section 4.2.2** for a detailed description of thresholds. In general, an adaptive management strategy would help to ensure that actions are taken to limit impacts to vegetation in an appropriate time frame to offset impacts.

Under Alternative 1, all states would include language to maintain and enhance sagebrush habitats with the intent of conserving GRSG populations. Habitat objectives would be considered when authorizing activities in GRSG habitat. The exact language varies by state, but in general, inclusion of specific habitat objectives would result in improved vegetation conditions. Following these objectives could prevent rangeland not meeting range health standards that degrade vegetation communities, reduce conifer encroachment, and reduce the introduction and spread of invasive weeds.

State-Specific Environmental Consequences

In MT and WY, a 5% disturbance cap would apply to land use activities, including wildfire and agriculture, at the project area scale in PHMA. States with higher disturbance caps could see greater levels of disturbance within a project area, and therefore greater potential for impacts to vegetation as described *under Nature and Types of Effects*. WY has no required mitigation in GHMA potentially increasing impacts to vegetation.

In CO, ID, NV/CA, OR, UT, and the Dakotas, a 3% disturbance cap would apply to land use activities (except wildfire and agriculture) at both BSU-scale and at proposed project analysis area within PHMA. In ID, the same cap would apply but it could be exceeded in utility corridors if it benefits GRSG. Calculating disturbance at the project-level means that the amount of disturbance allowed could not exceed 3% of the site-specific project area; this may prevent some development that could occur if disturbance is only calculated at a coarser scale. In addition to calculating disturbance at the project-level, disturbance would also be calculated for each BSU. Including caps at both project and BSU scales would reduce the likelihood for sagebrush or riparian vegetation removal, degradation, or fragmentation, and improve the acreage and condition of sagebrush vegetation on both the local and landscape scales.

Although all states would include an adaptive management strategy, the metrics, thresholds, timeframes, and spatial scales for evaluating and responding to thresholds would vary state by state. As a result, there would be no consistency in how thresholds are calculated across the range and responses may not be implemented across an area that encompasses an entire population group and/or seasonal habitats needed throughout the year. If management changes do not apply to all populations and habitats being affected, some vegetation communities may improve while others remain impacted.

Minerals Management

Rangewide Environmental Consequences

Leasing of fluid minerals would be allowed in PHMA and IHMA subject to NSO stipulations and/or seasonal restrictions. In general, NSO stipulations on new leases would protect vegetation in PHMA from surface-disturbing activities and would not contribute to fragmentation. Restrictions on mineral development within PHMA and GHMA as described in the 2015 EISs for CA, CO, ID, MO/DK, NV/CA, OR, UT, and WY (BLM 2015a-2015h) would reduce potential impacts to vegetation such as vegetation removal and increased weed spread as described under *Nature and Types of Effects*.

State-Specific Environmental Consequences

In WY, management of PHMA as NSO within 0.6 miles of leks would protect vegetation in these areas, though to a lesser extent than elsewhere rangewide where all PHMA would be NSO. In WY and MT PHMA fluid mineral development in areas that are already leased (and thus are exempt from NSO stipulations) would also be subject to density and disturbance limits. In CO, OR, WY, and UT NSO stipulations within lek buffers (buffer distance varies by state) in GHMA would provide increased protection to vegetation in these areas. PHMA and GHMA in CO and GHMA in OR would be closed to fluid mineral development within 1 mile of leks which would also provide increased protections to vegetation and limit impacts from surface disturbance in these areas. However, development of fluid mineral resources in GHMA would still result in the localized direct loss and fragmentation of vegetation from current use areas outside of the applicable lek buffers. The general effects of mineral development on vegetation are discussed in *Nature and Types of Effects*.

Impacts of development outside buffer areas could be offset by mitigation because operators would be required to mitigate impacts until there is a net conservation gain. However, mitigation may be conducted off-site if it would provide greater benefit to GRSG, potentially resulting in unmitigated impacts on vegetation in GHMA.

Prioritizing leasing outside of PHMA and GHMA within CO, ID, ND, NV/CA, OR, UT, WY, and parts of MT/DK (Billings, HiLine, Miles City, ND, SD) would reduce the potential for impacts to vegetation associated with fluid mineral development as described under *Nature and Type of Effects* in these areas. There would be no similar objective in the Lewistown or Butte Field Offices, and therefore, potential for impacts would be greater. In WY and MT, saleable mineral and nonenergy mineral development in PHMA would also be subject to density and disturbance limits which would also reduce potential impacts to vegetation, but to a lesser extent than if they were completely closed to development. In Idaho, IHMA would be open to nonenergy mineral development in Known Phosphate Lease Areas; therefore, similar impacts (e.g., direct vegetation loss, surface disturbance, and erosion) could occur in areas open to development.

Lands and Realty Management

Rangewide Environmental Consequences

Under Alternative 1, PHMA in all states and ID IHMA would be identified as ROW avoidance areas to allow for management flexibility (except for minor ROWs in WY, as described under state analysis). PHMA would be exclusion areas for wind and solar development (with some differences between states, see state-specific analysis). Classifying PHMA as exclusion or avoidance areas would decrease the potential for impacts associated with ROW development, such as disturbance and increased potential for weed spread, as described *in Nature and Types of Effects*. GHMA in all states would be open to minor ROWs with mitigation measures (except for in WY where mitigation is not required). Impacts associated with ROW development, such as surface disturbance and increased potential for weed spread, could occur in these areas if developed, but mitigation measures would help to offset the impacts.

New ROWs in PHMA would not be allowed except in accordance with the Anthropogenic Disturbance Screening Criteria outlined in the Proposed RMP Amendment. In IHMA new ROWs could be considered if in accordance with the IHMA Anthropogenic Disturbance Development Criteria. The BLM would collocate new ROWs with existing infrastructure when possible. Alternative 1 would apply a buffer from disturbance around leks in PHMA, IHMA and GHMA, depending on the type of disturbance and based on the latest science (Manier et al. 2014) which would protect vegetation in the buffer. Existing ROW corridors are preferred for collocation of new ROWs but could not be widened more than 50% greater than the original

footprint. These measures would protect vegetation from fragmentation and other impacts as described in *Nature and Types of Effects*.

State-Specific Environmental Consequences

PHMA in WY would be open to minor ROWs with buffers and mitigation. Buffers and mitigation would help offset the impacts, but to a lesser extent than ROW exclusion/avoidance. GHMA in WY would be open to minor ROWs and no mitigation measures would be required which would increase the potential for impacts associated in these areas.

Classifying GHMA in CO, NV/CA, and OR as avoidance areas for major ROWs would continue to reduce the potential for impacts associated with ROW development as described *in Nature and Types of Effects*. Opening UT and ID GHMA to major ROWs with minimization measures would increase the potential for impacts, but mitigation measures would help to offset the impacts. Opening GHMA in WY to major ROWs would also increase the potential for impacts, and there would be no mitigation measures to offset the impacts.

Livestock Grazing Management

Under Alternative 1, PHMA and GHMA in all states and ID IHMA would be available for domestic livestock grazing. Therefore, impacts to vegetation from grazing such as increased weed spread as described under *Nature and Types of Effects*, could occur in these areas. The BLM would prioritize SFAs and PHMA outside of SFAs for additional livestock grazing management. This would include the option to adjust permit terms and conditions as needed to meet land health standards and GRSG habitat objectives.

Wild Horse and Burro Management

The BLM within all states where wild horses and burros overlap with GRSG habitat would need to manage populations within established AML, incorporating GRSG habitat objectives into wild horse and burros management. Monitoring wild horses and burros would gather prioritization information for GRSG habitat activities within SFAs, PHMA, IHMA (ID) and GHMA. Under Alternative 1, evaluation of land health assessments in wild horse HMA could identify vegetation conditions that would determine prioritization of areas to reduce wild horse numbers and the associated impacts on vegetation. Disturbances that are found in *Nature and Types of Effects* would have similar grazing impacts and may increase noxious weeds and invasive species presence, while also promoting conifer encroachment. Removing wild horses and burros in those PHMA with existing herd management areas in all states would increase total vegetation, grass abundance and cover, and sagebrush canopy cover, species richness, and dominance of palatable forbs (Manier et al. 2013; Chambers et al. 2017).

Hard thresholds (see **Appendix 2**) represent a trigger indicating that immediate action is necessary to stop a severe deviation from GRSG conservation objectives set forth in the BLM plans. Adaptive management strategies and the potential for changes in management would be consistent between all states and would benefit GRSG habitat, especially in wild horse and burro areas. However, there is no consistency in the specific thresholds between states or the strategies associated with responding to those thresholds. The metrics, thresholds, and timeframes and spatial scales vary state by state, as does the level of detail that explains each of these. Similarly, the responses associated with adaptive management thresholds vary by state, with some prescribing specific actions and others identifying teams to develop a response.

10.3.3 Alternative 2

Greater Sage-Grouse Management

Rangewide Environmental Consequences

Areas managed as HMAs would vary slightly from Alternative 1 (**Table 2-3**). Rangewide effects to vegetation from GRSG habitat management and conifer encroachment treatment under Alternative 2, would be the same as those described for Alternative 1.

State-Specific Environmental Consequences

Removing SFAs in UT, WY, NV, and ID would reduce protections to vegetation by removing restrictions on land use and surface-disturbing activities in those areas. However, previous management area classifications (e.g., PHMA) would remain, but protections may be lower than what is required in SFAs. Protections afforded to vegetation from restrictions to land use and surface-disturbing activities would continue in SFAs in MT and OR, where the habitat classification would be retained; impacts would be as described under Alternative 1.

Under Alternative 2, the GHMA designation in UT would be removed with all its corresponding management actions. This would likely incentivize development in areas formally identified as GHMA, and could lead to vegetation loss, sagebrush or riparian vegetation fragmentation, and increased weed spread.

Requirements for mitigation that achieves a net conservation gain in all HMA types would apply in MT/DK, NV/CA, and OR, and impacts would be the same as described for Alternative 1. CO and ID would enforce mitigation resulting in no net loss in HMA. This would help offset impacts associated with land use activities, as described under *Nature and Types of Effects*, but to a lesser extent than Alternative 1, in which a net conservation gain would be required. In UT and WY, the net conservation gain requirement would be removed, which would increase potential for impacts.

Although the BLM would not require compensatory mitigation in HMA, it would enforce state mitigation policies and programs. In CO, ID, NV/CA, OR, UT, and WY HMA, compensatory mitigation would be voluntary unless required by laws other than FLPMA or by the State. As a result, the potential for impacts from land use activities, as described under *Nature and Types of Effects*, would increase relative to Alternative 1, in which a net conservation gain would be required.

Impacts from applying a 3% (CO, ID, NV/CA, OR, UT, and Dakotas) or 5% (MT and WY) disturbance cap in PHMA would be similar to those described for Alternative 1. However, in UT and ID the cap could be exceeded if it would benefit GRSG. The cap would be applied at the BSU and project scale, except in ID which would only apply it at the BSU scale. Consequently, some additional development could occur in ID, which may increase potential for impacts to vegetation compared to Alternative 1.

Impacts of including an adaptive management strategy would be similar to those described for Alternative 1. However, some states would include the addition of "un-triggers", meaning that the management change implemented to reverse a threshold could be revoked and the original management would be reimplemented once the issue is resolved. Reverting to the original management that resulted in the threshold being met would likely lead to impacts to vegetation that could cause the threshold to be met again.

Minerals Management

Rangewide Environmental Consequences

Impacts from mineral development would generally be the same as described for Alternative 1 except for slight differences among the states (see state-specific analyses). Removing the recommendation for locatable

mineral withdrawal in SFAs in all states (except in MT/DK, which did not have a 2019 amendment) would have no on the ground impact. The Secretary proposes and makes withdrawals according to a separate process pursuant to section 204 of FLPMA not through the BLM land use planning.

State-Specific Environmental Consequences

Removing the CO PHMA closure to fluid mineral development would increase potential for disturbance and vegetation loss or degradation. This is because mineral development activities could occur in previously closed areas and cause impacts as described under *Nature and Types of Effects*. Changing GHMA from closed to fluid mineral development to NSO would likely not change impacts to vegetation because the NSO stipulation would avoid potential for disturbance and associated impacts due to surface-disturbing activities.

Impacts from prioritizing fluid mineral leasing outside of HMA in CO, ID, OR, and MT/DK offices would result in the same impacts as described under Alternative 1. Removing the objective in UT, NV/CA would increase the potential for impacts because land in PHMA and GHMA could be leased. In WY, fluid mineral leasing would be allowed in PHMA, which would increase the potential for impacts. However, if the BLM has a backlog of Expressions of Interest for leasing, the BLM would prioritize work first in non-habitat followed by lower habitat management areas (e.g., GHMA). For fluid mineral development on existing leases that could adversely affect GRSG populations or habitat, the BLM would work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts consistent with lessees' rights.

Adding an exception criterion to saleable and nonenergy mineral closures for NV/CA PHMA with free use permits and allowing consideration of new free use permits for saleable minerals in ID IHMA would increase the chance for activities to occur in these areas and thus the potential for associated impacts as described in *Nature and Types of Effects* would be greater.

Lands and Realty Management

Rangewide Environmental Consequences

Impacts from ROW management would be the same as described for Alternative 1 (with additional exception criteria in NV/CA, see state-specific analysis).

State-Specific Environmental Consequences

There would be additional exception criteria for ROW development in NV/CA PHMA and for wind development in NV/CA GHMA. This could increase the potential for impacts associated with ROW and renewable energy development because there would be a higher chance of development.

Livestock Grazing Management

Impacts from domestic livestock grazing management would generally be the same as described for Alternative 1, with differences across states as described below.

State-Specific Environmental Consequences

Removing SFAs in UT, WY, NV, and ID would remove the prioritization for review and processing of grazing permits in these areas. However, the BLM would still have the authority to prioritize staff time and budget to identify areas that aren't meeting land health standards and implement corrective actions in areas with the greatest GRSG habitat value.

Adding clarification of habitat objectives to land health standards in WY, ID, and NV and clarifications on grazing in riparian areas and management of range improvements in WY may, in some cases, help move vegetation toward desired conditions.

In OR, livestock grazing in the 13 key RNAs would be returned to language that pre-dated the 2015 amendments. Because this language would not specifically address habitat objectives for GRSG, these habitat objectives may not be met, and potential for impacts to vegetation and overall vegetation degradation would increase relative to Alternative 1.

Wild Horse and Burro Management

Impacts from wild horse and burro management in Alternative 2 would be the same as Alternative 1, except for the removal of references to SFAs for the states that removed them, and removal of the reference to GHMA in UT, which removed that HMA type under this alternative. This would potentially lead to disturbances in extensive portions of the PHMA, IHMA, and GHMA that aren't required to protect SFAs. Disturbances to these areas, see *Nature and Types of Effects*, would increase the likelihood of native vegetation degradation and fragmentation for GRSG habitat with an increase in bare ground soils that would potentially increase noxious weeds and invasive species establishment and conifer encroachment.

10.3.4 Alternative 3

Greater Sage-Grouse Management

Under Alternative 3, the BLM would manage the largest acreage of HMAs, all as PHMA (**Table 2-3**). In addition, the BLM would manage ACECs for GRSG. Conifer encroachment impacts and treatments for Alternative 3 would be the same as those described for Alternative 1. Management actions for PHMA would be more restrictive and designed to promote GRSG conservation to a greater extent in areas previously designated as GHMA. Therefore, managing previously designated GHMA as PHMA would minimize potential impacts to vegetation to a greater extent than if they remained managed as GHMA. Expanding PHMA in some states to include areas of adjacent non-habitat, unoccupied historic habitat, or areas with potential to become habitat as PHMA would also increase protections for and minimize impacts to vegetation.

Classifying previously designated SFAs as PHMA would likely not reduce protections to vegetation rangewide. This is because although management actions for PHMA would be less restrictive than those for SFAs under other alternatives, the management restrictions in PHMA under this alternative would be more restrictive than Alternatives 1 and 2 (e.g., PHMA would be closed to fluid, saleable, and nonenergy minerals) and applied to a greater overall area.

Impacts from mitigation would be similar to those described for Alternative 1, as the BLM would require and ensure mitigation that achieves a net conservation gain in all HMA types. An emphasis would be placed on avoiding impacts, which would reduce potential for effects. Additionally, compensatory mitigation would need to fully offset any residual effects on habitat function and value and at the scale necessary to meet the RMP GRSG goals and objectives. These requirements would reduce the potential for impacts from land use activities, such as direct vegetation loss and sagebrush or riparian vegetation fragmentation.

The BLM would apply a 3% cap for new and pre-existing authorizations for infrastructure, wildfire, and agriculture (subject to valid existing rights) at the project scale and within HAF fine scale habitat selection area while honoring valid existing rights. Calculating disturbance at the project scale and HAF fine scale habitat selection area may prevent some development, and therefore reduce impacts to vegetation. Because fine scale HAFs typically represent a local population's home range and are determined in part by the quality and juxtaposition of resources within and between seasonal habitats, reducing disturbance in these areas may help to reduce sagebrush or riparian vegetation fragmentation and impacts to vegetation from surface disturbance.

Effects to vegetation from habitat management and conservation would be similar to those described for Alternative 1, however, Alternative 3 would include additional objectives to maintain existing connectivity between GRSG populations. Maintaining connectivity would reduce the potential for increased sagebrush or riparian vegetation fragmentation. Adaptive management would more accurately reflect GRSG habitat conditions and strive to better manage vegetation to support GRSG.

Minerals Management

Closing PHMA in all states to fluid mineral leasing, saleable minerals, and nonenergy minerals would reduce the potential for impacts to vegetation, such as direct vegetation loss, increased fragmentation, and increased weed spread as described under the *Nature and Types of Effects*. Impacts would be reduced to a greater extent than Alternatives 1 and 2 because areas closed to leasing could not be developed at any point.

Recommending PHMA for withdrawal from location and entry under the United States mining laws would have no impact. However, if the BLM were to apply for a withdrawal pursuant to section 204 of FLPMA and the Secretary were to accept the application, the BLM could initiate the process to withdraw PHMA. A withdrawal would reduce potential impacts to vegetation associated with locatable mineral development as described under *Nature and Types of Effects* since surface disturbance associated with location and entry would be less likely to occur in withdrawn areas.

Lands and Realty Management

Under Alternative 3, all PHMA would be excluded from new ROW authorizations. New linear ROWs would be allowed only in designated ROW corridors. These restrictions would decrease the potential for impacts to vegetation in PHMA to a greater extent than under Alternatives 1 and 2. However, the inability to site ROWs in PHMA could lead to longer ROW routes in order to bypass closed areas which would in turn increase surface disturbance overall and other impacts of ROW siting on vegetation outside of PHMA.

Livestock Grazing Management

Under Alternative 3, all PHMA would be unavailable for domestic livestock grazing. As a result, livestock would be removed from PHMA and impacts to vegetation associated with livestock grazing, as described under *Nature and Types of Effects* would not occur. Alternative 3 would reduce the likelihood for spread of weeds, would allow for native understory perennial plant recovery, and would increase herbaceous vegetation cover (Strand and Launchbaugh 2014). Not utilizing livestock as a tool available for implementing fuels management treatments or invasive species control in sagebrush habitat areas could make PHMA more susceptible to a large-scale wildfire that would decrease native vegetation and increase the potential for noxious weed and invasive species growth in sagebrush vegetation communities within PHMA. Increased risk of wildfire would decrease protection of sagebrush habitats and may require repeated post-fire rehabilitation treatments to recover habitat function and continuity.

Wild Horse and Burro Management

Under Alternative 3, no wild horse and burro herd management areas would be designated in PHMA and wild horses and burros would be removed in areas where there are currently herd management areas. This could potentially increase protections for native plant communities within PHMA and decrease the potential for introduction and spread of noxious weeds and invasive species. Reducing ground disturbances to the herd management areas in PHMA would improve GRSG habitat and would assist in reducing the potential for conifer encroachment opportunities from compacted and bare soils.

10.3.5 Alternative 4

Greater Sage-Grouse Management

Under Alternative 4, more PHMA and less GHMA would be managed than Alternatives 1 and 2 (**Table 2-3**). Restrictions within HMAs would improve GRSG habitat by increasing acres and conditions of vegetation communities, connect sagebrush or riparian vegetation fragmented areas, mitigate noxious weed or invasive species introduction and spread, and decrease conifer encroachment. HMA protections would be expanded to new areas based on updated science.

The disturbance cap would be applicable to new authorizations under Alternative 4. Disturbance cap calculations would also be specific to activities that would remove vegetation and increase the potential for noxious weeds due to an increase in bare-ground areas. This would require more mitigation that could assist in preserving native vegetation populations or reducing invasive plants and noxious weeds for GRSG management. However, areas of GRSG non-habitat within the HMA boundaries would either be removed from the HMA or would be recategorized with decreased protections. Removing areas from HMA classification would have noticeable impacts to native vegetation in those areas and increase the potential for noxious and invasive species as well as soil degradation from surface disturbing activities. The 3% disturbance cap would include all acres of habitat classified as PHMA (and IHMA in Idaho). Areas outside those designations could experience disturbance and be converted to an earlier seral stage that would change vegetation community succession and reduce the extent of native plant communities.

As under Alternative 1, the BLM would continue to include language to maintain and enhance sagebrush habitats with the intent of conserving GRSG populations under Alternative 4. However, habitat objectives tables would be updated based on best available science which would reinforce current or provide new thresholds. The updated language would allow for flexible management that could identify problems sooner and assist in reducing potential vegetation disturbances and invasive plants and noxious weeds spread. Impacts from adaptive management would be as described for Alternative 3.

Minerals Management

Alternative 4 and NSO stipulations would be similar to Alternative 1, including in WY where the NSO stipulations would be expanded to include all of PHMA. Leasing would be focused to areas that have the least potential for conflicts. The BLM would evaluate parcels identified in Expressions of Interest (EOIs) associated with GRSG HMA and determine which to potentially analyze for potential inclusion in a lease sale. This would be applied to a larger area compared with Alternative 1 due to the increase in acres that would be managed as PHMA. As a result, Alternative 4 could reduce fragmentation of vegetation communities and could maintain the extent and condition of native populations where development doesn't occur.

The BLM would work with project proponents to promote measurable GRSG conservation objectives such as, but not limited to, consolidation of project related infrastructure to reduce habitat fragmentation and loss and to promote effective conservation and connectivity of seasonal habitats and PHMA (and IHMA). Vegetation communities in HMA that are considered to have least potential for conflicts with GRSG management and therefore more likely to be considered for development would see a potential increase in impacts to vegetation communities and in invasive plants and noxious weeds.

Lands and Realty Management

Alternative 4 would be similar to Alternative 1 with varying PHMA and IHMA exclusions for utility scaled ROWs. State-specific differences for facilities and activities would be guided by the strategy to avoid,

minimize, or mitigate impacts on GRSG habitat. Wind and solar energy development would be excluded in PHMA and within specified areas of IHMA. Vegetation and soils disturbance from energy development would be eliminated in GRSG habitat containing sagebrush/perennial grass vegetation communities. By exclusion of development, the vegetation and soil conditions would neither be adversely nor beneficially impacted, but rather maintain current conditions and trends. Alternative 4 would exclude wind and solar energy testing and generation facilities in PHMA and in IHMA exclusions would apply within 3.1 miles from active leks that would reduce impacts compared to Alternative 1. Maintaining current conditions in PHMA and IHMA would provide consistent habitat for GRSG, reduce noxious weed and invasive species introduction, and decrease sagebrush or riparian vegetation fragmentation.

Livestock Grazing Management

Impacts to GRSG habitat from Alternative 4 would be the same as Alternative 1, although no SFAs would be managed under Alternative 4. As a result, these areas would not receive additional priority for grazing management. However, the BLM would still have the authority to prioritize staff time and budget to identify areas that aren't meeting land health standards and implement corrective actions in areas with the greatest GRSG habitat value.

Wild Horse and Burro Management

Alternative 4 is similar to Alternative 1 with the exception of references to SFAs, for all states, would be removed from the management plan. Removal of SFAs would have similar impacts to vegetation communities as states that have removed them under Alternative 2.

10.3.6 Alternative 5

Greater Sage-Grouse Management

Under Alternative 5, more PHMA and less GHMA would be managed than Alternatives 1 and 2 (**Table 2-3**). Lands would be managed for avoiding and minimizing direct and indirect disturbances on sagebrush vegetation and sagebrush communities that would require compensatory mitigation to achieve no net habitat loss. Alternative 5 habitat objectives would be similar to Alternative 4. Impacts from adaptive management would be as described for Alternative 3.

Minerals Management

Under Alternatives 5, fluid mineral development could be more flexible compared with Alternative 1 due to WEMs, though adherence to the WEM criteria would ensure no impacts to GRSG within 0.6 miles of leks or provide for off-setting effects through compensatory mitigation in PHMA beyond 0.6 miles (except in WY, where the NSO only applies within 0.6 miles). In addition, compensatory mitigation could be used more frequently under Alternative 5 to offset both direct and indirect adverse impacts on riparian and sagebrush habitats in PHMA and GHMA. Protective effects of PHMA would increase under Alternative 5 compared to Alternative 1, as PHMA would be expanded (**Table 2-3**). Approved fluid mineral developments would cause surface disturbances that would lead to vegetation community degradation, sagebrush or riparian vegetation fragmentation, and increases in noxious weeds and invasive species presence.

Lands and Realty Management

Avoidance for utility scale wind and solar in Alternative 5 would be similar to management under Alternative 1 but would keep GHMA open for utility scale projects with minimization measurements. This would result in more impacts on native vegetation and GRSG habitats from renewable energy development, in comparison to Alternative 1 where GHMA are only open in ID and WY for solar and wind. Under Alternatives 5, GRSG habitat would be fragmented from new ROWs in GHMA resulting in an increase in

the potential for invasive species and noxious weeds throughout the open ROW areas from impacts as described under *Nature and Types of Effects*.

Livestock Grazing Management

Impacts from livestock grazing management under Alternative 5 would be the same as those described for Alternative 4.

Wild Horse and Burro Management

Impacts from wild horse and burro management under Alternative 5 would be the same as described for Alternative 4. Under Alternative 5, the BLM would manage WHB populations within their established AML levels and would reduce the potential for impacts from wild horses and burros on vegetation such as those described under Nature and Type of Effects, compared with Alternatives 1, 2, and 4.

10.3.7 Alternative 6

All impacts would be the same as described for Alternative 5 except for those from ACECs. ACECs under Alternative 6 would cover the same areas as Alternative 3 and would provide further protection to vegetation communities from surface disturbing activities as described under *Nature and Types of Effects*.

10.4 WILDLAND FIRE ECOLOGY AND MANAGEMENT

10.4.1 Methods and Assumptions

Methodology

Impacts on wildland fire ecology and management would primarily result from management actions described in **Chapter 2** that would change the BLM's ability to control the amount or location of fuels. The types of actions that can result in these impacts are discussed in more detail in **Section 4.4.1**, Nature and Type of Effects. For management actions not specifically described below, the effects would remain as described in the 2015 and/or 2019 plans.

Indicators

The indicator of impacts on wildland fire management is a substantial change in the likelihood or severity of wildfire.

Assumptions

This analysis includes the following assumptions:

- The spread of invasive annuals (e.g., cheatgrass) has lengthened the fire season in many parts of the planning area. These species often cure sooner than native perennial species and are more prone to ignition. Therefore, actions that reduce the spread or footprint of invasive annuals or restore perennial vegetation communities would reduce the frequency and intensity of wildfires, while reducing wildfire management costs.
- Fire is an important functional natural disturbance in many of the ecological systems found in the planning area.
- In many cases, a direct relationship exists between fuel loading and potential fire intensity and severity.

10.4.2 Alternative 1

A comprehensive strategy for wildland fire management would be implemented under Alternative 1, including the FIAT. The FIAT would identify PHMA areas and management strategies to reduce the threats to GRSG from invasive annual grasses, wildfires, and conifer expansion. It would incorporate recent scientific

research on resistance and resilience of Great Basin ecosystems as well as interdisciplinary team knowledge. Potential management strategies include proactive measures, such as fuels management and habitat restoration and recovery, and reactive measures, such as fire operations and post-fire rehabilitation. Together, these actions would improve wildland fire management, given the limited resources available, and would target those areas that need most protection. The likelihood for wildfire would be reduced and subsequent impacts on vegetation, particularly vegetation that meets GRSG habitat requirements, described under **Section 3.2**. would also be reduced. Providing adequate rest from livestock grazing would improve the likelihood that ESR seedings would stabilize the site, compete effectively against invasive annuals, and successfully establish native vegetation over the long term.

10.4.3 Alternative 2

Impacts on wildland fire management under Alternative 2 would be the same as described for Alternative 1.

10.4.4 Alternative 3

Under Alternative 3, all PHMA and proposed ACECs would be unavailable for livestock grazing. This could limit the BLM's ability to achieve resource objectives as described under the *Nature and Type of Effects* and could alter the risk of large-scale wildfires.

10.4.5 Alternative 4

Impacts on wildland fire management under Alternative 4 would be the same as described for Alternative 1.

10.4.6 Alternatives 5 and 6

Impacts on wildland fire management under Alternatives 5 and 6 would be the same as described for Alternative 1.

10.5 FISH AND WILDLIFE

10.5.1 Methods and Assumptions

Methodology

Impacts on fish and wildlife species would primarily result from management actions described in **Chapter 2** that result in habitat removal, fragmentation, or other alteration, and actions that result in injury or mortality, displacement, or other disturbance to species. The types of actions that can result in these impacts are discussed in more detail in **Section 4.4.3**, Nature and Type of Effects. For management actions not specifically described below, the effects would remain as described in the 2015 and/or 2019 plans (Colorado 2015 Section 4.3; Oregon 2015 Section 4.5, 2019 Section 4.7; South Dakota 2015 pages 686-725; Utah 2015 Section 4.5, 2019 Section 4.6.6; Wyoming 2015 Section 4.21).

Indicators

Indicators of impacts on fish and wildlife species are as follows:

- Amount and condition of available habitat
- Likelihood of mortality, injury, or direct disturbance
- Likelihood of habitat disturbance

Assumptions

This analysis includes the following assumptions:

- Implementing the management actions for GRSG would have mostly negligible or beneficial impacts on fish and wildlife species. Impacts on fish and wildlife species from resource use actions can have detrimental effects on fish and wildlife, though not all resource uses will have such effects.
- Impacts on big game populations would result from disturbance and/or loss of seasonally important habitat (for example, overwintering, breeding, or migration corridors) to a point that would cause the species' population to decline. Impacts that reduce the population of any herd unit that currently exceeds population objective levels would not be considered significant, so long as impacts would not reduce the population below defined objective levels.
- If adverse impacts are identified, the full suite of mitigation measures could be implemented to minimize, eliminate, or offset the impacts. If monitoring reveals that mitigation is unsuccessful in reducing or eliminating impacts, measures to prevent further impacts would be implemented as appropriate to the species affected.
- Short-term effects would occur over a timeframe of 5 years or less, and long-term effects would occur over longer than 5 years.

10.5.2 Alternative 1

Under Alternative 1, lands would be managed to conserve, enhance, and restore sagebrush ecosystems. By separating GRSG habitat into SFAs, PHMAs, IHMAs, and GHMAs, management actions would then be applied within identified designations, as well as in certain areas outside of PHMA, IHMA, and GHMA, including vegetation objectives to achieve improvements in GRSG habitat. SFA designations would have the most restrictions, and therefore the most protection for wildlife species that occupy these habitat types. However, restrictions to development on BLM lands might push development onto private land, which could result in indirect impacts as described under *Nature and Types of Effects*.

In most of the planning area, priority will continue to be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMAs and GHMAs, or within the least impactful areas within PHMA, IHMA, and GHMA if avoidance is not possible. Applying a disturbance cap can help reduce effects to wildlife within the areas, as well as applying seasonal restriction when wildlife species are more vulnerable to disturbance. Impacts on wildlife species from mineral development would be as described under *Nature and Types of Effects*. Allowing exceptions to lease stipulations, COAs, and terms and conditions to be considered on a case-by-case basis during restricted time periods could lead to additional surface disturbing activities and functional habitat loss. It is unknown, however, what type or degree of exceptions would occur, because the outcome is dependent on each lease and the habitat where the lease is being developed.

Fluid Minerals Management

Under Alternative 1, restrictions on fluid mineral leasing, application of the disturbance cap, and use of conservation measures would reduce the extent of direct habitat loss for terrestrial wildlife species whose ranges overlap PHMA. However, scale of disturbance (both direct and indirect) would depend on lease size and configuration. In instances where several small leases occur entirely within PHMA or the 4-mile lek perimeter, pad and road development may have substantial impacts on wildlife species. Excluding or reducing surface-disturbing activities in PHMA would shift development into other areas and may influence those species that use non-sagebrush communities for nesting, cover, and forage.

Under this alternative, NSO and CSU stipulations would be applied to protect GRSG, which would further reduce wildlife habitat loss and degradation caused by fluid mineral development. While GHMA would be available for fluid minerals leasing and other types of minerals and energy development, such activities would be subject to conservation measures (i.e., net conservation gain, lek buffers, and RDFs). This would generally have a local protective impact on some wildlife in those areas.

The primary impacts on wildlife species (especially big game) from minerals development within the planning area would be the reduction in usable wildlife habitat and disruption of migration corridors that link crucial habitats (winter range) and parturition areas. Reductions would be particularly severe in areas with continuous surface disturbance. As discussed by (Bartmann et al. 1992), crowding of animals may have a density-dependent impact of reducing animal survival and damaging resources. Human disturbance of big game results in increased energy costs (Bromley 1985) and disturbed big game animals incur a physiological cost, either through excitement (preparation for exertion) or locomotion. A fleeing or displaced animal incurs additional costs through loss of food intake and potential displacement to poorer (lower) quality habitat. If the disturbance becomes chronic or continuous, these costs can result in reduced animal fitness and reproductive potential (Geist 1978). Additionally, a fleeing or displaced animal is also more visible to predators and at a higher risk for predation. Displacement of fluid mineral development outside of suitable GRSG habitats could negatively affect raptors and migratory birds that commonly nest in pinyon-juniper and other treed areas. Direct removal or modification that compromises nest stand character would reduce the habitat quality or carrying capacity for local raptor and migratory bird populations.

Saleable Mineral Management

All saleable mineral pits located in PHMA that are no longer in use would be restored to meet GRSG habitat conservation objectives. As such, this alternative would benefit those wildlife species whose ranges and habitats are coincident with PHMA. Surface-disturbing activities from saleable minerals development would be relocated outside of PHMA. This would result in habitat loss or modification of other vegetation types (mountain shrub and pinyon-juniper), with negative impacts on those wildlife species associated with non-sagebrush communities.

Nonenergy Leasable Minerals

Under Alternative 1, no new nonenergy mineral leasing would be allowed in PHMA and existing mines would not be permitted to expand. RDFs would be applied for solution mining wells in PHMA. By reducing the amount of direct habitat loss, this alternative would retain habitat for terrestrial wildlife species whose ranges or habitats are coincident with PHMA.

Locatable Minerals Management

SFAs were recommended for withdrawal from the Mining Law of 1872, as amended. Such a withdrawal, if it occurs, would close the SFA to location and entry under the Mining Law of 1872, subject to valid existing rights. The BLM would request that operators include appropriate mitigation and applicable seasonal restrictions in plans of operation which would reduce impacts on fish and wildlife.

Lands and Realty Management

Under Alternative 1, PHMA in CO, NV/CA, ID, and OR would be managed as an avoidance area. ROW projects would be allowed in PHMA if the project would not adversely affect GRSG populations. GHMA would also be managed as avoidance for ROWs. Additionally, no aboveground structures would be authorized within 1 mile of active leks in occupied habitat. As a result, protections would be greater under

this alternative for those species that overlap all GRSG habitat. Both PHMA and GHMA would be managed as avoidance for large transmission lines, except for several ongoing projects.

Alternative 1 in UT would provide management flexibility in developing infrastructure, focusing on GRSG habitat. PHMA would be ROW avoidance for new linear and site type ROWs, permits, and leases; high voltage transmission lines ROWs (100 kV or greater); major pipelines; and communication sites. Additional protection would be provided by managing PHMA and GHMA as ROW exclusions areas for solar energy development and PHMA as ROW exclusion areas for wind energy development. RDFs would be applied to further reduce impacts. Ensuring a net conservation gain to GRSG under the regional mitigation strategy may require projects to avoid, minimize, or mitigate for their potential impacts on GRSG, which could reduce the loss or disturbance of habitat from specific projects. Offsite mitigation may not always benefit species impacted at the disturbed site. Therefore, there could be a local impact on certain species.

In WY there would be an increase in ROW avoidance areas that could reduce ROW construction activities and related impacts to wildlife habitat. Existing ROWs would be used whenever possible for placement of new linear facilities, which would minimize overall habitat loss and fragmentation. Exceptions could occur, and in those cases, disturbance is to be limited and mitigated. New projects would have seasonal stipulations that would help prevent disturbance to wildlife species during those timeframes. Management for construction would consider impacts to GRSG populations and be designed to minimize impacts through project design and mitigation. The considerations could reduce the impacts from disturbance and habitat loss for other wildlife species. Requiring raptor perching deterrents could reduce the effects to prey species from hunting by predatory bird species; however, predatory birds would not benefit from hunting perches.

Under Alternative 1, a 3% disturbance cap (5% on lands in WY and MT which would include fire, agriculture, and urban development [MT only]) on discrete anthropogenic disturbances would be applied in PHMA and IHMA in ID, at both the BSU and project levels. Additionally, a limit would be placed on the density of energy and mineral development facilities, which would reduce impacts on wildlife habitat caused by such disturbances. Including transmission lines outside of transmission corridors in the 5% disturbance calculation could reduce wildlife habitat loss and reduce disruptions in habitat connectivity. Disturbance and development can create travel or migration barriers which can alter distribution patterns, increasing stress and energy loss and fitness in wildlife species.

Renewable Energy Management

Under Alternative 1, renewable energy development would be permitted in some states. As a result, sagebrush associated wildlife species would experience reduced potential for disturbance, habitat alterations, and habitat fragmentation as described *in Nature and Types of Effects*. Within exclusion areas, direct impacts would be eliminated on wildlife species, but development in avoidance areas would have more effects on wildlife as some development would occur on a case-by-case basis. Impacts include altered habitat, habitat fragmentation, and noise associated with development. Additionally, the potential exists for both solar and wind facilities to cause direct mortality of some wildlife, particularly birds and bats (Frick et al. 2015; DOE 2021).

Mitigation and Adaptive Management

Under Alternative 1, anthropogenic disturbances in PHMA, IHMA, and GHMA would be mitigated to ensure a net conservation gain to GRSG, which would also maintain habitat for other wildlife species that use GRSG habitat. Conservation measures would be imposed to complement mitigation and further reduce anthropogenic disturbance in PHMA and GHMA, including RDFs and lek buffers.

Application of Habitat Objectives

The habitat objectives would identify the desired outcome for habitat on BLM-administered lands in all GRSG HMAs. Some wildlife species that co-exist in sagebrush communities with GRSG and which have similar habitat requirements would benefit most from the desired habitat conditions. These include management of activities to support suitable GRSG habitat at multiple scales, supporting connected mosaics of sagebrush to provide seasonal habitats and dispersal. The specific tables identifying indicators and benchmarks supported by various scientific publications throughout the range would be retained in the monitoring appendix as a tool through which suitability is informed.

Livestock Grazing Management

Under this alternative, site-specific reviews during grazing permit renewals could allow for adjustments to the number of AUMs on federal lands. Within SFAs, the prioritization of grazing permit/lease reviews not meeting Land Health Standards for special status species, especially in areas containing riparian and wet meadow vegetation, would improve these habitats. Riparian and wet meadow areas are critical for fish and wildlife, serving as essential habitat for breeding, feeding, and shelter.

Adjustments in grazing use or management of BLM-administered lands to meet Standards for Rangeland Health could minimize the impacts of grazing on fish and wildlife by improving habitat conditions. These actions could help sustain wildlife populations, particularly species dependent on sensitive habitats, such as riparian zones. Reducing the intensity of grazing in these areas could decrease soil compaction, enhance water quality, and restore vegetation structure, which is important for species and habitats.

Improved grazing management could also result in overall landscape health improvements, reducing the spread of invasive, nonnative plant species that threaten native wildlife habitats. These actions would provide greater forage and cover for wildlife, particularly in riparian areas, and contribute to maintaining biodiversity by balancing the needs of livestock with habitat conservation for fish and wildlife species.

Wild Horse and Burro Management

Alternative 1 would place some restrictions on the management of wild horses and burros, however the BLM would consider all resource values in conjunction with GRSG when managing wild horses. These management strategies would benefit wildlife species whose ranges overlap herd management areas within PHMA or GHMA. Management within the established levels of AMLs could reduce impacts from wild horses and burros on fish and wildlife in some areas.

ACEC Designation

Alternative 1 does not include management for ACECs.

10.5.3 Alternative 2

Habitat Management Area Designation

Impacts from designating GRSG habitat as SFAs, PHMA, IHMAs, and GHMA (**Table 2-3**) would be similar to those described for Alternative 1. However, some SFAs would be removed in states as described under state impacts. Impacts from language to maintain and enhance sagebrush habitats would be the same as described for Alternative 1.

Removal of GHMA in UT and associated management may reduce some indirect protection for all wildlife species, including crucial habitat for big game species that rely on the area for wintering and fawning/calving within mapped GHMA. Impacts on big game are considered negligible because big game uses a variety of habitat types beyond sagebrush. Additionally, GHMA is not the only management for these areas but is

merely complimentary to management of habitat under applicable RMPs and according to the BLM Land Health Standards. Removing GHMA minimization measures that, as noted above would not preclude development, would not likely result in additional impacts that are not already addressed by management of crucial habitats in existing land use plans.

The offsite mitigation in PHMA to replace impacted habitat in occupied GRSG habitat outside of PHMA may not always benefit the same other wildlife species that were impacted at the disturbed site. While it could lead to a local improvement for species in treated areas, especially those that rely on sagebrush habitats, it could also result in an unmitigated loss in the quantity and quality of habitat at the location of the impact. As the amount of development increases in the GRSG habitat outside PHMA, the impact from disturbances mitigated in PHMA would mount and could affect the use patterns of wildlife in those areas.

Fluid Minerals Management

Impacts on fish and wildlife species from the leasing objective would be similar to Alternative 1, except it would not be relevant in UT or NV/CA. In WY, leasing would be allowed in PHMA, which would increase the potential for impacts on wildlife species that occupy PHMA and surrounding habitat. Impacts from fluid mineral development is discussed under *Nature and Types of Effects*.

Impacts on fish and wildlife species from WEMs would be similar to Alternative 1, except that they would no longer be applied in NV/CA and UT. Allowing placement of developments in non-habitat portions of PHMA may increase impacts on certain wildlife and migratory birds whose habitat requirements do not overlap sagebrush areas. Adjacent non-sagebrush habitats could see an increase in development and disturbance when trying to avoid and minimize disturbance to sagebrush communities.

Saleable Mineral Management, Nonenergy Leasable Minerals, and Locatable Minerals

Impacts on wildlife species would be the same as Alternative 1, except PHMA in ID allows consideration of new free use permits and NV/CA added exception criteria to the closure. Increased potential for related impacts as outlined in *Nature and Types of Effects* would result from providing consideration of new free use permits for saleable minerals in ID IHMA and adding an exemption criterion to saleable and nonenergy mineral closures for NV/CA PHMA. This is because there would be a higher likelihood of saleable and/or nonenergy mineral activities taking place in these areas. Removing the recommendation for locatable mineral withdrawal in SFAs in all states (except in MT/DK, which did not have a 2019 amendment) has no impact. This is because a recommendation to withdraw lands under the Mining Law of 1872 has no impact. The Secretary proposes and makes withdrawals not through the BLM land use planning but according to a separate process pursuant to section 204 of FLPMA.

Lands and Realty

Under Alternative 2, impacts from ROWs on wildlife species would be the same as Alternative 1, with additional exception criteria added in Nevada. Alternative 2 proposes to remove the requirement to consider burying transmission lines (except when not technically feasible) and allow increased flexibility to consider site-specific impacts and minimization options. This action could impact wildlife such migratory birds, small mammals, and reptiles by increasing predator perches from unburied lines that may lead to increased take of migratory birds and their nests by raptors and corvids; however, impacts of predator perches could be minimized on a site-scale by use of perch deterrents on poles. Additionally, Alternative 2 would result in more aboveground power lines that increases the risk of birds and bat collisions (Frick et al. 2017). There could be beneficial impacts on big game and migratory bird habitat by not burying transmission lines because it offers more protection for sensitive habitat areas. Removal of sagebrush and associated

vegetation can be avoided with placement of surface lines, which minimizes habitat disturbance and potential for weeds.

In addition, there would be a 3% disturbance cap, not including wildfire or agriculture for CO, ID, NV/CA, OR, UT, and the Dakotas. In UT the cap may be exceeded if it will benefit GRSG. The 3% cap may be exceeded at either scale if a technical team determines that site specific GRSG habitat and population information, combined with project design elements indicates the project will improve the condition of GRSG habitat within the proposed project analysis area or within the PHMA in the population area where the project is located. Factors considered by the team will include GRSG abundance and trends, movement patterns, habitat amount and quality, extent and alignment of project disturbance, location and density of existing disturbance, project design options and other biological factors. Such exceptions to the 3% disturbance cap may only be approved by the BLM Authorized Officer with the concurrence of the State Director. The finding and recommendation shall be made by the technical team, which should consist of, at least, a BLM field biologist, other local GRSG experts, and biologists and other representatives from the appropriate State of Utah agency.

Allowing exceedances to the disturbance and density caps in PHMA could affect wildlife by a reduced level of protection for habitat from disturbance. These disturbance impacts may increase by allowing exceptions to the disturbance cap, especially within areas of non-sagebrush, therefore impacting wildlife species that use these other habitat types (e.g., pinyon-juniper woodlands and pinyon jays); however, exceptions to the disturbance and density cap may also benefit some wildlife species with habitats that overlap with GRSG. This would come about by improving habitat conditions through the increased potential for voluntary vegetation treatments.

Renewable Energy Management

Impacts from renewable energy would be similar under Alternative 1. However, in Nevada, PHMA would have additional exception criteria added. This could increase the potential for impacts associated with ROW and renewable energy development because there would be a higher chance of development. These impacts are described under *Nature and Types of Effects*.

Mitigation and Adaptive Management

Maintaining a mitigation strategy in PHMA that leads to a planning area-wide improvement of GRSG habitat would include management for vegetation communities. Generally, these areas include habitats that are dominated by grasses and shrubs rather than by trees. However, the removal of trees such as pinyon and juniper are included in some habitat management strategies. While each individual project proponent would no longer be required to increase habitat to obtain an authorization for use of public lands, the effects of habitat improvements that were described in the 2015 Final EIS would continue to be achieved: namely, increasing the quantity and quality of sage-steppe vegetation communities in early- to mid-seral condition. Additionally, the effects of habitat improvements would still occur where voluntary mitigation occurs. This would increase habitats for wildlife species with habitats that overlap that of GRSG; however, it would also generally decrease habitat availability for wildlife species or seasonal habitats of species that are not sage dependent.

Application of Habitat Objectives

Impacts from habitat objectives would be the same as for Alternative 1.

Livestock Grazing Management

Impacts from domestic livestock grazing management would be the same as described for Alternative 1, except for in the states described below. In UT, WY, and NV/CA, the prioritization for review and processing of grazing permits was removed; however, the BLM would still have the authority to prioritize staff time and budget to identify areas that aren't meeting land health standards and implement corrective actions in areas with the greatest GRSG habitat value.

Wild Horse and Burro Management

Impacts on fish and wildlife species would be the same as described under Alternative 1.

ACEC Designation

Impacts on fish and wildlife species would be the same as described under Alternative 1.

10.5.4 Alternative 3

Habitat Management Area Designation

Managing the largest area as PHMA would minimize potential impacts on wildlife species that occupy previously designated GHMA as there would be more restrictions in the areas. Expanding PHMA in some states to include areas of adjacent non-habitat, unoccupied historic habitat, or areas with potential to become habitat as PHMA would also decrease potential for disturbance to sagebrush associated wildlife species and habitat alterations because management restrictions associated with PHMA would occur over a larger area.

Minerals Management

Closing PHMA in all states to fluid mineral leasing, saleable minerals, and nonenergy minerals would reduce potential impacts to wildlife that occupy GRSG range, such as disturbance and habitat alterations. The type of impacts associated with mineral development are described in detail under *Nature and Types of Effects*. Compared to the other Alternatives 1 and 2, the impacts would be lessened. This is because areas closed to leasing would not be developed and there would be a decrease of HMA acres that would be subjected to effects from mineral development. Closing PHMA to mineral leasing and development would protect habitat for wildlife in these areas from surface-disturbing activities as well as subsurface activities (e.g., directional drilling), maintain connectivity between leks and big game habitat, and not contribute to fragmentation. Sagebrush associated wildlife would not be exposed to disruption that is often associated with the noise and human activity that accompanies construction, development, or production activities in PHMA. However, restrictions to development on BLM lands might push development onto state, tribal, or private land, which could result in indirect as described under *Nature and Types of Effects*.

Recommending PHMA for withdrawal from location and entry under the United States mining laws would have no impact. However, if the BLM were to apply for a withdrawal pursuant to section 204 of FLPMA and the Secretary were to accept the application, the BLM could initiate the process to consider withdrawing PHMA from location and entry under the Mining Law of 1872. Such a withdrawal would reduce potential impacts to wildlife associated with GRSG range and habitat associated with locatable minerals as described under *Nature and Types of Effects*. This is because surface disturbance associated with location and entry would be less likely to occur in withdrawn areas because only claimants who demonstrate a valid existing right would be able to proceed.

Excluding or reducing surface-disturbing activities in PHMA could shift development into habitats outside of PHMA. This may influence those species that use non-sagebrush communities for nesting, cover, and forage. Of note would be woodland raptors and migratory birds that commonly nest in pinyon-juniper. Direct removal or modification that compromises nest stand character would reduce the habitat quality or carrying

capacity for local raptor and migratory bird. Additional development in habitats outside of PHMA would affect small mammals and big game populations and connectivity between habitats could be reduced by habitat loss and degradation. This would depend largely on the amount and distribution of development.

Lands and Realty

Compared to Alternatives 1 and 2, new infrastructure development would be far more restricted. All PHMA would be excluded from new ROW authorizations. Only new linear ROW would be allowed in designated ROW corridors. The potential impacts on wildlife that occupy PHMA would be decreased because of the exclusion of ROWs. In PHMA, there would be a decreased probability of habitat degradation and fragmentation. However, because ROWs cannot be placed in the PHMA, more lengthy ROW routes may be necessary to go around closed areas. Longer routes could have more negative effects on wildlife species using habitat outside of PHMA because the ROW would be located in PHMA adjacent habitats, non-federal lands, or private lands.

Renewable Energy Management

Under Alternative 3, PHMA in all states would be ROW exclusion areas for wind and solar energy development. Prohibiting wind energy development would eliminate the likelihood for habitat loss, degradation, fragmentation, direct mortality to birds and bats and direct disturbance to wildlife in PHMA. Alternative 3 would offer more protection from renewable energy development compared to Alternatives 1 and 2 because more areas would be excluded from renewable energy development with no exceptions. Impacts from wind and solar projects are described under *Nature and Types of Effects*.

Mitigation and Adaptive Management

Impacts on wildlife species from mitigation would be similar as described for Alternative 1, because the BLM would require and ensure mitigation that achieves a net conservation gain in all HMA types. These requirements would reduce the potential for impacts from land use activities, such as habitat loss or alterations. Maintaining habitat function and value would benefit wildlife species associated with sagebrush habitats.

Application of Habitat Objectives

Impacts from habitat objectives would be similar to those described for Alternative 1. Since the habitat objectives would be modified under this alternative, the species affected may vary slightly.

Livestock Grazing Management

Alternative 3 would make all PHMA unavailable for livestock grazing and therefore would have the fewest direct impacts on terrestrial wildlife. The reduction in herbivory from livestock grazing under this alternative would allow for herbaceous forage and cover for wildlife to increase and would prevent impacts as described under *Nature and Type of Effects*. There would also be less trampling or compacting of vegetation and/or soils, and less competition for forage, water, space, and habitat alteration.

In contrast, livestock grazing may reduce invasive species and noxious weeds or enhance forage and brood-rearing conditions for some wildlife species, so the removal of livestock grazing may increase the risk of invasion of noxious or invasive weeds. Relatedly, without a reduction in fine fuels, there may be an increased risk of large-scale wildfire that would remove wildlife habitat. Additionally, more fencing may be needed to separate PHMA from adjacent non-federal grazed lands, which could increase collision risk, change or prevent movements by some wildlife species, and increase predator perching opportunities for some species.

Wild Horse and Burro Management

Under Alternative 3, wild horses and burros would be removed from herd management areas within PHMA. This would increase habitat quality for wildlife because there would be a reduction in grazing competition, which could result in improvements to vegetation cover, forb abundance, forage for native wildlife, and spring habitat. Where range improvements, such as water troughs are removed, there would be a reduction in potential drowning hazards and/or potential for disease transmission. Additional fencing may also be needed to keep wild horses off BLM-administered HMAs which could increase collision risk, change or prevent movements by some wildlife species, and increase predator perching opportunities for some species.

ACEC Designation

Under Alternative 3, all ACECs would be managed as PHMA. The management in ACECs under this alternative would be similar to management in PHMA, with the exception of ROW management and locatable minerals requirements. Managing ACECs as exclusion to ROWs both within and outside of designated corridors would expand protections to fish and wildlife from ROW development compared to PHMA. Plans of operations for locatable mineral disturbances would reduce effects if measures were included to reduce disturbance, which would incidentally benefit fish and wildlife in these areas.

10.5.5 Alternative 4

Habitat Management Area Designation

Under Alternative 4, PHMA boundaries would be expanded compared with Alternatives 1 and 2 and acres managed as GHMA would decrease (**Table 2-3**). By managing these areas, wildlife species whose range overlaps with GRSG would benefit from management actions to protect GRSG to a greater extent where PHMA and other HMA designations have expanded. Under this alternative, impacts on wildlife would be similar under to those described under alternatives 1 and 2 with a focus on improving GRSG habitat by increasing acres and conditions of vegetation communities, habitat connectivity, mitigation of noxious weeds and/or invasive species, and decrease conifer encroachment.

Minerals Management

Range wide, leasing would be permitted in HMAs, which would increase potential impacts to wildlife in these areas as described in the *Nature and Types of Effects*. The BLM would, however, implement management strategies that would reduce the possibility of conflict and associated consequences from potential development in GRSG habitats or linking regions as described in **Section 4.2.3**. Giving preference to lands that would not obstruct the suitability and proper operation of GRSG habitat, considering their proximity to already-existing development, potential for development, and the presence of significant GRSG habitats or connectivity areas, would minimize potential impacts to wildlife species that overlap GRSG habitat. In contrast, this may shift operations to nonfederal lands and impact other wildlife species whose range does not overlap GRSG.

The fluid mineral development and leasing objective would consider leasing in areas where there is the least potential for conflicts with GRSG and its habitat. The avoidance strategy will ensure minimal disturbance on wildlife species that overlap GRSG range. However, impacts may be shifted to non-federal lands which may pose greater impacts for wildlife species that do not overlap with GRSG habitat. Those impacts are discussed under *Nature and Types of Effects*.

Other impacts from minerals management would be similar to those described for Alternative 1.

Lands and Realty

Under Alternative 4, in all states managing PHMA (IHMA in ID) as ROW avoidance areas would be similar to Alternative 1. In areas where development cannot be avoided, there would be additional protection by avoiding important GRSG habitat such as leks and nesting/early brood-rearing habitat. This would reduce impacts on wildlife species who also utilize high value GRSG habitat, however, this may shift impacts to other potentially important wildlife habitat that doesn't overlap with GRSG. Impacts on wildlife species are described in *Nature and Types of Effects*.

GHMA would also be managed as ROW avoidance areas within breeding and nesting habitats, along with other limited seasonal use habitats. Avoiding placement of ROWs within one-half mile of PHMA or IHMA would help protect or buffer those areas from indirect impacts. Because all other areas would be managed as ROW open, impacts, such as habitat alteration and disturbance, could occur, however, compensation would be required (see Alternatives). Similar to impacts from PHMA management described above, potential for impacts on wildlife whose range overlaps with GRSG habitats would be reduced, while other wildlife species whose range is outside of GRSG habitat may have increased potential for impacts. Those impacts are described in *Nature and Types of Effects*.

Since HMAs would be extended to additional regions based on best available science, restrictions inside HMAs would lessen impacts on wildlife species whose range overlaps with GRSG, as discussed under *Nature and Types of Effects*. Alternative 4 would have restrictions on disturbance caps between states that would decrease surface disturbances impacting wildlife habitat and improve protection for GRSG habitat within new HMA boundaries.

Renewable Energy Management

Under Alternative 4, wind and solar development would be managed by HMA, and proximity to lek locations, similar to Alternative 3. Management stipulations for PHMA would be exclusion for utility scale wind and solar development. For IHMA exclusion would be within 3.1 miles of active lek locations and avoidance strategies for the remainder. All GHMA would be managed as avoidance. Within the exclusion areas impacts on wildlife that overlap GRSG habitat would be reduced as development would not be permitted. As a result, development would likely shift to areas outside of GRSG habitat, causing direct impacts on wildlife species whose range does not overlap with GRSG. Those impacts are described under *Nature and Types of Effects*.

Mitigation and Adaptive Management

Impacts under this alternative would likely be higher than Alternative 3 because more projects would take place if PHMA, IHMA, and GHMA were not closed to new projects. There would also be the addition of required compensatory mitigation that would meet the requirements set by the state wildlife agency or appropriate authority (See alternatives). Depending on GRSG population triggers there may be additional mitigation in some areas, and the BLM would coordinate with state wildlife management agencies to consider project activities, direct and indirect impacts, and restoration success rate. Impacts on wildlife would potentially be minimized depending on GRSG population triggers in the area and the overlap of wildlife habitat with GRSG habitat. On the contrary, management actions may be shifted to non-federal lands or other wildlife habitat where development and disturbance may occur. These impacts are discussed under *Nature and Types of Effects*.

Application of Habitat Objectives

Impacts on wildlife from application of habitat objectives under this alternative would be the same as Alternative 3.

Livestock Grazing Management

Impacts on wildlife would be similar to those described under Alternative 1. However, because SFAs would not be managed, Alternative 4 does not include a programmatic prioritization strategy. However, the BLM would still have the authority to prioritize staff time and budget to identify areas that aren't meeting land health standards and implement corrective actions in areas with the greatest GRSG habitat value. In addition, the BLM would include additional management objectives and actions that give GRSG and GRSG habitat further protection from livestock grazing impacts. Some of these management objectives and actions include site-specific adjustments to AUMs, flexibility to adjust permits, and meeting land health conditions. These added management objectives and actions would potentially reduce impacts to other wildlife species that overlap GRSG range. The impacts are further discussed under *Nature and Types of Effects*.

Wild Horse and Burro Management

Impacts on wildlife from wild horse and burro management would be the same as described for Alternative 1.

ACEC Designation

Alternative 4 does not include management for ACECs and thus there would be no effects on fish and wildlife from ACEC management under this alternative.

10.5.6 Alternative 5

Impacts on fish and wildlife from fluid, saleable, nonenergy leasable, and locatable minerals management would be the same as described for Alternative 2. Impacts from application of habitat objectives and minimizing threats from predation would be the same as described for Alternative 3. Impacts from the fluid mineral development and leasing objectives, mitigation, adaptive management, and grazing would be the same as described for Alternative 4.

Habitat Management Area Designation

Under Alternative 5, the BLM would manage protections in more PHMA and less GHMA compared with Alternatives 1 and 2. This would lead to increased protection for other wildlife whose ranges overlap with PHMA but less protection for those whose ranges overlap with GHMA.

Lands and Realty

Impacts under this alternative would be similar to those described under Alternative 4 in comparison to the management of PHMA and IHMA in ID as ROW avoidance areas with the application of minimization measures in areas where major ROWs cannot be avoided.

Renewable Energy Management

Under this alternative, PHMA and IHMA would be classified as avoidance areas. This would minimize the potential impacts from wind and solar development, but to a lesser degree than exclusion areas because development would be considered on a case-by-case basis, whereas development would be prohibited in exclusion areas. Impacts from wind and solar development are described under *Nature and Types of Effects.*

In high value GRSG habitat such as leks and nesting/early brood-rearing habitat, development would not be permitted, therefore impacts to other wildlife species in these areas would be negligible unless certain criteria are met (nonhabitat/unsuitable habitat or the project prevents indirect impacts).

Managing GHMAs as open to wind and solar energy development range wide would result in potential for impacts on wildlife species as described in *Nature and Types of Effects*. However, the inclusion of minimization measures and compensation to maintain GRSG habitats consistent with state agency habitat designations (e.g., restoration, connectivity, seasonal, or other), and to preclude negative impacts to any adjacent PHMA habitats would reduce the potential for those impacts on wildlife in high value and seasonal GRSG habitats.

Under this alternative, a 3% disturbance cap would be applied range wide at the fine scale, similar to Alternative 4, however, there would be a 5% disturbance cap for the project scale in MT and WY (which would include fire, agriculture, and urban development (MT only)). Impacts on wildlife species under this alternative would be similar as described under Alternative 4 but with more exceptions which would potentially result in more development and disturbance in GRSG habitat.

Livestock Grazing Management

Impacts from livestock grazing management under Alternative 5 would be the same as those described for Alternative 4.

Wild Horse and Burro Management

Impacts from wild horse and burro management under Alternative 5 would be the same as those described for Alternative 1.

10.5.7 Alternative 6

Impacts would be the same as described for Alternative 5 but with the additional designation of ACECs. Under this alternative, ACECs would be open to fluid mineral leasing with NSO stipulations. These stipulations would minimize impacts on wildlife in these areas, however, this would increase the HMA acres that are potentially at risk to effects from mineral development that are discussed in *Nature and Types of Effects*. While limiting surface disturbance would ensure habitat connectivity between lek locations, this would benefit other wildlife that utilize sagebrush habitat in these areas. On the contrary, this may push surface disturbance into other important wildlife habitats that do not overlap with GRSG habitat.

Managing ACECs and saleable mineral/mineral material operations as closed to new or expansion of nonenergy minerals associated with existing operations (e.g., fringe leases) would reduce potential impacts on wildlife species and habitat. Management of these resources would reduce potential impacts on wildlife and habitat such as disturbance and habitat degradation or alteration which is discussed in *Nature and Types of Effects*. However, saleable mineral/mineral material operations would not close all free-use pits and would have more impacts than if not permitted.

Management of ACECs as exclusion areas for major ROWs and wind and solar development and avoidance areas for minor ROWs would reduce potential impacts on wildlife and associated sagebrush habitat, such as disturbance, habitat alterations, and increased potential for predation, as described under *Nature and Types of Effects.* While ROWs would not be permitted in exclusion areas, they would be evaluated on a case-by-case basis in avoidance areas, therefore impacts would be reduced to a greater extent in exclusion areas compared to avoidance areas.

10.6 SPECIAL STATUS SPECIES

10.6.1 Methods and Assumptions

Methodology

Although data on many known locations and habitats within the planning area are available, the data are not complete or comprehensive concerning all special status species known or suspected to occur, or potential

habitat that might exist. Known and potential special status species and habitats for key special status species that use sagebrush ecosystems in the planning area were considered in the analysis.

As described for Fish and Wildlife in **Section 4.4.2**, impacts on special status species would primarily result from management actions described in **Chapter 2** that result in habitat removal, fragmentation, or other alteration, and actions that result in injury or mortality, displacement, decreased water quality, or other disturbance to species. The types of actions that can result in these impacts would be the same as those described for fish and wildlife species, in **Section 4.4.3** and vegetation, in **Section 4.3.3**. For management actions not specifically described below, the effects would remain as described in the 2015 and/or 2019 plans.

This analysis focuses on a number of key special status species that would have the greatest potential to be affected by the GRSG management decisions outlined in **Chapter 2**. These are typically species that have overlapping ranges with GRSG, and that are closely associated with sagebrush and pinyon-juniper habitats.

Indicators

Indicators of effects on special status species would be the same as those described for fish and wildlife in **Section 4.4.1**.

Assumptions

This analysis includes the following assumptions:

- The analysis presented is largely qualitative due to the lack of data or uncertainty in existing data on certain special status species' occurrences. Further, because many special status species may potentially use habitats that are currently unoccupied and populations fluctuate, any quantitative analysis of occupied habitat would change over time as knowledge of species locations increases.
- Impacts on special status species (for example, habitat degradation or direct disturbance) would be more intense than similar impacts on common species. This is because population viability may be already uncertain for special status species, and certain species, such as special status plants, tend to be poor competitors, and habitat may be more limited or fragmented.
- All federal actions would comply with ESA consultation requirements and BLM policy for threatened, endangered, and sensitive species, and all implementation actions would be subject to further special status species review before site-specific projects are authorized or implemented. The USFWS would be consulted on any action that could potentially affect any listed plant or wildlife species or their habitat, including critical habitat.
- The potential for changes to the distribution and extent of special status plant populations and seedbanks.
- Implementing the management actions for GRSG would have mostly negligible or beneficial impacts on other special status species and, therefore, impacts from each alternative are not discussed separately in detail. The key impacts from resource uses, as well as management actions for GRSG, on other special status species are described below.
- If adverse impacts are identified, compensatory mitigation measures could be implemented to minimize or eliminate the impacts. If monitoring reveals that mitigation is unsuccessful in reducing or eliminating impacts, measures to prevent further impacts would be implemented as appropriate to the species affected.
- Short-term effects are defined as those that would occur over a timeframe of 5 years or less, and long-term effects would occur over longer than 5 years.

All new and renewed leases and permits would be subject to terms and conditions determined by the BLM Authorized Officer to manage and achieve resource condition objectives and land health standards for BLM-administered lands.

In general, impacts on special status fish and wildlife species would be similar to those discussed under **Section 10.5**, Fish and Wildlife, and **Section 10.2**, Greater Sage-Grouse, while impacts on special status plant species would be similar to those discussed under **Section 10.3**, Vegetation. However, impacts on special status species may be greater than impacts on common species because population viability is already uncertain for special status species. A detailed analysis of impacts on federally listed and proposed species and designated and proposed critical habitat will be prepared in the biological assessment for this RMPA/EIS. The biological assessment is under development and will be included with the Final RMPA/EIS.

Those species more closely associated with sagebrush communities or whose ranges are largely coincident with PHMA and GHMA (e.g., Brewer's sparrow and to a lesser extent white-tailed prairie dog, black-footed ferret, pygmy rabbit, western burrowing owl, ferruginous hawk, Holmgren lupine, Beatley's buckwheat, and squalid milkvetch) would benefit from conservation measures designed to protect GRSG and sagebrush habitat.

Conversely, excluding or avoiding development in GRSG habitats most likely outside of PHMA and IHMA, in GHMA inclusions, may lead to increased activity in other vegetation types (e.g., pinyon-juniper, mountain shrub, and aspen/spruce/fir). Special status species associated with these habitat types, such as pinyon jay, northern goshawk, BLM-sensitive bat species, Canada lynx, Columbian sharp-tailed grouse, sand cholla, Reese River phacelia, and Eastwood milkweed, may be adversely influenced to varying degrees, depending on alternative and development scenarios.

10.7 WILD HORSES AND BURROS

10.7.1 Methods and Assumptions

Methodology

The following section analyzes impacts on wild horses and burros, including herd management areas and associated AMLs from the potential planning decisions in this document. Under Alternatives 1 through 5, the BLM has proposed various management actions in relation to GRSG habitat objectives, and their analyses are outlined below.

Indicators

Indicators of impacts on wild horses and burros are as follows:

- Changes to population size or AML in mapped GRSG Habitat, changes to forage availability, changes to water resource availability, and climate change
- Ability to perform management activities within herd management areas including gathers and contraceptive activities.

Assumptions

In addition to the assumptions in **Section 4.1.1**, Analytical Assumptions, this analysis includes the following assumptions:

- While wild horses and burros may be found on lands outside herd management areas, these areas have no forage allocated to wild horses and burros. The BLM has no authority to manage wild horses and burros outside of herd management areas, except to remove them.

- Wild horses compete with other wildlife species, including GRSG, for various habitat components. When populations exceed AML or when habitat resources become limited (e.g., reduced water flows, low forage production, or dry conditions), they expand beyond the boundaries of the herd management area.
- Factors contributing to failure to meet Land Health Standards within herd management areas commonly include western juniper encroachment, invasive annual grass and other noxious weed infestations, wildfire, and impacts of livestock and wildlife grazing.
- Population growth suppression (fertility control agents, sterilization, and sex ratio adjustments) can aid in population control, but periodic gathers are still necessary to remove excess wild horses and burros.

10.7.2 Alternative 1

Alternative 1 would require a 3% disturbance cap on human surface-disturbing activities in PHMA. It would incorporate RDFs consistent with applicable law in PHMA, GHMA, and IHMA and would also require all human disturbances to result in a net conservation gain for GRSG and their habitat. Lek buffers would also be required.

Collectively, these GRSG conservation management actions would increase mitigation requirements for land use authorizations. This would result in more complex project designs, could exclude infrastructure placement in the most cost-effective locations, and would result in overall greater development costs. A corresponding effect could be a reduction in the number of authorization applications received for activities in PHMA and longer, more complicated review periods for those that are proposed in PHMA.

Protections afforded to GRSG and their PHMA or GHMA habitats would benefit wild horses and burros where herd management areas overlap these areas. This is because habitat conditions and forage would be improved, there would be less impact from human disturbances, and wildfire would be strategically managed in habitats. Temporary or long-term management changes to wild horses and burros may be necessary to achieve and maintain the desired habitat condition. Examples are reducing AMLs, designations, removals, movement patterns, and forage access. Alternative 1 would require more intensive management, particularly in the boundaries of SFAs.

10.7.3 Alternative 2

Alternative 2 would remove references to management within SFAs in some states and remove reference to GHMA in Utah. Management is more restrictive on lands within SFAs to emphasize protection of GRSG, management for SFAs provides the highest level of protection to forage. Without these protections, there could be additional surface disturbance, and thus removal of forage Removal of SFAs would increase impacts on wild horses and burros when compared with Alternative 1. Impacts on wild horses and burros, herd management areas, and AML under Alternative 2 within PHMAs would be the same as those described under Alternative 1.

10.7.4 Alternative 3

Under Alternative 3, no new designation of herd management areas would occur in any herd areas that overlap with PHMA unless the area outside of the PHMA boundary could still support a herd management area. All wild horses and burros would be removed from existing PHMA and proposed ACECs, which would result in short-term disturbance of herds by human presence and round up activities. Round ups would occur based on congressional budget appropriations for these actions, therefore the exact timeline is unknown. In the long-term, all wild horses and burros would be removed from PHMA and moved to holding

facilities per wild horse and burro herd-removal guidelines under Public Law 92-195 as amended and 43 CFR Part 4700. Herd management areas in PHMA under Alternative 3 are shown in **Figure 2.80**.

Wild horses and burros outside of herd management areas in PHMA but in adjacent lands could be impacted by changes in management within the herd management area. Because herd management areas would no longer be managed for AML under this alternative, there is potential for removal of resources, primarily water developments. Under Alternative 3, livestock grazing would become unavailable within PHMA, and thus range and water improvements may be removed or reclaimed, which would decrease the availability of developed water sources.

10.7.5 Alternative 4

Impacts on wild horses and burros under Alternative 4 would be similar to those under Alternative 1, with additional management direction to remove reference to SFAs. Removal of SFAs could increase impacts to wild horses and burros as forage will not be protected from surface disturbing activities. Management to the low end of the AMLs could reduce wild horse and burro populations in some areas.

10.7.6 Alternative 5

Impacts from wild horse and burro management under Alternative 5 would be similar to those described for Alternative 1.

10.7.7 Alternative 6

Under Alternative 6, the BLM would additionally manage ACECs. These ACEC would cover the same areas as under Alternative 3, however management would include restrictions on fluid minerals, nonenergy minerals, major ROWs, wind, and solar projects. ACEC management would provide further protection to forage for wild horses and burros from surface disturbing activities outside of the HMA.

10.8 LIVESTOCK GRAZING

10.8.1 Methods and Assumptions

Methodology

The following section analyzes impacts on livestock grazing, including range facilities, and rangeland improvements from the planning decisions in this document. Under Alternatives 1 through 6, the BLM has proposed various livestock grazing management actions in relation to GRSG management objectives, and their analyses are outlined below.

Indicators

Indicators of impacts on livestock grazing are as follows:

- Changes in permitted AUMs in areas available for livestock grazing.
- Prohibitions or limitations of the construction or maintenance of structural and nonstructural range improvements
- Modifications to or removal of structural range improvements
- Changes to the intensity, timing, duration, or frequency of permitted use, including temporary closures.
- Making areas unavailable for livestock grazing

Assumptions

In addition to the assumptions in **Section 4.1.1**, Analytical Assumptions, this analysis includes the following assumptions:

- All new and renewed leases and permits would be subject to terms and conditions determined by the BLM Authorized Officer to manage and achieve resource condition objectives and land health standards for BLM-administered lands.

10.8.2 Alternative 1

Greater Sage-Grouse Management

Alternative 1 could directly impact livestock grazing through its requirement through the BLM's management to meet GRSG-specific habitat objectives in PHMA, GHMA, and other HMAs, as well as other actions to achieve desired GRSG habitat conditions. In addition to restricting management in GRSG habitat management areas and including livestock grazing-specific actions in GRSG habitat (prioritizing reviews), the BLM would manage SFAs, which provide additional restrictions on development and disturbance.

These management actions, designed to enhance GRSG habitat on BLM-administered lands, could affect livestock grazing by the following:

Modifying grazing strategies or rotation schedules
Changing duration and the season of use
Changing the kind or class of livestock
Reducing livestock numbers
Reducing AUMs

Management to achieve these desired conditions would also impact permittees by increasing the amount of time permittees spend to manage livestock on BLM-administered lands and the total costs to a livestock operation. Restricting development in SFA would reduce disturbance on livestock and their forage.

Implementing management direction to achieve desired conditions in GRSG seasonal habitat could impact livestock grazing in the long term. It would do this by implementing management that improves rangeland conditions. Improved rangeland condition could also contribute to increased forage production.

Minerals Management

During the planning initiative that culminated in the 2015 RMP decisions, carried forward here as Alternative 1, SFAs were recommended for withdrawal from location and entry under the Mining Law of 1872, subject to valid existing rights. The BLM applied for a withdrawal of the recommended area and the Secretary accepted the application. The Secretary initiated a separate withdrawal process in 2015 pursuant to Section 204 of FLPMA. That process is currently underway. If the Secretary were to withdraw the lands identified in the proposed withdrawal, any resulting reduction in locatable mineral development would reduce impacts on livestock grazing through protection of forage from surface disturbance and a reduction in harassment of livestock from disturbance; the greatest reduction would be in allotments in SFA.

Under Alternative 1, PHMA would be closed to new mineral materials sales, but GHMA would be open. While these restrictions would limit livestock and forage disturbance, they could push development to allotments outside of PHMA. PHMA would be managed as closed to new nonenergy leasable mineral leasing, and impacts would be similar to those described above.

Alternative 1 would prioritize development of fluid minerals outside PHMA, GHMA, and IHMA. This approach would reduce disturbance to livestock and would maintain forage condition in allotments that fall in GRSG occupied habitat. Implementing the GRSG disturbance cap, mitigation strategy, monitoring framework, and hard trigger adaptive management responses under Alternative 1 would ensure that this reduction in disturbance of livestock, while forage condition would be maintained.

SFA would be managed as NSO without waivers, exceptions, or modifications. Unleased fluid mineral actions would be subject to objectives and screening criteria in GRSG habitat. This approach would not increase disturbance to livestock and forage in allotments that fall in GRSG-occupied habitat, but it would result in the fewest reductions in permitted use and the fewest restrictions on range improvement construction. This approach would also result in fewer reductions in permitted livestock use.

Renewable Energy Management

Increased restrictions on renewable energy development under Alternative 1 would reduce impacts on forage and harassment of livestock. Alternative 1 would designate PHMA and SFA as ROW exclusion for utility-scale commercial wind and solar energy facilities. There would be fewer potential reductions in permitted livestock use due to forage destruction and quality reduction. Fewer acres would be subject to restrictions on range improvement construction.

Management direction prohibiting solar and wind development in PHMA and restricting development in GHMA and IHMA would limit any impacts of ground disturbances from developing these resources. This management direction would limit the direct impacts of development and surface disturbances on rangelands, which would be beneficial to livestock grazing. This may shift impacts in areas outside of priority and general GRSG habitats.

Lands and Realty Management

Under Alternative 1, ROW development would be limited in avoidance and exclusion areas within PHMA. This would maintain forage sustainability and would not increase disturbance to livestock. Most of GHMA would remain open to ROW development. ROW development and associated disturbance to livestock and their forage are likely to be concentrated in designated corridors and GHMA. Implementing the GRSG mitigation strategy, monitoring framework, and hard trigger adaptive management responses under Alternative 1 would maintain livestock forage.

Alternative 1 would retain all public lands in public ownership; therefore, there would be no effect on current grazing operations. Limits on human disturbance, mitigation strategy, lek buffers, and other conservation measures would further limit disturbance. This would result in reduced indirect impacts on livestock and their forage in PHMA.

As described above, Alternative 1 would include a cap on human disturbance; the 3% disturbance cap (5% in MT and WY) on discrete human disturbances would be applied in PHMA. Human disturbances in PHMA, GHMA, and IHMA would be mitigated to ensure a net conservation gain to GRSG. Conservation measures would be implemented, such as adaptive management and defined monitoring protocols (**Appendix 2**).

Livestock Grazing Management

Under Alternative 1, the effect of livestock grazing management could increase the management actions necessary to maintain GRSG objectives in PHMA, GHMA, and IHMA.

Impacts could include modifying grazing strategies or rotation schedules, changing the season of use, changing the kind and class of livestock, deferring grazing use until a set objective is met, or reducing livestock numbers. Implementing this management direction could reduce AUMs on some allotments and present challenges to livestock operation viability.

Impacts from modification of grazing strategies could result in a decline in permitted grazing, anticipated over time as permits are modified to meet objectives. Under the Alternative 1, priority for land health assessment and permit renewal on BLM-administered lands would be tiered to include SFA first, followed by PHMA outside the SFA. Existing permits and leases in these areas not meeting Land Health Standards would be given priority, with a specific focus on those containing riparian areas, including wet meadows. The timeline for changes in management would generally follow this priority. In the long term, this prioritization could improve rangeland conditions for livestock and wildlife by focusing management on PHMA that are in most need of improvement.

In GHMA and PHMA, the potential risk to GRSG and its habitats from existing structural range improvements will be evaluated, and modifications of those structural range improvements identified as posing a risk will be addressed. Supplements and supplemental feeding will continue to be authorized where appropriate. New range improvement projects would be designed to monitor, adjust, and limit impacts from new and existing water and structural range improvements, as well as fences. Existing range improvements would be evaluated to make sure they conserve, enhance, or restore GRSG habitat. Consideration of GRSG habitat needs would likely limit the number and types of constructed range improvements. In some instances, improvements may be removed to help attain GRSG habitat objectives.

Under Alternative 1, all or portions of 15 key RNAs would be unavailable to grazing. In those areas, permittees and lessees would need to locate alternative forage or reduce AUMs, with the potential for economic impacts.

Modifications to grazing systems could be required to meet seasonal habitat objectives, increasing costs to lessees and permittees. Acres within nesting habitat may be more likely to require changes to grazing management, due to the desired conditions for this habitat type. Impacts would occur on an allotment scale as permit renewal and related management changes were implemented. The level and intensity of impacts would vary on a site-specific basis.

Under Alternative 1, the BLM may determine if voluntarily relinquished grazing permits and leases and associated allotments should remain available for livestock grazing or be used for other resource management objectives, in accordance with WO IM 2013-184. This may result in some reduction of overall available AUMs, but relinquishment is likely to remain uncommon.

Wild Horse and Burro Management

Management to adjust or reduce AMLs would enhance vegetation productivity and sustainable forage, particularly where rangeland conditions could be improved. Tiered prioritization of gathers in HMAs in SFA, followed by PHMA, GHMA, and IHMA to meet established AMLs would reduce any current levels of forage competition between wild horses and burros and livestock on allotments in PHMA.

10.8.3 Alternative 2

Greater Sage-Grouse Management

Rangewide Environmental Consequences

Impacts from designating GRSG habitat as SFAs, PHMA, IHMAs, and GHMA (**Table 2-3**) would be similar to those described for Alternative 1.

State-Specific Environmental Consequences

SFAs would be removed in UT, WY, NV/CA, and ID, thereby reducing restrictions due to GRSG habitat protection on livestock grazing operations in those areas. Removing SFAs would also prevent restrictions on land use and surface disturbing activities, and the impacts on livestock grazing from those surface disturbing activities would be as described under *Nature and Type of Impacts*. Removing restrictions on SFAs would likely result in fewer impacts on livestock grazing operations when compared with Alternative 1. Protections afforded to forage from restrictions to land use and surface-disturbing activities would continue in SFAs in MT and OR, where the habitat classification would be retained; impacts would be as described under Alternative 1.

Under Alternative 2, the GHMA designation in UT would be removed with all corresponding management actions from the 2015 plan amendments. Removal of GHMA and their associated management actions would likely lead to development in areas formally identified as GHMA and could therefore lead to removal of forage and increased human-livestock conflicts, which would increase impacts on livestock grazing operations when compared with Alternative 1.

Requirements for mitigation that achieves a net conservation gain in all HMA types would apply in MT/ND, NV/CA, and OR, and impacts would be the same as described for Alternative 1. CO and ID would enforce mitigation resulting in no net loss in HMAs. In UT, there would be a requirement to minimize or eliminate threats affecting the status of GRSG or to improve the condition of GRSG habitat. These requirements would help reduce impacts on livestock grazing associated with land use and surface disturbing activities but to a lesser extent than Alternative 1, in which a net conservation gain would be required. In WY, the net conservation gain requirement would be removed, which would increase potential for impacts.

The BLM would not require compensatory mitigation in HMAs, but it would enforce state mitigation policies and programs in CA, CO, ID, OR, UT, and WY. Compensatory mitigation would be voluntary unless required by laws other than FLPMA or by the state. As a result, the potential for impacts from land use activities would increase relative to Alternative 1, in which a net conservation gain would be required.

Impacts from applying a 3% disturbance cap in CO, ID, NV/CA, OR, UT, and the Dakotas or a 5% disturbance cap in MT and WY in PHMA would be like those described for Alternative 1. In UT and ID, the 3% disturbance cap could be exceeded if it would benefit GRSG. The cap would be applied at the BSU and project scale, except in ID which would only apply it at the BSU scale. Some additional development could occur in ID, which may increase potential for forage loss. The ability to exceed the disturbance and density caps could result in loss and degradation of livestock forage and increased human-livestock conflicts. Surface disturbing projects that would be precluded under if no exceedances were allowed could proceed under Alternative 2; however, exceedances to the caps would only be allowed if site-level analysis indicates the project, in combination with all voluntary and required design features, will improve the condition of GRSG habitat, thus likely improving forage conditions.

Minerals Management

Rangewide Environmental Consequences

Impacts on livestock grazing operations from fluid mineral management in PHMA and GHMA would be the same as described for Alternative 1, except in CO PHMA and CO GHMA (see *State-Specific Environmental Consequences*, below).

Impacts from saleable mineral management in PHMA and GHMA would be the same as described for Alternative 1, except in ID IHMAs and NV/CA PHMA (see *State-Specific Environmental Consequences*, below).

Impacts from nonenergy mineral management in PHMA and GHMA would be the same as described for Alternative 1, except in NV/CA PHMA (see *State-Specific Environmental Consequences*, below).

Removing the recommendation for withdrawal of the SFAs in all states (except in MT and Dakotas, which did not have a 2019 amendment) from location and entry under the Mining Law of 1872 would have no impact. This is because recommendations for withdrawal do not restrict any activities; therefore, such recommendations have no impact. The Secretary proposes and makes withdrawals not through BLM land use planning but according to a separate process pursuant to section 204 of FLPMA.

State-Specific Environmental Consequences

Removing the closure of CO PHMA to fluid mineral development would increase potential for surface disturbance, forage loss, and human-livestock conflicts. This is because mineral development activities could occur in previously closed areas. Changing GHMA from closed to fluid mineral development to NSO would likely not change impacts to livestock grazing operations because the NSO stipulation would avoid potential for surface disturbance and forage loss or degradation.

Impacts from prioritizing fluid mineral leasing outside of HMAs in CO, ID, OR, and MT/Dakotas would result in the same impacts in these states as described under Alternative 1. Removing the objective in UT, NV/CA would increase the potential for impacts because land in PHMA and GHMA could be leased. In WY, fluid mineral leasing would be allowed in PHMA, which would increase the potential for impacts. If the BLM has a backlog of interest for leasing, the BLM would prioritize work first in non-habitat followed by lower-tier habitat management areas (e.g., GHMA).

Adding an exception criterion to saleable and nonenergy mineral closures for NV/CA PHMA and allowing consideration of new free use permits for saleable minerals in ID IHMA would increase the potential for associated impacts on livestock grazing operations. This is because there would be a greater chance for saleable and/or nonenergy mineral activities to occur in these areas.

Lands and Realty Management

Rangewide Environmental Consequences

Impacts from ROW management would be the same as described for Alternative 1, with additional exception criteria in NV/CA.

State-Specific Environmental Consequences

There would be additional exception criteria for ROW development in NV/CA PHMA and for wind development in NV/CA GHMA. This could increase the potential for impacts associated with ROW and renewable energy development because there would be a higher chance of development.

Renewable Energy Management

Rangewide Environmental Consequences

Impacts from renewable energy management would be the same as described for Alternative 1 (with additional exception criteria in NV/CA).

State-Specific Environmental Consequences

There would be additional exception criteria for ROW and wind/solar development in NV/CA PHMA and for wind development in NV/CA GHMA. This could increase the potential for impacts associated with ROW and renewable energy development because there would be a higher chance of development and surface disturbance.

Livestock Grazing Management

Rangewide Environmental Consequences

Impacts from domestic livestock grazing management would be the same as described for Alternative 1, except for in the states described below.

State-Specific Environmental Consequences

In UT, WY, and NV, the prioritization for review and processing of grazing permits was removed. The BLM would still have the authority to prioritize staff time and budget to identify areas that aren't meeting land health standards and implement corrective actions in areas with the greatest GRSG habitat value.

The additional clarification of habitat objectives to land health standards in WY, ID, and NV/CA and clarifications on grazing in riparian areas and management of range improvements in WY may lead to a loss of AUMs in some cases, prohibitions or limitations on range improvements and water developments. Over the long-term movement towards desired conditions under land health standards could improve overall forage conditions.

Wild Horses and Burro Management

Impacts from wild horse and burro management would be the same as described for Alternative 1.

10.8.4 Alternative 3

Livestock Grazing Management

Under Alternative 3, all PHMA and proposed ACECs (see **Table 2-3**) would be made unavailable to livestock grazing. To make grazing unavailable, the BLM may have to construct and maintain a large amount of fencing, particularly in areas with mixed surface ownership, to effectively make grazing unavailable. Removing the ability to graze livestock would directly impact permittees/operators through a reduction in income provided by grazing livestock on BLM lands across the rangewide planning area (see **Section 4.12**).

The requirement to remove livestock grazing in PHMA would result in direct and indirect economic impacts on individuals, companies, and the local community. Most ranches are dependent seasonally on forage on public lands, and some are dependent year-round. Eliminating AUMs on public lands would affect the entire ranching operation by reducing the total amount of available forage Without the opportunity to graze public lands, ranchers would be incentivized to sell their private lands leading to an increased potential for urbanization in some areas, leading to a loss of forage for both livestock and native grazers, and would remove the opportunity to graze livestock in the future, should management decisions change in subsequent resource management and land use plans.

Removal of grazing also means less landscape-scale removal of fine fuels. Eliminating livestock grazing may increase the potential for large and severe wildfires as fuel loads increased in the absence of managed grazing. There would be potential for the BLM to conduct targeted grazing as a means to reduce fine fuels but would not be near the scale that currently exists.

Where areas are made unavailable for grazing due to a permit or lease is being relinquished, the agency may have to compensate the permittee or lessee for the range improvement projects constructed under a range improvement permit or cooperative agreement, in accordance with 43 CFR Part 4120.3-6(c).

Wild Horses and Burro Management

Impacts from wild horse and burro management would be the same as described for Alternative 1.

10.8.5 Alternative 4

Greater Sage-Grouse Management

Impacts on livestock grazing operations from designating GRSG habitat as HMAs (**Table 2-3**) would be similar to those described for Alternative 1. Impacts from applying a 3% disturbance cap at the project scale would be similar as to those described for Alternative 2, however, the disturbance cap would apply to both existing and proposed infrastructure authorizations, subject to valid existing rights, while wildfire and agriculture would not be included in the disturbance cap calculation. The level of disturbance from other sources such as energy development, roads and ROWs, and other surface disturbing activities would be higher than if wildfire and agriculture were included in the disturbance calculation. The disturbance cap could be exceeded at the project scale under certain conditions, which may lead to more development and increased impacts on livestock grazing operations, forage, and increased human-livestock conflicts. There would be no exceptions to the 3% PHMA (and IHMA) disturbance cap at the HAF fine scale habitat selection area, which would limit removal of forage or disturbance livestock at this scale.

Minerals Management

Increasing the acres subject to NSO Alternative 4 compared with Alternative 1 would reduce the HMA acres affected and potential for impacts. Prioritizing projects that avoid, minimize, reduce, rectify, and/or adequately mitigate for direct and indirect impacts to PHMA/IHMAs and including applicable and technical COAs would also reduce impacts on livestock grazing operations and forage.

Lands and Realty Management

Impacts on livestock grazing from managing PHMA in all states and ID IHMAs as ROW avoidance areas would be like those described for Alternative 1. Where development cannot be avoided, additional protection would arise unless certain criteria are met (see **Chapter 2**). This would reduce the potential for impacts.

Managing GHMA as ROW avoidance areas within limited GRSG habitats to meet the RMP GRSG goals and habitat objective would reduce the potential for impacts on forage. Within ROW avoidance areas in GHMA, the potential for livestock grazing operations and forage to be affected may vary depending on the location. Avoiding placement of ROWs within one-half mile of PHMA or IHMA would protect those areas from impacts. All other areas would be managed as ROW open, so impacts, such as surface disturbance or forage removal could cause a reduction in AUMs, thus reducing the amount of forage available for grazing.

Renewable Energy Management

Rangewide Environmental Consequences

Impacts from managing PHMA in all states as ROW exclusion areas for wind and solar energy development would be similar to those described for Alternative 2. Since PHMA would apply to a smaller area under this alternative, the extent of reduction in impacts on livestock grazing from disturbance associated with from renewable energy development would be less.

Managing GHMA as avoidance areas for wind and solar energy development in all states would decrease the potential for impacts associated with wind and/or solar development but to a lesser extent than exclusion areas. Where avoidance is not possible, impacts to livestock grazing and forage would be minimized through certain measures such as avoiding surface use and occupancy. Such measures would protect PHMA and the forage within from indirect impacts.

State-Specific Environmental Consequences

Managing ID IHMAs as exclusion areas for wind and solar energy development within 3.1 miles from active leks and avoidance in the remainder of the IHMA would decrease the potential for impacts on livestock grazing and forage as described in Nature and Types of Effects, but to a lesser extent than if the entire IHMA were managed as an exclusion area. This is because solar and wind development would be considered on a case-by-case basis in avoidance areas, whereas it would be prohibited in exclusion areas. As such, there would be greater potential for development to occur in avoidance areas.

Livestock Grazing Management

Because the presence of GRSG HMAs would not affect whether an area is available for livestock grazing (except in Oregon key RNAs) and existing areas designated would be maintained as available or unavailable for livestock grazing, impacts from livestock grazing management would be the similar to those described for Alternative 1.

The BLM would include additional livestock grazing management objectives and actions to minimize or reduce impacts to GRSG and habitat. For example, in HMAs, livestock grazing would be managed to toward meeting land health standards the GRSG habitat objectives, avoid direct adverse impacts to key GRSG habitats from range improvements, and employ grazing management strategies that avoid concentrating livestock on key GRSG habitats during key seasons. This could lead to prohibition of range improvement construction as well as adjustments to existing AUMs to meet these management objectives. There would be increased flexibility to adjust the terms and conditions of grazing permits conditions to help avoid or reduce impacts to GRSG or habitat.

Additionally, where the land health standards for GRSG habitat are not met - as indicated by an unsuitable site-scale HAF assessment specific to site capability – and existing livestock grazing is a significant causal factor, adjustments to livestock grazing practices would be made at the authorization, allotment, or activity plan level and in accordance with applicable regulations (43 CFR Part 4180.2(c)(1) or subsequent changes to regulations or policy). Range improvements and other existing infrastructure, such as water developments, would be evaluated with respect to their effect on GRSG and GRSG habitat. These evaluations could lead to limitations on the placement, repair, or construction of range improvements.

Wild Horses and Burro Management

Impacts from wild horse and burro management would be the same as described for Alternative 1. Management of wild horse and burro populations to the low end of the AMLs could reduce forage competition between wild horse and burro populations and livestock in some areas.

10.8.6 Alternatives 5 and 6

Greater Sage-Grouse Management

Rangewide Environmental Consequences

Impacts from applying a 3% disturbance cap would be the same as described for Alternative 4, except in WY and MT (see State-Specific Environmental Consequences). Impacts from exceeding the 3% disturbance cap under certain conditions would be similar to those described for Alternative 4, but more exceptions would be allowed, which may result in increased development, leading to a potential reduction in forage availability.

State-Specific Environmental Consequences

Impacts from applying a 5% disturbance cap at the project scale in WY and MT would be similar to those described for Alternative 1. The 3% disturbance scale would still apply at the HAF fine scale habitat selection area, which may prevent some additional development within those areas, reducing impacts on livestock grazing operations. WY and MT would include wildfire and agriculture in the disturbance calculation, and therefore, the level of disturbance from other human-made surface disturbing activities would be relatively lower than if wildfire and agriculture were not included in the disturbance calculation, similar to Alternative 2.

Minerals Management

Impacts on livestock grazing from mineral resource management would be the same as described for Alternative 4. The exception is in WY and MT, where applying a 5% disturbance cap at the project scale could allow for more potential mineral development, depending on the degree to which wildfire and agriculture contribute to disturbance in a given area, which could increase surface disturbance and forage removal, as well has increased human-livestock conflicts.

Renewable Energy Management

Classifying PHMA and IHMA as avoidance areas for wind and solar energy development would increase the potential for surface disturbing impacts and disturbance to livestock compared with Alternative 1 under which most PHMA would be exclusion areas.

Managing GHMA as open to wind and solar energy development in all states would result in potential for surface disturbing and limitation on livestock grazing availability.

Lands and Realty Management

Impacts from managing PHMA in all states and ID IHMAs as ROW avoidance areas and applying minimization measures where major ROWs cannot be avoided would be similar to those described for Alternative 4.

Compared with Alternative 1, managing GHMA in all states as open to ROW with minimization measures and compensation would increase the potential for ground disturbing impacts and disturbance to livestock. Such management would benefit grazing in the instances where a ROW is needed to access an allotment or where a structural range improvement is desired.

Livestock Grazing Management

Rangewide Environmental Consequences

Impacts from livestock grazing management would be the same as described for Alternative 4.

State-Specific Environmental Consequences

In OR, the 15 key RNAs would be retained; but their associated areas allocated as unavailable to grazing are proposed to be retained, modified, or re-allocated to grazing based on district-generated, site-specific

updated information since the 2015 ARMPA. This would result in an increase in acreage available for grazing in the Black Canyon, Dry Creek Bench, North Ridge Bully Creek, South Ridge Bully Creek, and Spring Mountain Key RNAs (see **Appendix 3**).

Wild Horse and Burro Management

Impacts from wild horse and burro management under Alternative 5 would be similar to those described for Alternative 1.

10.9 LANDS AND REALTY (INCLUDING WIND AND SOLAR)

10.9.1 Methods and Assumptions

Indicators

Indicators of impacts on lands and realty, including renewable energy, are as follows:

- Acres of ROW restrictions (avoidance and exclusion areas) that would limit or preclude new transmission line development to support renewable energy projects

Assumptions

In addition to the assumptions in **Section 4.1**, this analysis includes the following assumptions:

- Existing ROWs, designated utility corridors, and communication sites would be managed to protect valid existing rights.
- On renewal, assignment, or amendment of existing ROWs, permits, and leases, additional stipulations could be included in the land use authorization.
- Major ROWs would be needed to develop and operate renewable energy facilities.
- Maintaining and upgrading utilities, communication sites, and other ROWs is preferred before the construction of new facilities in the decision area, but only if the upgrading can be accommodated within the existing ROW.
- Activities on dispersed private, state, tribal, or non-BLM federal parcels within a decision area would continue to require new or upgraded access, communication, and utility services.
- Federal energy policies including (42 USC Section 13201 et seq. [2005], Executive Order 14008, and the Energy Act of 2020), would continue to support and promote domestic energy production, including renewable energy such as wind and solar.
- The number of ROW applications for new communication and computer technology, such as fiber optic cable, would continue to increase.
- Where demand for new ROWs exists on public lands, restricting ROW development in those areas would likely redirect ROW development to adjacent nonfederal or non-GRSG habitat federal land areas to accommodate the demand where feasible.
- Power lines and other vertical structures in areas naturally devoid of perching opportunities provide a perch for raptors and subsequently increase the potential for GRSG to abandon leks (Johnson and Holloran 2010). Mitigation in the form of burying lines or including non-perching design features on lines could be required to reduce perching opportunities and subsequent impacts on GRSG.
- For all alternatives, a major ROWs is defined as transmission lines over 100kv and distribution pipelines over 24" diameter but may also include smaller electrical transmission and/or distribution lines and pipelines, as well as, other ROW projects that require large distances, density or footprints, with high levels of activity or surface disturbance. In addition, major ROW sites may contain multiple types of above and below ground features leading to a high density of infrastructure, or many tall structures. All others are considered minor ROWs (see Glossary).

- Wind speeds for utility scale wind are often placed in areas with average annual wind speeds of 14.5 miles per hour (mph) or higher. However, newer technologies may make it possible to place turbines in areas with wind speeds of 12–14 mph in some circumstances.
- The types of actions that can result in the impacts described below are discussed in more detail in **Section 4.9.1**, Nature and Type of Effects.

Impacts Common to All Alternatives

All action alternatives for each state would increase the restrictions of ROWs in PHMA by applying exclusion and avoidance areas. This would result in adverse effects to lands and realty and renewable energy since it would decrease the acreage available to new development, which could lead to more complex designs, exclude infrastructure placement in cost effective locations, result in overall greater development cost and increased review periods. Such stipulations could limit future access, delay or increase the cost of energy supplies, or delay or restrict communications service availability. ROW exclusion and avoidance areas decrease the amount of land available for new development and could promote collocation. Collocating of new infrastructure within existing ROWs could reduce land use conflicts, additional land disturbances, and demarcate the preferred locations for utilities, which would simplify the processing on BLM-administered lands.

Avoidance areas require ROW applicants to meet additional project criteria, which could influence project location, delay the availability of energy supply (by delaying or restricting pipelines or transmission lines) or delay or restrict communications service availability. Within exclusion areas, new ROW development would be prohibited, which would prevent the lands and realty program from approving new applications in these areas and shifting them to GHMA and nonhabitat areas where fewer restrictions would apply. These restrictions would prevent the BLM from accommodating future demand for ROW development within the decision area.

10.9.2 Alternative 1

Under alternative 1 the entire plan area with the exception of Wyoming would limit lands used for ROWs in PHMA (or IHMA in Idaho) and GHMA for GRSG. Variations range from blanket restrictions on ROW development in PHMA and GHMA to variable restrictions by industry or project type. Plan details are derived from each state's 2015 ARMPA. **Table 38** in **Appendix 12** provides each state's proposed management of ROWs under Alternative 1 for all ROW types. Wind acres associated with the RFD are in **Appendix 12**, **Table 37** and solar acres associated with the RFD are in **Appendix 9**, **Table 3-10**.

Under Alternative 1, most of the states would manage PHMA and GHMA as ROW avoidance areas. PHMA would be managed as exclusion areas for ROWs including wind and solar major ROWs if the state has sufficient solar potential and differentiates solar ROWs.

Key elements in the planning area include the following:

- All states except North Dakota, South Dakota, and Utah would each have some form of disturbance caps on surface disturbing activities.
- Colorado, Idaho, Southwest Montana, and Utah would have land use authorizations that require avoiding disturbance to any BSU.
- Nevada, Northeastern California, Idaho, Southwest Montana, Utah, and Wyoming would require lek buffers.
- All states except for Colorado and Oregon would have requirements and/or restrictions for power lines.

- In Nevada, Northeastern California, Idaho, Southwest Montana, and Utah ROWs would be allowed if they could be demonstrated to provide a net conservation gain for GRSG habitat. A further description of this is located in **Appendix 2**. Existing GRSG Management.

Additionally, in Oregon, the BLM would manage SFA and PHMA outside of SFA as ROW exclusion areas for wind and solar, with the exception of Lake, Harney, and Malheur Counties. Within the avoidance areas of Lake, Harney, and Malheur Counties, Alternative 1 would establish a hierarchy to development opportunities, beginning with nonhabitat as the first preference, followed by poor quality GRSG habitat before considering high quality GRSG habitat.

Allowing future development in Lake, Harney, and Malheur Counties would accommodate future demand since these areas contain the most developable wind resources in the state. Demand for new transmission lines, access roads, and related ancillary features to serve new wind generation projects in Lake, Harney, and Malheur Counties, GHMA, and in nonhabitat or private lands could result in new ROW applications in PHMA.

In areas where the ROW avoidance and exclusion restrictions listed above would apply the impacts would be as described in the *Nature and Type of Effects*, above. Additionally, restrictions to development on BLM lands might push development onto private land, which could result in indirect impacts as described under *Nature and Types of Effects*.

Collectively, these GRSG conservation management actions would increase mitigation requirements for land use authorizations. This would result in more complex project designs, potentially excluding infrastructure placement in the most cost-effective or environmentally-suitable locations and potentially resulting in overall greater development costs. Another effect could be a reduction in the number of authorization applications for activities and longer, more complicated review periods for those that are proposed in GRSG habitat. A potential limiting factor for ROWs would be the width increase limit placed on existing ROWs. This limit would not accommodate the width of a fallen transmission line tower.

10.9.3 Alternative 2

Alternative 2 is derived from each region's respective 2019 RMPA/EIS, if completed by the state. Three of the states updated their plans with respect to lands and realty management. Colorado, Idaho, Montana, Oregon, North Dakota, and South Dakota did not provide a new or updated management for lands and realty and thus impacts would be as described under Alternative 1 for these states.

State-Specific Environmental Consequences

In Nevada, Alternative 2 would update the HMA boundaries for PHMA, GHMA, and OHMA to reflect the best available science, and outline a process for periodically revising these boundaries in the future as new data becomes available. Updating the HMA boundaries would result in a relatively minor shift in PHMA (-0.5%) and GHMA (+0.5%); these changes would not result in discernible differences from Alternative 1. The decrease in OHMA (-17%) would have negligible impacts on land use and realty, as there are limited allocation decisions tied to OHMA; therefore, the difference between the nature and types of impacts described would be negligible. These impacts are discussed under Alternative 1.

In Utah, Alternative 2 would remove the GHMA designation for GRSG from the 2015 plan. This would decrease impacts on lands and realty projects by allowing site-specific GRSG habitat analysis and population information, as well as proponent-developed project design elements, to be considered on a project-specific basis. If those voluntary measures were to improve GRSG habitat, both the disturbance and density caps

could be exceeded, allowing for more flexibility to allow consideration of infrastructure projects. There would be an option to exceed the cap by proponents developing measures that improve GRSG habitat. This would provide more opportunities for ROW development within PHMA.

The mitigation strategy for Alternative 2 in Utah would no longer require proponents to provide for compensatory mitigation on a project-by-project basis to show a net conservation gain. While the strategy would be similar, it would be achieved by the totality of GRSG management actions applied by the BLM. Not requiring proponents to pay for vegetation and habitat treatments could decrease project costs, providing more opportunities for ROW development in PHMA; however, during project design, the BLM would consider voluntary compensatory mitigation actions as a component of compliance with the State of Utah law, statute, or policy or when offered voluntarily by a project proponent. If such mitigation were volunteered, impacts would be the same as those described under the No-Action Alternative of the 2019 EIS.

Under Alternative 2 in Utah, changes in MA-SSS-3B[1] that allow site-specific GRSG habitat analysis and population information and project design elements to be considered on a project-specific basis, could potentially lessen impacts on renewable energy as it allows for more flexibility to allow infrastructure projects that exceed the disturbance cap if they meet the described criteria. This would likely have little impact on renewable energy development because PHMA would still be closed to commercial wind and solar development unless the project meets the exception criteria identified in MA-SSS-1.

In Wyoming under Alternative 2, impacts on the lands and realty program as a result of changes to habitat management areas would likely be minor over the landscape, with site-specific impacts potentially occurring where new restrictions are applied in areas that previously did not have restrictions (i.e., new PHMA in what was previously GHMA). This would require some projects to have additional restrictions and others to have fewer restrictions (i.e., projects in areas that transitioned from PHMA to GHMA designations). Depending on the change in acreage, impacts on lands and realty would likely be negligible.

Wind development in PHMA in Wyoming would be managed under the 2014 and 2015 decisions. If additional PHMA were identified in areas that were previously GHMA, then it could become more challenging for wind energy development to occur in those newly identified PHMA due to the restrictions on wind energy development in PHMA. If any areas were identified as GHMA (that were previously PHMA), those areas would then be available and open to wind energy development.

There would be no impact on solar energy development in Wyoming, beyond that identified under Alternative 1.

10.9.4 Alternative 3

Under Alternative 3 all HMAs and proposed ACECs would be managed as PHMA, there would not be GHMA classification and GRSG habitats would not be differentiated. This would result in all habitat being considered and managed as PHMA, and result in the most restrictions to lands and realty of all the alternatives.

Limitations on new ROWs and above-ground linear features, such as transmission lines and pipelines could restrict the availability of energy or service availability and reliability for communication systems. ROW exclusion areas could extend the processing time for renewals of existing ROW authorizations and make

[1] MA-SSS-3B – 2015 ARMPA Decision Number

siting of new linear or block ROWs more difficult. For linear ROWs, avoiding GRSG habitat could lead to the abandonment of the project based on increased costs or the inability to locate the project without using public lands. Costs also would be incurred as a result of requirements for mitigation in areas with limits on surface disturbance.

In some areas, there is a high concentration of intermixed landownership, corridors, oil, gas, and geothermal development, and existing authorizations. In these areas, restrictions on the ability to authorize ROWs and land tenure/landownership adjustments would have a greater impact than in areas with lesser degrees of intermixed ownership, ROW corridors, minerals development, and existing authorizations. The existing network of developed ROWs could provide opportunities for the collocation of compatible authorizations, but these may be limited due to size and availability. If the upgrading can be accommodated within the existing ROW and as long as it does not affect the integrity of, or the ability to operate facilities or their ability to operate their facilities (43 CFR Part 2807.14)

Managing habitat as exclusion areas for utility-scale wind and solar energy ROW development would eliminate LM's ability to accommodate new wind or solar energy demand on that portion of GRSG habitat. This would shift the burden to adjacent non-federal lands that do not have the siting requirements or mitigation standards and could increase costs. ROW exclusions would also inhibit development on adjacent private and state land where transmission infrastructure would be needed across BLM-administered lands. Alternative 3 would restrict the possibility for urban expansion and housing affordability, as well as limit necessary infrastructure development, including that required for emergency services.

10.9.5 Alternative 4

Under Alternative 4, areas within 0.5 miles of PHMA/IHMA would be designated as ROW avoidance areas to address the impacts to adjacent PHMA/IHMA. If these areas are mapped, then the remainder of GHMA that lies outside the 0.5-mile buffer, would be managed as open to major ROWs. If these areas are not mapped, the entire GHMA would be managed as ROW avoidance areas and the habitats would be identified during implementation. Designated corridors would be managed as open to ROWs and all habitats would be subject to mitigation, this would result in a less restrictive planning process for projects. GHMA would be managed as ROW avoidance areas within breeding, nesting, and limited-seasonal habitats. The identification of these habitats would be the responsibility of each state's wildlife agency. This would allow for states to have an additional involvement in the planning process.

Utility scale wind and solar projects in PHMA would be managed as ROW exclusion areas. IHMA would be managed as ROW exclusion areas within 3.1 miles of active leks, outside of the 3.1-mile buffer, and IHMA would be managed as ROW avoidance areas. Areas within 0.5 miles would be managed as ROW avoidance areas to address the indirect impacts to the adjacent PHMA and IHMA. GHMA not included in the 0.5-mile buffer would be managed as ROW avoidance areas for utility scale wind and solar projects. The impacts under Alternative 4 would result in standardized management practices across the project area and would remove State-by-State restrictions. This would allow for easier planning for large interstate projects such as transmission lines and simplify management expectations across the planning area. However, similar to Alternative 3, Alternative 4 could restrict the possibility for urban expansion and housing affordability as well.

10.9.6 Alternative 5

Under Alternative 5, lands encompassing major ROWs and utility scale wind and solar in PHMA would be managed as ROW avoidance areas, while in GHMA they would be managed as open to ROWs. GHMA

would be subject to mitigation measures for both major ROWs and utility scale projects. Designated corridors would remain open to ROW development and mitigation would not be required.

Similar to Alternative 4 the impacts would result in standardized management practices across the planning area. The impacts to ROWs would be less than all other alternatives since the BLM would not designate ROW exclusion areas, mitigation would not be required in corridors, and buffers would not be placed in areas surrounding HMAs.

10.9.7 Alternative 6

Impacts would be the same as Alternative 5. Additionally, management of ACECs as ROW exclusion under Alternative 6 could prevent ROWs from being developed, could increase costs, or could increase development pressure on adjacent lands.

10.10 MINERAL RESOURCES

10.10.1 Fluid Minerals (including Geothermal)

Methodology

The analysis of impacts on fluid minerals focuses on impacts of existing and proposed conservation measures to protect GRSG. These impacts may be direct or indirect. For example, a direct impact on oil and gas development would result from closing an area to fluid mineral leasing, particularly an area that has moderate to high potential for the development of an oil or gas resource. An indirect impact would result from managing an area as a ROW exclusion, which could prohibit construction of necessary off-lease facilities and access, thereby changing the economic feasibility of developing the leased resource. The types of actions that can result in these impacts are discussed in more detail in **Section 4.10.1**, Nature and Type of Effects. Additional actions or conditions that would cause direct or indirect impacts on fluid minerals are described under indicators below.

Indicators

Indicators of impacts on fluid minerals are as follows:

- The amount of land identified as closed to fluid mineral exploration and leasing
- The amount of land open to leasing subject to NSO stipulations
- The amount of land open to leasing subject to CSU stipulations
- The amount of land open to leasing subject to TL stipulations
- Application of COAs on fluid mineral exploration and development activities on existing and future leased lands for the protection of GRSG
- The amount of land managed as ROW avoidance areas
- The amount of land managed as ROW exclusion areas
- The amount of land closed to mineral material disposal

Assumptions

The analysis includes the following assumptions:

- Fluid mineral operations on existing federal leases, regardless of surface ownership, would be subject to COAs by the BLM Authorized Officer and the authorized officer of the surface management agency at the time of APD approval. The BLM and Forest Service can deny surface occupancy on portions of leases with COAs to avoid or minimize resource conflicts if this action does not eliminate reasonable opportunities to develop the lease. Existing leases would be developed consistent with

applicable laws and valid existing rights, using as many of the RDFs and conservation measures as possible while still allowing reasonable opportunities for development. Access to producing leases, including roads and pipelines to those leases, would not be affected by this RMPA.

- Valid existing leases would be managed under the stipulations in effect when the leases were issued; new stipulations proposed under this RMPA would apply only on new leases.
- Under all alternatives, reclamation bonds would be required, pursuant to 43 CFR 3104, in an amount sufficient to ensure full restoration of lands to the condition in which they were found. In addition, APDs, including drilling plans and surface use plans of operations, would be required under all alternatives in accordance with 43 CFR 3162.
- If an area is leased, it could be developed; however, not all leases would be developed within the life of this RMPA.
- As the demand for energy increases, so will the demand for extracting energy resources in areas with potential.
- Technological advancements, such as directional drilling, could lead to changes in levels of fluid mineral development potential throughout the planning area as additional resources become more easily accessible.

Alternative 1

Rangewide Environmental Consequences

All states include language to maintain and enhance sagebrush habitats with the intent of conserving GRSG populations. The exact language varies by state, see the state headings below for more details. This Alternative affirms habitat management area (HMA) boundaries from 2015 amendments (as maintained).

Most states are NSO (in PHMA and IHMA) and/or have seasonal restrictions. Wyoming and Montana are also subject to density and disturbance limits. Colorado closes PHMA within 1 mile of leks to fluid mineral leasing. This Alternative maintains the Sagebrush Focal Areas (SFAs) from the 2015 amendments.

If a state is not specifically mentioned under its own environmental consequences heading, the rangewide consequences would apply.

Colorado Environmental Consequences

Management actions related to lands and realty in conjunction with protection of GRSG and its habitats and use area could adversely impact fluid minerals leasing and development. This potential for impacts includes reduced availability, reduced accessibility, and increased costs.

Reduced availability is the least significant impact from lands and realty actions. This is because the BLM does not require a lands action (Issuance of a ROW grant) for surface occupancy of federal lands to drill into federal minerals. Accessibility to federal minerals with new leases could be significantly reduced or precluded when management of specific areas as ROW exclusion areas would prohibit access roads or pipelines into those areas.

Identification of ROW avoidance areas, while not creating absolute barriers to use of the area for access roads or pipelines, or for locating surface facilities on federal lands for the purpose of accessing private minerals, could make permissible facilities infeasible for technical or economic reasons. Some other potential management actions or BMPs could also affect costs that would make a project infeasible.

Alternative 1 would manage all PHMA and GHMA (**Table 2-3**) as ROW avoidance areas with exceptions for pending large transmission lines. No aboveground structures would be authorized within 1 mile of active

leks. Avoidance areas would require that impacts be avoided. The ROW could be allowed, subject to COAs, all applicable surface use stipulations, and any site-specific stipulations identified through the NEPA process. Potentially large local impacts on access of fluid minerals where the PHMA and GHMA are open for large transmission lines. Areas open to large transmission lines could preclude development of facilities required for access to fluid minerals.

New leasing would be prohibited within 1 mile of all active leks. Potentially large local impacts on access of fluid minerals where the PHMA and GHMA are open for large transmission lines. No modifications or waivers would be permitted, and the BLM Authorized Officer may grant an exception to this NSO stipulation only where the proposed action:

1. Would not have direct, indirect, or cumulative effects on GRSG or its habitat
2. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to GRSG

Exceptions based on conservation gain (number 2, above) may only be considered in PHMA of mixed ownership where federal minerals underlie less than 50% of the total surface, or areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid federal fluid mineral lease existing as of the date of this RMP. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits would endure for the duration of the proposed action's impacts.

Any exceptions to this NSO lease stipulation may be approved by the BLM Authorized Officer only with the concurrence of the State Director. The BLM Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies 1 or 2, above. Such finding would be made initially by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception would not be granted.

Approved exceptions would be made publicly available at least quarterly. Because all of PHMA would be managed as NSO with very rare potential for exceptions, impacts would be increased difficulty of access, increased costs, and decreased efficiency of oil and gas development in PHMA.

The following BMPs have the potential to significantly affect the economic feasibility of individual oil and gas projects. Those with the greatest potential for affecting future developments are the following:

- Place liquid gathering and storage facilities outside PHMA—Potentially cost prohibitive where a well pad would be located several miles from the storage tanks due to the additional piping costs when water or liquid condensates are produced in very small quantities from a natural gas well and more efficiently hauled off-site with trucks. However, because all PHMA would be NSO with limited exceptions under this alternative, very few well pads might be subject to this BMP.
- Place new utility developments in existing utility or road corridors—Potentially cost prohibitive where the road follows a long and topographically complex route, thereby lengthening the utility development and potentially requiring one or more lift stations for liquids.
- Bury electric distribution lines—Potentially cost-prohibitive where a well pad would be located a long distance from the nearest utility tie-in, compared to the cost of constructing an aboveground line fitted with raptor deterrents.

- Limit noise to less than 10 decibels above ambient levels at sunrise at a lek perimeter during the lek season and require noise shields during the lek, brood-rearing, and winter-use seasons—This could increase development costs if it were to require erecting expensive, site-specific, acoustical barriers for wells.
- Locate all new compressors outside PHMA—This could be cost prohibitive or not technically feasible in certain situations, depending on the topography over which gas-gathering pipelines are installed, the pressure of the natural gas at the wellhead, and the location and availability of a permissible compressor in relation to commercial pipelines, access roads, and other utilities.
- Incorporate GRSG habitat requirements in reclamation—This is unlikely to be an issue for well pad reclamation. However, very long road or pipeline corridors could be prohibitively expensive if they require including GRSG components if planting or transplanting sagebrush is required instead of including sagebrush in a seed mix with native perennial bunchgrasses and forbs.

A determination of the extent to which increased costs and decreased efficiency would affect fluid minerals development is a function of project- and site-specific considerations and of market forces at the time. It is possible that some well pads, access roads, pipelines, and other facilities would be affected to the extent that marginal projects are economically nonviable, reducing the number of future oil and gas wells to an extent that may be considered significant at the local, state, or regional levels.

Idaho Environmental Consequences

Impacts from Lands and Realty Management

Under Alternative 1, all PHMA and IHMA would be managed as ROW avoidance areas. All acres in PHMA and IHMA would be either closed to leasing or open subject to NSO stipulations, so no oil and gas activities on future leases within these areas would require new rights-of-way. Therefore, oil and gas activity in PHMA and IHMA would not be impacted by management of ROW avoidance areas under Alternative 1.

All GHMA would be managed as ROW avoidance for high voltage transmission lines and major pipelines but open to other fluid mineral-related ROW location under Alternative 1. Transportation of fluid minerals might be impacted by the major pipeline ROW avoidance but fluid minerals beneath those acres would be unlikely to be significantly impacted by the ROW avoidance area.

Application of RDFs, BMPs, buffers, and seasonal timing restrictions to ROW construction in all GRSG habitat would also limit construction of new ROWs for oil and gas development. If these limitations made it uneconomic to develop a ROW for oil and gas development, development of federal oil and gas resources in the planning area could decrease.

Impacts from Fluid Minerals Management

Under Alternative 1, approximately 257,400 unleased acres with medium development potential (33% of the federal oil and gas estate with medium development potential) would remain closed to oil and gas leasing. Closing unleased lands to leasing, especially those with medium potential, would have the greatest impact on fluid minerals resources in Idaho by prohibiting oil and gas development. Impacts of closing these areas to leasing are the same type as those described under Nature and Type of Effects.

Approximately 348,100 acres, or 44% of unleased federal oil and gas estate with medium development potential (including all areas in PHMA and IHMA not already closed) would be open to oil and gas leasing subject to NSO stipulations. Under this alternative there would be no waivers or modifications to the NSO stipulation, and only one exception would exist. A total of approximately 77% of unleased federal oil and gas

estate with medium oil and gas potential in the decision area would be inaccessible, either due to closure or NSO, under Alternative 1.

Under Alternative 1, approximately 121,900 unleased acres, or 17% of the unleased federal oil and gas estate with medium development potential would be open to oil and gas leasing, subject to lek buffers and TL stipulations. This would include all areas in GHMA not already closed. These stipulations would restrict the timing and location of oil and gas exploration and development activities**.**

Under Alternative 1, it is reasonably foreseeable for planning purposes that 15 new oil and gas exploratory wells would be developed on federal fluid mineral estate in the decision area in the next 20 years.

The BLM could not apply COAs that would eliminate reasonable opportunities to develop an existing lease. Therefore, although restrictions on development would increase where COAs were applied, oil and gas development would still be allowed in these areas.

Geophysical exploration would be allowed on the over 8 million acres of federal mineral estate within PHMA but would be subject to TLs and other restrictions. Geophysical exploration would be allowed only for gathering information about fluid mineral resources outside PHMA. Because of these limitations and the fact that PHMA would be closed to fluid mineral leasing, geophysical exploration in PHMA would decrease under this alternative. Decreases in geophysical exploration in PHMA could impact the fluid minerals program.

Under Alternative 1, RDFs would be applied as COAs to existing leases on PHMA and GHMA overlying federal mineral estate. Only management actions related to master development plans and unitization would apply. Application of the 3% disturbance cap in PHMA and IHMA could impact both new and existing fluid mineral activities by preventing or restricting new surface development. New fluid mineral activities and new surface development on existing leases could be affected or temporarily delayed if the cap were exceeded. Application of lek buffers in GHMA could impact both new and existing fluid mineral activities by preventing or restricting new surface development. Applying lek buffer distances when approving actions could also restrict development of infrastructure related to fluid mineral development.

Under Alternative 1, RDFs would be applied as COAs to existing leases on occupied habitat overlying federal mineral estate. These RDFs would include such requirements as surface disturbance limitations, TLs, noise restrictions, structure height limitations, design requirements, water development standards, remote monitoring requirements, and reclamation standards. The BLM could not apply COAs that would eliminate reasonable opportunities to develop the lease. Restrictions and costs on development would increase where COAs were applied, but oil and gas development would still have reasonable opportunity to occur.

Geothermal

Impacts from Fluid Minerals Management

Under Alternative 1, 11,296,800 acres, or 44% of planning areas, would remain closed to geothermal leasing. This includes 2,832,200 acres with moderate to high geothermal potential (32% of the moderate to high geothermal potential acres in the decision area). An additional 8,464,000 acres (34%) with no or low geothermal potential would remain closed to geothermal leasing. Geothermal resource potential may be outdated or inaccurate in some areas and it is possible that developable resources exist in these areas. New technologies such as Enhanced Geothermal Systems (EGS) could make areas considered low or moderate feasible in the future, therefore it is difficult to predict the impacts of closure of low to moderate geothermal potential areas.

13,834,400 acres would be subject to TL and CSU stipulations (including 1,278,100 acres in moderate to high geothermal potential areas) and 9,630,000 acres would be subject to NSO stipulations, including 2,906,800 acres in moderate to high geothermal potential areas.

Under the Alternative 1, RDFs and BMPs would be applied as COAs when a geothermal drilling permit or other post-lease activity is approved. In addition to affecting new leases, the COAs would be applied to the 25,571 acres of existing leases within GRSG habitat, consistent with existing lease terms and special stipulations. These RDFs and proposed management actions would include such requirements as noise restrictions, structure height limitations, design requirements, water development standards, remote monitoring requirements, and reclamation standards.

The BLM could not apply COAs that would eliminate reasonable opportunities to develop an existing lease. Restrictions on development would increase where COAs were applied, but geothermal development would still be allowed in these areas.

Impacts from Lands and Realty Management

Under Alternative 1, 8,365,000 acres (33%) of BLM-administered surface in the decision area (including all PHMA) would be managed as ROW avoidance areas, where development of new ROWs for geothermal development could not occur unless the Anthropogenic Disturbance Development and Screening Criteria (AD-3 and AD-4) were satisfied. These restrictions would only allow new ROWs to be developed pursuant to a valid existing authorization.

1,013,800 acres (4%) of BLM-administered surface in the decision area (including all IHMA) would be managed as ROW exclusion areas where development of new ROWs for geothermal development could not occur unless the Anthropogenic Disturbance Development Criteria (AD-4) were satisfied (including the requirement that the project would not exceed the 3% disturbance threshold). Lessees would be unable to site off-lease features, such as transmission lines, roads, and pipelines that may be necessary to transport the product to market, on public lands. These actions could result in the stranding of a geothermal lease and its resources, if surrounded by federal lands subject to these constraints.

Application of RDFs, BMPs, buffers, and seasonal timing restrictions to ROW construction in GRSG habitat would also limit the construction of new ROWs for geothermal development to certain times of the year or in certain locations. If these limitations made it uneconomic to develop a ROW for geothermal development, development of federal geothermal resources in the planning area could decrease.

Impacts from Anthropogenic Disturbance Management, Adaptive Management, and Coordination

Under Alternative 1, anthropogenic disturbance, including leasable mineral development, would be limited to 3% of nesting and wintering habitat within PHMA and IHMA within a Conservation Area (BSUs). In BSUs where the 3% cap is already exceeded, new development of federal leasable mineral resources would be prohibited until enough habitat was restored to maintain the area under the threshold. Development of federal leasable mineral resources that would result in exceedance of the 3% cap in a BSU would also be prohibited. Impacts would be greatest where these caps limit development in unleased portions of high geothermal potential because these areas have the highest potential for leasable mineral development. The uncertainty from this limitation could decrease the value of any future lease, disincentivize geothermal energy development in the western United States, and could affect the ultimate scope of rights authorized under any lease offered in the future.

Montana Environmental Consequences

Under Alternative 1, priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMA and GHMA. When analyzing leasing and authorizing development of fluid mineral resources, including geothermal, in PHMA and GHMA, and subject to applicable stipulations for the conservation of GRSG, priority will be given to development in non-habitat areas first and then in the least suitable habitat for GRSG. Where a proposed fluid mineral development project on an existing lease could adversely affect GRSG populations or habitat, the BLM will work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts to the extent compatible with lessees' rights to drill and produce fluid mineral resources.

Alternative 1 would apply an NSO stipulation within all GRSG PHMAs and apply an NSO stipulation within 0.6 miles of GRSG leks in Restoration Areas and GHMAs. Development on existing leases within PHMAs would be subject to density and disturbance limits. CSU stipulations would be applied within RAs in order to maintain GRSG habitat. TL stipulations would be applied from March 1 to June 15 in GRSG nesting habitat within 3 miles of a lek within RAs and GHMAs, and from December 1 to March 1 within designated GRSG winter range within 3 miles of a lek.

In PHMA, this alternative would implement an anthropogenic disturbance cap of 5% at the BSU and project area scale and implement a density cap of an average of 1 energy and mining facility per 640 acres.

Nevada Environmental Consequences

Alternative 1 would require a 3% disturbance cap on human surface-disturbing activities in PHMA and would incorporate RDFs consistent with applicable law in PHMA, GHMA, and OHMA. It requires all human disturbances to result in a net conservation gain for GRSG and their habitat, and lek buffers would be required.

Collectively, these GRSG conservation management actions would increase mitigation requirements for land use authorizations. This would result in more complex project designs, potentially excluding infrastructure placement in the most cost-effective locations, and potentially resulting in overall greater development costs.

A corresponding effect could be a reduction in the number of authorization applications received for activities in PHMA and longer, more complicated review periods for those that are proposed in PHMA. Implementing the GRSG habitat conservation management actions listed above would also place NSO stipulations on fluid mineral development in PHMA, which would further reduce the demand for new ROW development in those areas.

North Dakota Environmental Consequences

Impacts from Lands and Realty

Under Alternative 1, all BLM-administered surface in PHMA (32,900 acres, or approximately 100% of BLM-administered surface in the decision area) would be managed as ROW avoidance areas for oil and gas-related activities. All fluid mineral development in PHMA would be subject to NSO stipulations under Alternative 1, so managing ROW avoidance areas in PHMA would have no impact on fluid minerals.

All GHMA would be open to ROW location for oil and gas-related activities under Alternative 1. Identification of conservation measures to minimize surface disturbance and disrupting activities could increase the expense of developing facilities for oil and gas operations by limiting routing options and requiring the use of more expensive technology.

Impacts from Fluid Minerals (Including Mineral Split Estate)

Application of the density and disturbance caps in PHMA and lek buffers in PHMA and GHMA could impact both new and existing oil and gas activities by preventing or restricting new surface development. New oil and gas activities could be precluded if the cap were exceeded in a BSU or a proposed project analysis area. New surface development on existing leases could be restricted if the cap were exceeded. The BLM would not apply the density and disturbance caps in a manner that would eliminate reasonable opportunities to develop an existing lease. Applying lek buffer distances when approving actions could also restrict development of infrastructure-related fluid mineral development. Under Alternative 1, except that the lack of waivers and modifications, combined with the limited exceptions for NSO stipulations under Alternative 1 Amendment, would further restrict oil and gas activities.

Under Alternative I, federal oil and gas estate in PHMA would be open to fluid mineral leasing subject to NSO stipulations. The unleased federal oil and gas estate in PHMA would be subject to these stipulations. Under this alternative, there would be no waivers and modification, and limited exceptions for NSO stipulations which would further restrict oil and gas activities.

All GHMA would be subject to CSU stipulations. Impacts of these stipulations would be the same type as those described under *Nature and Type of Effects* in **Section 4.2.1** above.

Under Alternative 1, it is projected that 51 new exploratory and development wells would be drilled on federal oil and gas estate in the short term. Of these new wells, 42 are expected to be producing oil and gas wells in the long term**.**

In addition to RDFs and limitations on disturbance, structure height restrictions would apply under Alternative 1. Closing areas within GRSG habitat to fluid mineral leasing would directly impact the fluid minerals program by prohibiting the development of those resources on federal mineral estate. Fluid mineral operations would be limited in their choice of project locations and may be forced to develop in areas that are challenging to access or have less economic resources because more ideal areas could be closed to leasing. No quantitative percentage limit, surface occupancy buffers, or TL would apply to surface disturbance. Surface disturbance would prevent or minimize disturbance to GRSG and their habitat. Unitization would occur on a case-by-case basis.

Geophysical exploration would be allowed, except for in PHMA, where geophysical exploration would be limited to use of existing roads and trails, as well as helicopter-portable methods on the 61,197 acres of federal oil and gas estate but would be subject to TLs and other restrictions, reducing exploration opportunities.

Oregon Environmental Consequences

Impacts from Lands and Realty Management

Under Alternative 1, all BLM-administered surface in PHMA (totaling 4,547,000 acres, or approximately 36% of BLM-administered surface in the decision area) would be managed as ROW avoidance areas for fluid mineral-related activities. All PHMA would be subject to NSO stipulations on fluid mineral leases, so no fluid mineral activities on future leases within these areas would require new ROWs. Managing PHMA as ROW avoidance areas would have minimal impact on fluid minerals development but could impact the location of fluid mineral transportation pipelines if any were proposed.

All BLM-administered surface in GHMA would be managed as ROW avoidance for high voltage transmission lines and major pipelines, but open to other fluid mineral-related ROW location under Alternative 1. Fluid minerals beneath those acres would be impacted by the ROW avoidance area**.**

Impacts from Fluid Leasable Minerals Management

Under Alternative 1, 4,333,700 acres (31% of the federal mineral estate decision area), including all federal mineral estate in PHMA, would be subject to NSO stipulations; 4,319,800 acres subject to NSO stipulations would be unleased, so this management would apply NSO stipulations to 31% of the 14,147,900 unleased acres in the decision area. Application of NSO stipulations to leases on these acres would directly impact the fluid minerals program. The lack of waivers and modifications combined with the limited exceptions for NSO stipulations under Alternative 1 would further restrict oil and gas and geothermal activities. SFA would be subject to NSO stipulations with no waivers, exceptions, or modifications.

Approximately 4,847,400 acres of federal mineral estate would be subject to CSU and TL stipulations. This includes all federal mineral estate in GHMA not subject to other existing stipulations, or 34% of the federal mineral estate decision area; 4,715,500 of these acres are unleased. Application of CSU and TL stipulations to leases on these acres would directly impact the fluid minerals program

Under Alternative 1, the BLM would manage lands to conserve, enhance, and restore GRSG habitat. PHMA and GHMA would be designated, and the BLM would implement numerous conservation measures to reduce impacts from human activities in PHMA, including a maximum 3% disturbance cap to human activities, not including wildfire, in PHMA. Application of the 3% disturbance cap in PHMA and lek buffers in GHMA could impact both new and existing fluid mineral activities by preventing or restricting new surface development. New fluid mineral activities could be precluded if the cap were exceeded in an Oregon priority area of conservation and the proposed project area. New surface development on existing leases could be restricted if the cap were exceeded. The BLM would not apply the disturbance cap in a manner that would eliminate reasonable opportunities to develop an existing lease. Applying lek buffer distances when approving actions could also restrict development of infrastructure related to fluid mineral development.

Geophysical exploration would be allowed on the 11,234,800 acres of federal mineral estate within GRSG habitat but would be subject to seasonal restrictions. Because of these limitations, geophysical exploration in GRSG habitat would decrease under this alternative. Decreases in geophysical exploration in GRSG habitat would impact the fluid minerals program.

Under Alternative 1, conservation measures in addition to RDFs would be applied as COAs to the five federal leases in PHMA. These RDFs and conservation measures would include such requirements as surface disturbance limitations, TLs, noise restrictions, structure height limitations, design requirements, water development standards, remote monitoring requirements, and reclamation standards. The only conservation measures applied would relate to master development plans and unitization.

South Dakota Environmental Consequences

Impacts from Lands and Realty Management

Under Alternative 1, all BLM-administered surface in PHMA, exclusive of GRSG winter range, would be managed as ROW exclusion areas for fluid mineral-related activities. GHMA and GRSG winter range would be ROW avoidance areas. All PHMA would be subject to NSO stipulations on fluid mineral leases, so no fluid mineral activities on future leases within these areas would require new ROWs. Managing PHMA as ROW exclusion areas would have minimal impact on fluid minerals development but could impact the location of fluid mineral transportation pipelines if any were proposed.

Impacts from Fluid Leasable Minerals Management

Under Alternative 1, 152,100 acres (45% of the federal mineral estate decision area), including all federal mineral estate in PHMA and GRSG winter range in GHMA, would be subject to NSO stipulations. Application of NSO stipulations to leases on these acres would directly impact the fluid minerals program**.** The lack of waivers and modifications combined with the limited exceptions for NSO stipulations under Alternative 1 would further restrict oil and gas and geothermal activities.

Approximately 21,175 acres of federal mineral estate would be subject to CSU stipulations and 1,169 acres subject to TL stipulations. This includes all federal mineral estate in GHMA in nesting and brood-rearing habitat near leks. Application of CSU and TL stipulations to leases on these acres would directly impact the fluid minerals program.

Under Alternative 1, the BLM would manage lands to conserve, enhance, and restore GRSG habitat. PHMA and GHMA would be designated, and the BLM would implement numerous conservation measures to reduce impacts from human activities in PHMA, including a maximum 3% disturbance cap to human activities in a BSU and 5% cap including wildfire and agriculture at the project level. Application of the disturbance cap in PHMA and lek buffers in GHMA could impact both new and existing fluid mineral activities by preventing or restricting new surface development. New fluid mineral activities could be precluded if the cap were exceeded in a BSU and the proposed project area. New surface development on existing leases could be restricted if the cap were exceeded. The BLM would not apply the disturbance cap in a manner that would eliminate reasonable opportunities to develop an existing lease. Applying lek buffer distances when approving actions could also restrict development of infrastructure related to fluid mineral development.

Under Alternative 1, conservation measures in addition to RDFs would be applied as COAs to federal leases in PHMA. These RDFs and conservation measures would include such requirements as surface disturbance limitations, TLs, noise restrictions, structure height limitations, design requirements, water development standards, remote monitoring requirements, and reclamation standards.

Utah Environmental Consequences

Application of the 3% disturbance cap in PHMA could impact both new and existing fluid mineral activities by preventing or restricting new surface development. New fluid mineral activities could be precluded if the cap were exceeded in a BSU or a proposed project analysis area. New surface development on existing leases could be restricted if the cap were exceeded. The BLM would not apply the disturbance cap in a manner that would eliminate reasonable opportunities to develop an existing lease. Currently there are no population areas where the level of disturbance exceeds the disturbance cap. Tere are areas within 4 miles of a lek in population areas that are near or exceeding the disturbance cap, including in the Carbon and Uintah Population Areas where there is higher potential for oil and gas.

Application of lek buffers in GHMA could impact new and existing fluid mineral activities by restricting new surface development. Lek buffers in PHMA would not impact fluid mineral development because all PHMA would be subject to NSO stipulations. Any development for which the limited exception to the NSO stipulation were granted would not be within the lek buffer. In GHMA, applying lek buffer distances when approving actions for linear features, infrastructure related to energy development, tall structures (including transmission lines), surface disturbance, and noise could also restrict development of infrastructure related to fluid mineral development, especially in areas of high potential for oil and gas.

In PHMA, the density of energy and mining facilities would be limited to one energy/mining facility per 640 acres. When calculated at the project level, this requirement would push developers to consolidate facilities and, where technically feasible, directionally or horizontally drill from outside of GRSG habitat.

RDFs would be applied in PHMA and GHMA. However, exceptions to the application of RDFs could mitigate impacts on fluid minerals. Exceptions would occur where a design feature was not applicable (e.g., a resource is not present on a given site) or where the design feature would not actually provide additional protection for GRSG or its habitat. Disturbance caps, lek buffers, and density restrictions, additional conservation measures in PHMA would include net conservation gain requirements, restrictions on noise and tall structures, and seasonal restrictions. These combined would restrict oil and gas development. In the Carbon and Uintah Population Areas, where oil and gas potential is relatively high and some areas are at or exceeding the disturbance cap, the cumulative effect of all of the restrictions would likely reduce opportunities for oil and gas development on public lands.

Exploration would be allowed on federal mineral estate within GRSG habitat but would be subject to seasonal restrictions.

Infrastructure Development (including all ROWs and utility corridors)

Management actions for programs related to infrastructure development other than lands and realty would not impact fluid minerals. Only the impacts from lands and realty management actions are discussed in the paragraphs below.

Under Alternative 1, all BLM-administered surface within PHMA not already managed as ROW exclusion would be managed as ROW avoidance for new linear and site-type ROWs, except for within ROW corridors designated for aboveground use. All acres in PHMA would be either closed to leasing or open subject to NSO stipulations, so no oil and gas activities on future leases within these areas would require new ROWs.

Under Alternative 1, 3,219,000 acres (97%) of BLM-administered surface within the decision area in Utah would continue to be open to ROW location. Wherever there is overlap between federal oil and gas leases and the 94,800 acres (3%) of BLM-administered surface in the decision area that would continue to be managed as ROW avoidance or exclusion under this alternative, the fluid minerals program could be indirectly impacted by the resulting limits on the available means for transporting fluid minerals to processing facilities and markets. Impacts would be mitigated where new ROWs could be collocated within existing ROWs. Leases within units would not be impacted as much because infrastructure within these unitized leases is exempt from ROW requirements.

Impacts would be mitigated for existing leases in PHMA because collocation of new ROWs close to existing ROWs and minimal construction of new roads would be allowed. In PHMA, ROW development that was able to occur would be subject to RDFs, lek buffers, the disturbance cap, and limitations for tall structures, and net conservation gain requirements, which could impact fluid minerals development. The expense of these mitigation activities would increase the costs of oil and gas development.

Under Alternative 1, GHMA would be available for the types of ROW location that could impact fluid minerals development, except for 17,600 acres already managed as exclusion. While fluid minerals development would not be directly impacted because of ROW avoidance or exclusion areas, ROW development in GHMA would be subject to RDFs, lek buffers, and net conservation gain requirements,

which could impact fluid minerals development. The expense of these mitigation activities would increase the costs of oil and gas, oil shale, and tar sands development.

Mineral Development

Management actions for mineral programs other than mineral materials and fluid minerals would not impact fluid minerals. Therefore, only the impacts from mineral materials and fluid mineral management actions are discussed in the paragraphs below.

Mineral Materials

Under Alternative 1, PHMA in Utah would be closed to commercial mineral material disposal. PHMA on lands in the Utah portion of the planning area would be closed to commercial mineral material disposal. This includes 1,196,000 acres with mineral material occurrence (92% of federal mineral estate with mineral material occurrence in the decision area). Closing these areas to mineral material disposal could indirectly impact fluid minerals in the areas by reducing the amount of readily available material for road and pipeline construction. This could limit the available means for accessing fluid mineral resources and transporting those resources to processing facilities and markets and could ultimately decrease the amount of development of federal fluid minerals in the planning area.

Free use permits and expansion of existing active pits in PHMA would be subject to the disturbance cap, density of energy/mining facilities restrictions, lek buffers, RDFs, noise restrictions, seasonal restrictions, and net conservation gain requirements. These requirements, particularly on the expansion of existing active pits, would further restrict access to mineral materials and increase costs associated with fluid minerals development.

Fluid Minerals

Outside of the areas closed to new fluid mineral leasing, the remaining PHMA would be open to new oil and gas leasing subject to an NSO stipulation. Of this area, NSO stipulations on approximately 7% of federal mineral estate would not be available with waivers, exceptions, or modifications. These areas are in the Rich and Box Elder Population Areas. The Box Elder Population Area does not have high potential for oil and gas, so impacts would be minimal. The potential in the Rich Population Area is high. Most federal mineral estate in the Rich Population Area is already under lease, and many oil and gas fields have already been depleted. Impacts of the 233,400 acres subject to NSO with no waivers, exceptions, or modifications would be minimal.

In the remainder of PHMA, an exception to the NSO stipulation could be granted if the activity would not have direct, indirect, or cumulative effects on GRSG or its habitat or is proposed as an alternative to a similar action occurring on a nearby parcel and would provide a clear conservation gain to GRSG. Any exception must have to concurrence of the state wildlife agency and the USFWS. As such, exceptions would only be granted on rare occasions. Any development that did occur in PHMA would be subject to the pertinent management for discretionary activities (mitigation measures, disturbance cap, minerals/energy density restrictions, lek buffers, seasonal restrictions, and RDFs). Impacts of which are discussed under Special Status Species – GRSG.

Approximately 30,000 acres in GHMA would also be closed to fluid mineral leasing. GHMA near leks would be managed as NSO, the NSO buffer from the leks would vary by office. In GHMA, development would be subject to the disturbance cap, mitigation, lek buffers, and RDFs.

Wyoming Environmental Consequences

Under Alternative 1, 883,670 acres in Wyoming would be closed to oil and gas leasing. This, in addition to other restrictions, such as NSO on 441,690 acres and CSU on 6,438,480 acres within PHMAs and GHMAs would reduce the number of projected oil, gas, and CBNG wells projected under this alternative. In total, 12,355 oil and gas and 2,462 CBNG wells are projected over the life of the plan under this alternative. Drainage of federal minerals on areas closed to leasing or on leases that are shut in on an annual basis due to timing and distance limitations may occur due to development on adjacent private or state lands.

Density limitations of one oil and gas or mining location per 640 acres and a 5% disturbance cap within PHMAs (core only) would slow mineral development and could also lead to the relocation of well pads, access roads, pipelines, and ancillary facilities. Relocation of these proposed facilities could cause temporary delays in developing oil and gas resources and limit oil and gas activities in these areas.

Applying BMPs to federal mineral estate where the surface ownership is non-federal could restrict the ability of mineral operators to efficiently develop mineral resources. Depending on the stipulations required, these requirements could increase delays in mineral development.

Avoiding primary and secondary roads within 1.9 miles of the perimeter of occupied GRSG leks and prohibiting other new roads within 0.6 miles of the perimeter of occupied GRSG leks within PHMAs could lead to the relocation of well pads, access roads, pipelines, and ancillary facilities. Relocation of these proposed facilities could cause temporary delays in developing oil and gas resources and could limit oil and gas activities in these areas.

Alternative 2

Rangewide Environmental Consequences

In PHMA management would be the same as Alternative 1, except Colorado has no closed areas. In GHMA, management would be the same as Alternative 1, except Colorado changed the closure areas to NSO.

Mitigation: The BLM in Montana, North Dakota, South Dakota, Nevada, California, and Oregon would apply the same mitigation as Alternative 1. The BLM does not require compensatory mitigation but will enforce state mitigation policies and programs. Colorado and Idaho provide mitigation resulting in no net loss. Utah and Wyoming removed the net conservation gain requirement. Colorado, Idaho, Nevada/California, Oregon, Utah, and Wyoming specify that compensatory mitigation would be voluntary, unless required by laws other than FLPMA or by the State.

The 3% disturbance cap does not include wildfire or agriculture. In Idaho the cap can be exceeded in utility corridors if there is a demonstrated benefit to GRSG. In Utah the disturbance cap can be exceeded if it will benefit GRSG. The cap is applied at the BSU and project scale except in Idaho which just applies it at the BSU scale. In Montana and Wyoming, a 5% disturbance cap which includes disturbance from wildfire and agriculture, is applied at the project area scale in PHMA.

In Colorado, Idaho, Oregon, and Montana and Dakotas field offices, priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMAs and GHMAs, or within the least impactful areas within PHMA and GHMA if avoidance is not possible. In Utah, Nevada/California, and the Lewistown and Butte field offices no similar objective exists.

In Wyoming, leasing would be allowed in PHMA, and if the BLM has a backlog of Expressions of Interest for leasing, the BLM will prioritize work to first process Expressions of Interest in non-habitat, followed by lower

habitat management areas (e.g., GHMA). In Wyoming for fluid mineral development on existing leases that could adversely affect GRSG populations or habitat, the BLM would work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts consistent with lessees' rights.

In Montana/Dakotas, Oregon, and Wyoming no waivers or modifications would be issued. An exception can be considered if the excepted action is an alternative to action on nearby parcels that would be more harmful to GRSG).

In Idaho no waivers or modifications would be issued in PHMA, IHMA or GHMA. An exception can be considered if the excepted action is an alternative to action on nearby parcels that would be more harmful to GRSG, no concurrent approval from other agencies is required.

Colorado, Nevada/California, and Utah developed state-specific exceptions, modifications, and waivers. If a state is not specifically mentioned under environmental consequences, the rangewide consequences would apply.

Colorado Environmental Consequences

In Colorado, the BLM anticipates differing effects for this fluid minerals. Under Alternative 2, approximately 224,200 acres that are closed to fluid mineral leasing under the Alternative 1 would be open for fluid mineral leasing subject to NSO stipulations. Opening the 224,200 acres for fluid mineral leasing means that there is the potential for revenue generation associated with leasing and developing fluid mineral resources.

Approximately 34% of the federal mineral estate in PHMA is currently unleased, including approximately 29% with high potential for oil and gas. There are numerous considerations that operators consider before acquiring and developing leases, including market value of the commodity being produced, operational costs, ease of access to lease minerals, practicality of necessary infrastructure such as roads and pipelines, and technological capabilities. It is difficult to predict if these changes to availability of leases and increased flexibility of the WEMs (Waivers, Modifications, and Exceptions) would lead to additional oil and gas development or a varied approach to the same level of development. In GHMA the closure to leasing under Alternative 1 would change to open to leasing with an NSO stipulation under Alternative 2, this would make more acres available for leasing, potentially resulting in increased production of fluid mineral resources.

Idaho Environmental Consequences

In Idaho, the BLM anticipates differing effects for fluid minerals. PHMA and IHMA not already closed to leasing would be open to oil and gas leasing subject to NSO stipulations. This alternative would maintain Sagebrush Focal Areas (SFAs) from Alternative 1.

Montana Environmental Consequences

Montana did not complete a 2019 Plan Amendment, management and impacts on fluid minerals under this alternative would be the same as described under Alternative 1.

Alternative 3

Rangewide Environmental Consequences

Under alternative 3 all areas managed for GRSG would be PHMA and fluid minerals in these areas would be closed to leasing. Some states are considering expanding HMAs to include areas of adjacent non-habitat, unoccupied historic habitat, or areas with potential to become habitat as PHMA. For valid existing rights the ROW exclusion within PHMA could preclude development of a lease.

ACECs will be considered under this alternative, though because of the restrictive nature of the PHMA management under this alternative, there would be no different allocations between the PHMA and the potential ACEC boundaries.

In areas with development potential for oil and gas resources, closing PHMA to leasing would result in a reduction in oil and gas development and production.

Alternative 4

Rangewide Environmental Consequences

The amount of fluid mineral acreage available for leasing under this alternative is similar to Alternative 1, but the amount that will be leased under Alternative 4 is difficult to predict because leasing in GRSG habitat areas will occur following a process in which parcels for lease are identified by received EOIs and evaluated based on fluid mineral and GRSG habitat criteria in order to determine which parcels are offered for lease. Parcels could be nominated and leased with potentially prohibitive stipulations which could discourage operators from further development. Geothermal leasing would occur following a similar process as described above but evaluation criteria would be adjusted to recognize the differences between geothermal development and petroleum fluid mineral development.

Compared to existing management this alternative would apply similar NSO stipulations to leasing in PHMA and IHMA, and around Leks in GHMA. In some states this alternative would make more acreage available for leasing, but because of the prioritization process for leasing EOIs it is possible that fewer acres could be offered for lease sale. State specific changes for Colorado, Oregon, and Wyoming are discussed below. A 3% disturbance cap would apply at the HAF fine scale habitat selection area in PHMA/IHMA, which could limit development, however very few areas are over or near the disturbance cap at this time. This cap could result in a delay in the timing of future fluid mineral exploration or development; however, the magnitude of the delay would depend on site-specific factors including the current level of habitat assessment that has been conducted to date. If a state is not specifically mentioned under environmental consequences, the rangewide consequences would apply.

Colorado Environmental Consequences

In Colorado, the BLM anticipates differing effects for fluid minerals. Under Alternative 4 more acreage would be available for leasing EOIs and potential leasing than under Alternative 1, this is because under Alternative 4 the plan would no longer apply closures within one mile of leks in GHMA.

Oregon Environmental Consequences

In Oregon, the BLM anticipates differing effects for fluid minerals. Under Alternative 4 more acreage would be available for leasing EOIs and potential leasing than under Alternative 1, this is because under Alternative 4 the plan would no longer apply closures within one mile of leks in GHMA.

Wyoming Environmental Consequences

In Wyoming, the BLM anticipates differing effects for fluid minerals. Unlike in other states, in WY NSO stipulations would be applied to leasing only within 0.6 miles of leks in PHMA and within 0.25 miles of leks in GHMA. Compared to Alternative 1, this alternative would make more acres available for leasing without NSO stipulations.

Alternative 5

Rangewide Environmental Consequences

Impacts on fluid minerals under Alternative 5 would be less than those described for Alternative 4 because fewer acres would be subject to an NSO stipulation (e.g., PHMA in WY would be 0.6-mi NSO around leks with TL stipulations in the rest of PHMA). Under this alternative more flexible WEMs would be considered in all states, allowing compensatory mitigation and the potential for more areas open to leasing with reduced major and minor operational constraints.

Alternative 6

Rangewide Environmental Consequences

Impacts would be the same as those described for Alternative 5 with the additional designation of ACECs. Management of ACECs as open to leasing subject to NSO stipulations with an exception/modification to allow occupancy if there are drainage concerns from adjacent development and if it can be demonstrated that no direct or indirect impacts on GRSG will occur would increase impacts on fluid minerals compared with Alternative 1.

10.10.2 Nonenergy Leasable Minerals

Methodology

Analysis of impacts on nonenergy leasable mineral development from this EIS focuses on the impacts of conservation measures to protect GRSG. These impacts may be direct or indirect. For example, a direct impact on nonenergy leasable mineral development would result from closure of an area to nonenergy leasable mineral development. An indirect impact would result from removal of a road, which would change the economic feasibility of developing a site. For example, a direct impact of closing lands to nonenergy leasable development would be that those mineral resources are not extracted. An indirect impact would be limited or no traffic into and out of the area since those resources are no longer available to develop. The types of actions that can result in these impacts are discussed in more detail in **Section 4.10.2**, Nature and Type of Effects. Additional actions or conditions that would cause direct or indirect impacts on nonenergy leasable minerals are described under indicators below.

Indicators

Indicators of impacts on nonenergy solid minerals are as follows:

- The number of acres closed to nonenergy solid mineral leasing
- The number of acres closed to new nonenergy leasable surface mining
- The restrictions on surface use or timing placed on nonenergy solid mineral leasing
- The restrictions on surface use or timing placed on prospecting and exploration
- Application of RDFs to nonenergy leasable development for the protection of GRSG

Assumptions

The analysis includes the following assumptions:

- Nonenergy leasable mineral operations on existing federal leases, regardless of surface ownership, could be subject to RDFs by the BLM Authorized Officer and the authorized officer of the surface management agency. Under these circumstances, existing leases would be developed consistent with applicable laws and valid existing rights, using as many of the RDFs and conservation measures as possible while still allowing reasonable access.

Alternative 1

Rangewide Environmental Consequences

Under Alternative 1 most of the PHMA and IHMA in the planning area is closed to new leasing of nonenergy leasable minerals but states can consider expansion of existing leases. In Idaho, all IHMA in Known Phosphate Lease Areas is open to leasing. Wyoming keeps PHMA open subject to occupancy, seasonal limitations, disturbance, and density. Wyoming and Montana are subject to density and disturbance limits. In GHMA most states propose minimization measures to protect GRSG.

Application of the 3% disturbance cap in PHMA and lek buffers in PHMA and GHMA could impact both new and existing nonenergy leasable minerals activities by preventing or restricting new surface development and reducing ultimate recovery of the resource. New nonenergy leasable minerals activities could be precluded if the cap were exceeded in a BSU or a proposed project analysis area. New surface development on existing leases could be restricted if the cap were exceeded. The BLM would not apply the disturbance cap in a manner that would eliminate all reasonable opportunities to develop an existing lease.

Applying lek buffer distances when approving actions could also restrict development of infrastructure related to nonenergy solid leasable mineral development, as could application of RDFs.

Idaho Environmental Consequences

In Idaho, the BLM anticipates differing effects for nonenergy leasable minerals.

Impacts from Nonenergy Solid Leasable Minerals Management

In Idaho, all IHMA in Known Phosphate Lease Areas is open to leasing. No leases are currently on BLM-administered lands in IHMA. All other areas of IHMA would be closed to leasing except for consideration of the expansion of existing leases. Under Alternative 1, 16,270,500 acres, or 59% of the federal nonenergy leasable mineral estate decision area (including all federal nonenergy leasable mineral estate in PHMA outside Known Phosphate Lease Areas) would be closed to prospecting and leasing. Fringe leases and modifications to existing leases would be allowed in PHMA. Approximately 2,899,800 acres, or 10% of federal nonenergy solid leasable mineral estate in the decision area (including all federal nonenergy leasable mineral estate in IHMA outside Known Phosphate Lease Areas), would be open to leasing consideration but only if the Anthropogenic Disturbance Development and Criteria (AD-4) were satisfied (including the requirement that the project would not exceed the 3% disturbance threshold). Development on these acres would also be subject to RDFs, BMPs, and buffers for exploration and initial mine development, and compensatory mitigation once mining commences.

Development of federal nonenergy leasable minerals within GHMA would also be subject to RDFs, BMPs, and buffers on exploration and initial mine development. These limitations could increase costs of federal nonenergy leasable mineral development in the planning area.

Because Known Phosphate Lease Areas in IHMA would remain open to nonenergy solid mineral leasing, which would allow continued development in most of the planning area, impacts on federal nonenergy solid leasable mineral development in Idaho would be lessened compared to a full closure of all IHMA. The areas considered to have moderate potential for future development in the decision area would not be constrained by a closure. RDFs would be applied to phosphate development projects in IHMA. These RDFs could increase the cost of phosphate mining in the decision area.

Impacts from Anthropogenic Disturbance Management, Adaptive Management, and Coordination

Under Alternative 1, anthropogenic disturbance, including nonenergy leasable mineral development, would be limited to 3% of nesting and wintering habitat on new leases and prospecting permits within IHMA within a Conservation Area (BSUs). In BSUs where the 3% cap is already exceeded, new parcels would not be offered for lease until enough habitat was restored to maintain the area under the threshold. New leases for federal nonenergy solid leasable mineral resources that would result in exceedance of the 3% cap in a BSU would also be prohibited. This cap could potentially impact activities on 2,900,100 acres of unleased federal nonenergy solid leasable mineral estate in IHMA, including 400 unleased acres within Known Phosphate Lease Areas. Impacts would be greatest where these caps limited development in unleased portions of Known Phosphate Lease Areas because these areas have the highest potential for nonenergy leasable mineral development. The 16,270,500 acres that would be closed to nonenergy solid mineral leasing under Alternative 1 would not be impacted by the disturbance cap because no new nonenergy leasable solid mineral development could occur in the closed areas.

Nevada Environmental Consequences

In Nevada, the BLM anticipates some differing effects for nonenergy leasable minerals.

Alternative 1 would require a 3% disturbance cap on human surface-disturbing activities in PHMA, and it incorporates RDFs consistent with applicable law in PHMA, GHMA, and OHMA. It would also require all human disturbances to result in a net conservation gain for GRSG and their habitat. Lek buffers would also be required.

Collectively, these GRSG conservation management actions would increase mitigation requirements for land use authorizations. This would result in more complex project designs, potentially excluding infrastructure placement in the most cost-effective locations and potentially resulting in overall greater development costs. A corresponding effect could be a reduction in the number of authorization applications received for activities in PHMA and longer, more complicated review periods for those that are proposed in PHMA.

Management actions for mineral programs other than nonenergy leasable minerals would not impact nonenergy leasable mineral development. Therefore, only the impacts from nonenergy leasable minerals management actions are discussed in the paragraphs below.

Impacts from Nonenergy Leasable Minerals Management

Under the Alternative 1, 10,739,100 acres of the decision area would be closed to nonenergy leasable mineral development. Expanding existing leases would be considered in PHMA. Impacts of this closure would be the same type as those described under Nature and Type of Effects.

Alternative 1 includes applying RDFs on all GRSG habitat, which would mean additional conservation measures for the protection of GRSG consistent with applicable law. Impacts from the RDFs would likely result in higher costs and longer time frames for developing nonenergy leasable minerals. RDFs would require placing operations and facilities as close together as possible, would minimize site disturbance through site analysis and planning, and would phase development with concurrent reclamation.

Oregon Environmental Consequences

Impacts from Lands and Realty Management

Under Alternative 1, all BLM-administered surface in PHMA would be managed as ROW avoidance areas for nonenergy leasable-related activities. All PHMA would be closed to new leases and prospecting permits, so managing PHMA as ROW avoidance areas would have no impact on nonenergy leasable minerals.

BLM-administered surface in GHMA would be managed as ROW avoidance for high voltage transmission lines, major pipelines, but open to other nonenergy leasable mineral-related ROW location under Alternative 1.

Impacts from Nonenergy Leasable Minerals Management

The BLM would close all PHMA to nonenergy solid mineral leasing under Alternative 1. This would result in 7,247,900 acres (51%) of federal mineral estate in the decision area being closed to prospecting and leasing.

Utah Environmental Consequences

Production rates for gilsonite and phosphate are expected to remain steady for the life of the LUPs covered by this LUPA. Total phosphate production in the Utah Sub-region may increase with the possible opening of a new phosphate mine in Utah.

Application of the 3% disturbance cap in PHMA and lek buffers in PHMA and GHMA could impact both new and existing nonenergy leasable minerals activities by preventing or restricting new surface development. New nonenergy leasable minerals activities could be precluded if the cap were exceeded in a BSU or a proposed project analysis area. New surface development on existing leases could be restricted if the cap were exceeded. The BLM would not apply the disturbance cap in a manner that would eliminate all reasonable opportunities to develop an existing lease. Currently there are no population areas where the density of disturbance exceeds the 3% cap. There are areas within 4 miles of a lek in population areas that are near or exceeding the disturbance cap, including in the Uintah Population Area where there is high occurrence and existing development of phosphate.

Applying lek buffer distances when approving actions for linear features, infrastructure related to energy development, surface disturbance, and noise could also restrict development of nonenergy leasable minerals.

RDFs would be applied as under the action alternatives in PHMA and GHMA. In addition to the RDFs, disturbance cap, lek buffers, and density restrictions, additional conservation measures in PHMA would include net conservation gain requirements (also a requirement in GHMA), restrictions on noise, and seasonal restrictions. All of these combined could further restrict nonenergy leasable minerals development. Based on the disturbance cap and these other restrictions, it is unlikely that the existing phosphate and gilsonite mines could expand or that new phosphate or gilsonite mines would be approved on federal mineral estate in the decision area.

All sodium occurrence in the decision area is in PHMA and, under Alternative 1, PHMA would be closed to new nonenergy minerals leases. The occurrence of sodium is largely present outside of GRSG HMAs, so the overall impact on sodium development in Utah would be minimal.

Approximately 673,600 acres (16%) of federal mineral estate in the decision area would be open to leasing consideration for both surface and underground mining, all of which would be in GHMA. In GHMA, development would be subject to mitigation and lek buffers.

Gilsonite. Under Alternative 1, all federal mineral estate with gilsonite potential in the decision area would be within GHMA and would be open to nonenergy leasable mineral leasing. New leases in GHMA would be subject to mitigation and lek buffers. The 2,700 acres of authorized gilsonite leases in mapped occupied habitat would lie within GHMA and would be subject to current lease-specific surface disturbance limitations and/or BMPs included in those leases or approved plans governing the leases.

Phosphate. Under Alternative 1, 186,700 acres (88%) of federal mineral estate with phosphate potential in the decision area would be closed to new nonenergy leasable mineral prospecting and exploration and leasing, including all of federal mineral estate with high phosphate potential in the decision area. New leases adjacent to existing operations would be allowed. This allowance for new leases adjacent to existing operations would reduce impacts on locatable minerals from the closure of PHMA to new nonenergy leasable mineral leasing by allowing continued development around ongoing operations. These new leases would be subject to restrictive management which would likely preclude new surface development associated with new and existing phosphate leases, where existing surface infrastructure could be used for underground development on new leases development would continue, but if that were not feasible operations in PHMA could be forced to close once existing reserves are exhausted.

The mineral potential report for the Vernal RMP identifies continued development of phosphate on nonfederal mineral estate during the period of analysis (through 2017). It does not anticipate any development on federal mineral estate during the period of analysis. Since completion of that report, the phosphate mine in PHMA has changed ownership. Given current mineral holdings on private lands, it is anticipated that mining operations will be able to continue on private lands for 15 years. As the current mine on private lands expands, it is foreseeable that existing mining operations would progress to the edge of the nonfederal mineral estate. Development of federal mineral estate would likely not be consistent with the disturbance cap, so the mine would have to be redirected to other areas with nonfederal minerals or change mining methods

These changes would increase the cost of phosphate mining or, if the cost were deemed too high by the developer, potentially result in phosphate ore being left in place on federal mineral estate. Depending on the size of the federal minerals tract, this could result in either a loss (temporary lack of mining) or waste (permanent lack of mining if the remaining federal mineral resource is not economical to return to develop later) of federal mineral resources. This is because the mine on private lands would be reclaimed, then, if at some future date the federal minerals are available for mining, the minerals on the federal tract would generally not be economical to return to mine. While mining operations would be able to continue, there would be an increase in costs to the mine to use underground mining, move operations around the federal tracts, or redirect to other portions of the private lands. Restricting access to phosphate could hamper the production of fertilizer products needed to produce food.

Sodium. Under Alternative 1, none of the federal mineral estate with sodium occurrence in the decision area would be open to nonenergy leasable mineral leasing. This would reduce the availability and potentially the amount of development of sodium in Utah.

Wyoming Environmental Consequences

In Wyoming PHMA would be managed as open subject to occupancy, seasonal limitations, disturbance, and density. Seasonal restrictions, and density and disturbance limits would be applied to nonenergy leasable mineral development.

Alternative 2

Rangewide Environmental Consequences

In PHMA all states would apply the same management and expect the same resulting impacts on nonenergy leasable minerals as described under Alternative 1 above. The only change is that Nevada would add exception criteria to the closure in PHMA, described under the Nevada Environmental Consequences section below.

In GHMA all states would apply the same management and expect the same resulting impacts on nonenergy leasable minerals as described under Alternative 1 above.

Montana, North Dakota, South Dakota, Nevada/California, and Oregon would apply the same mitigation as Alternative 1. The BLM does not require compensatory mitigation but will enforce state mitigation policies and programs. Colorado and Idaho require mitigation resulting in no net loss. Utah and Wyoming removed the net conservation gain requirement. Colorado, Idaho, Nevada/California, Oregon, Utah, and Wyoming specify that compensatory mitigation would be voluntary unless required by laws other than FLPMA, or by the State.

Under Alternative 2, in all states except Montana and Wyoming, the 3% disturbance cap does not include wildfire or agriculture. In Idaho, the cap can be exceeded in utility corridors if it will benefit GRSG. In Utah the 3% disturbance cap can be exceeded if will benefit GRSG. The cap is applied at the BSU and project scale except in Idaho where it is applied at the BSU scale only. In Montana and Wyoming, a 5% disturbance cap is applied at the project area scale in PHMA, it includes disturbance from wildfire and agriculture.

Nevada Environmental Consequences

Nevada added exception criteria to the closure in PHMA, allowing leasing of nonenergy leasable minerals under certain circumstances. This would improve the availability of nonenergy leasable minerals in the planning areas compared to Alternative 1.

Alternative 3

Rangewide Environmental Consequences

Under this alternative, all PHMA and IHMA, including all proposed ACECs, would be closed to new nonenergy mineral leasing; there would be no GHMA. 100% of the decision area (including acreage already closed) would be closed under Alternative 3, so impacts would increase compared with Alternative 1. COAs would be applied to existing leases where applicable and feasible. These COAs would include no new surface occupancy on existing leases within 1 mile of active leks, and within 2 miles of active leks within PHMA. If the lease is entirely within the active lek buffer, require any development to be placed in the area of the lease least harmful to GRSG based on vegetation, topography, or other habitat features. This Alternative would limit permitted disturbances to 1 disturbance per 640 acres average across the landscape in PHMA. Disturbances may not exceed 3% in PHMA in any biologically significant unit and proposed project analysis area.

Idaho Environmental Consequences

<u>Impacts from Nonenergy Solid Leasable Minerals Management</u>

Impacts under Alternative 3 are the same as those described under Alternative 1, except that more acres would be affected by closures (21,629,700 acres, or 78% of the nonenergy leasable decision area). The magnitude of impacts under this alternative would increase compared with Alternative 1 since 473 acres of existing phosphate leases on BLM-administered lands would occur in PHMA. Less than 1% of the acres closed to leasing would be within Known Phosphate Lease Areas. Because the number of unleased acres within Known Phosphate Lease Areas that are closed would increase compared with Alternative 1, impacts on nonenergy solid leasable minerals would increase under this alternative.

Approximately 5,730 acres of existing unmined federal nonenergy leasable mineral leases in PHMA and GHMA would be subject to RDFs. This would limit surface disturbance, vehicle use, siting, and design of mineral development operations, in addition to imposing reclamation requirements. Application of RDFs

would have the types of impacts described under Nature and Type of Effects**.** Because these RDFs would not be applied under Alternative 1, impacts would increase under Alternative 3.

Under Alternative 3, 19,167,400 acres, or 69% of the federal nonenergy solid leasable mineral estate decision area (including all federal nonenergy solid leasable mineral estate in PHMA), would be closed to prospecting and leasing. New leases to expand existing mines for phosphate would not be permitted in areas managed as closed.

Utah Environmental Consequences

Under Alternative 3 all federal mineral estate in the federal mineral estate decision area (4,008,600 acres) would be closed to new prospecting and exploration and leasing. Management under this alternative would close more federal mineral estate to nonenergy leasable mineral prospecting and exploration and leasing than management under Alternative 1. This allocation decision would impact gilsonite, phosphate, and sodium. New leases to expand existing mines for these minerals also would not be permitted. Closing areas to nonenergy mineral leasing would result in the same type of impacts as those described under *Nature and Type of Effects*.

Under Alternative 3, exploration would be prohibited on all 4,008,600 acres of federal mineral estate within the decision area. Closing the decision area to exploration could reduce the availability of data on nonenergy leasable mineral resources outside the decision area and could increase costs of nonenergy leasable mineral development if it resulted in the need to conduct exploration for resources outside the decision area via less easily accessible locations than the locations within the decision area from which exploration might otherwise occur. Operators with existing leases would still be able to conduct new exploration on those leases.

Alternative 4

Rangewide Environmental Consequences

Under this alternative, nonenergy leasable minerals would be managed the same as under Alternative 1; the impacts would be the same as described under Alternative 1 above, but would be applied to different HMA areas. In Idaho, 1 acre of existing phosphate leases would be within IHMA and 472 acres would be within GHMA.

Nevada and Northeastern California Environmental Consequences

In Nevada and northeastern California, exceptions to the nonenergy leasable mineral closure in PHMA under may allow for increased development of nonenergy leasable minerals in some locations.

Alternative 5

Rangewide Environmental Consequences

Under this alternative, nonenergy leasable minerals would be managed the same as under Alternative 1; the impacts would be the same as described under Alternative 1 above, but would be applied to different HMA areas. In Idaho, no existing phosphate leases would be within HMAs on BLM-administered lands.

Nevada and Northeastern California Environmental Consequences

Impacts would be the same as described for Alternative 4.

Alternative 6

Rangewide Environmental Consequences

Under this alternative, impacts would be the same as described under Alternative 5 except that any existing nonenergy leasable operations within ACECs would not be able to expand on federal mineral estate and no new operations would be permitted in ACECs.

10.10.3 Coal

Methodology

Analysis of impacts on coal development from this EIS focuses on the impacts of conservation measures to protect GRSG. These impacts may be direct or indirect. The types of actions that can result in these impacts are discussed in more detail in **Section 4.10.3**, Nature and Type of Effects. Additional actions or conditions that would cause direct or indirect impacts on coal are described under indicators below.

Indicators

Indicators of impacts on coal are as follows:

- The amount of acres identified as unacceptable for coal leasing
- The amount of land surface identified as unsuitable for surface coal mining
- Application of siting, surface disturbance, and TL stipulations on both surface and underground coal mining
- Application of surface disturbance limitations and TL stipulations and reclamation requirements for coal exploration.

Assumptions

The analysis includes the following assumptions:

- If an area is leased, it could be developed. Not all leases would be developed within the life of this RMPA; however, pursuant to 43 CFR 3483, coal leases may be terminated if they are not diligently developed.
- Coal operations on existing federal leases, regardless of surface ownership, could be subject to restrictions on surface disturbance. Under these circumstances, existing leases would be developed consistent with applicable laws and valid existing rights, using as many of the restrictions and conservation measures as possible while still allowing reasonable access.
- As the demand for energy increases worldwide, so will the demand for extracting energy resources in areas with potential.

Alternative 1

Rangewide Environmental Consequences

Under Alternative 1, Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming manage PHMA as "essential habitat" for unsuitability evaluation. In GHMA there is no state specified special coal management.

Idaho, Nevada, California, and Oregon did not address coal due to absence of coal mineral in deposits with a reasonably foreseeable possibility of development.

Colorado Environmental Consequences

Under this alternative, the BLM would find coal resources unsuitable for future leasing when GRSG cannot be adequately protected. In addition, the BLM would have flexibility in approving projects with adequate

design and mitigation, subject to a 3% disturbance cap. Restrictions on land use and other authorizations would be included under the Alternative 1, as follows:

- Managing both PHMA and GHMA as ROW avoidance areas
- Prohibiting aboveground structures within 1 mile of active leks
- Restricting surface disturbance to 3% in PHMA

This Alternative provides opportunity for new or expanded mines, subject to restrictions on the amount of surface disturbance in PHMA and ADH areas.

Impacts of the restrictions and authorizations would be as described under *Nature and Type of Effects,* above.

Montana Environmental Consequences

Coal exploration under Alternative 1 would not be allowed on about 93,925 acres of BLM-administered coal mineral estate pursuant to 43 CFR Part 3410.1-1(a)(1) and 43 CFR Part 3465.1(d). About 13,659 acres where exploratory coal drilling would be disallowed fall within the areas designated as coal with development potential.

In areas where coal exploratory drilling would be allowed mitigation such as specialized design features or requiring maintenance of habitat functionality or avoidance would likely be required. These actions would delay permitting and increase the operator's costs for exploratory coal drilling. Requirements for specialized design features or mitigation would allow the operation to occur.

North Dakota Environmental Consequences

There has been no coal development within the planning area. While the Bowman-Gascoyne Known Recoverable Coal Resource Area intersects PHMA and GHMA, no additional development of this field is anticipated within the planning period. This Known Recoverable Coal Resource Area has low development potential, and no interest has been expressed in developing the area.

Lignite is being mined in other areas of the state. The Known Recoverable Coal Resource Area within the planning area was not designated as a Coal Study Area because it was determined not to have sufficient economic coal resources. No coal development is foreseeable in the planning area, coal resources in the planning area are not expected to be impacted by management actions proposed in this RMPA. Potential future surface mining could be precluded as a result of suitability determinations in PHMA (87,443 acres) under Alternative 1.

Utah Environmental Consequences

Measures to protect GRSG and its habitat (disturbance cap, lek buffers, net conservation gain requirements, and restrictions on noise and season) could affect the feasibility of new underground coal leases or the expansion of existing underground operations (e.g., increased costs and development delays due to limits on the timing of activities) but would not preclude them.

Application of a 3.1-mile lek buffer could affect mine placement, though the required buffer distance could be adjusted based on local topography.

Wyoming Environmental Consequences

Consideration of coal leasing within GRSG core, connectivity, and general habitat areas would allow for future development of these resources. Areas available for coal leasing would be dependent on the results of the coal screening process and the application of appropriate mitigation measures. Allowing coal

exploration would enhance the development of these resources. Designating PHMA as "essential habitat" for unsuitability evaluation would impact 338,533 acres which would restrict the ability to develop coal over 2% of GRSG habitat areas.

Alternative 2

Rangewide Environmental Consequences

In all states except Utah management and impacts on coal resources would be the same as described under Alternative 1. Colorado, Montana, North Dakota, South Dakota, and Wyoming all PHMA would be "essential habitat" for unsuitability evaluation. Idaho, Nevada California, and Oregon did not address coal due to absence of coal mineral in deposits with a reasonably foreseeable possibility of development.

Utah Environmental Consequences

In Utah essential habitat would be identified as part of future unsuitability criteria, compared to Alternative 1 where all PHMA would be considered as "essential habitat" for unsuitability evaluation this might give flexibility to consider leasing in small areas that were included in PHMA but do not meet the criteria for essential habitat, such as important connectivity areas. Impacts would likely be minimal because the amount of PHMA that does not meet essential habitat criteria is small. Impacts would otherwise be the same as described under Alternative 1.

Alternative 3

Rangewide Environmental Consequences

All areas managed for GRSG would be PHMA. All essential habitat would be identified as part of future unsuitability criteria. compared to Alternative 1 where all PHMA would be considered as "essential habitat" for unsuitability evaluation, this change in management might give flexibility to consider leasing in small areas that were included in PHMA but do not meet the criteria for essential habitat, such as important connectivity areas. Impacts of this management change would likely be minimal because the amount of PHMA that does not meet essential habitat criteria is small. Impacts of this alternative would otherwise be the same as described under Alternative 1.

Idaho, Nevada, California, and Oregon did not address coal due to absence of coal mineral in deposits with a reasonably foreseeable possibility of development.

Alternative 4

Rangewide Environmental Consequences

Under Alternative 4 the consideration of PHMA as essential habitat for unsuitability evaluation in CO, MT/DK, UT, and WY state that PHMA would be removed as some areas of PHMA do not meet essential habitat criteria. Almost all essential habitat is likely to overlap with PHMA so the impacts would be approximately the same as described under Alternative 1. The plan will not modify any existing suitability and unsuitable determinations. The proposed management under this alternative would apply rangewide, but the planning area in Idaho, Nevada, California, and Oregon does not have coal mineral in deposits with a reasonably foreseeable possibility of development so no impacts on coal would occur in these states.

Alternatives 5 and 6

Rangewide Environmental Consequences

Impacts under Alternatives 5 and 6 would be the same as under Alternative 4.

10.10.4 Locatable Minerals

Methodology

RMP decisions can include those that affect uses related to minerals subject to disposal under the mineral leasing, geothermal leasing, and mineral materials disposal laws; however, no RMP decision can affect the applicability of the US mining laws or uses thereunder. Under section 202(e)(3) of FLPMA, public lands can only be removed from or restored to the operation of the Mining Law of 1872, as amended, by withdrawal action pursuant to section 204 or other action pursuant to applicable law (43 USC 1712(e)(3)). An RMP may recommend an area for withdrawal from location and entry under the U.S. mining laws; however, such recommendation has no legal effect or environmental consequence. Under section 204 of FLPMA, only the Secretary or an individual in the Office of the Secretary who has been appointed by the President, by and with the advice and consent of the Senate, can make, modify, extend, or revoke withdrawals. An RMP recommendation to withdraw an area from location and entry under the U.S. mining laws does not constitute a withdrawal proposal under section 204 of FLPMA, nor does it compel the Secretary to consider such a withdrawal in more detail, or otherwise dictate or limit what areas may be withdrawn.

Despite the lack of legal effect or environmental impact associated with a recommendation in an RMP that the Secretary withdraw any public land from location and entry under the US mining laws, and strictly for the purposes of comparison between the alternatives, this EIS includes a description of the potential environmental consequences of a Secretarial withdrawal of the analysis area from location and entry under the US mining laws. These types of impacts are discussed in more detail in **Section 4.10.4**, Nature and Type of Effects. Should the Secretary propose a withdrawal, such proposal would include a legal land description of the land proposed for withdrawal and would be published in the Federal Register for public review and be subject to appropriate analysis under NEPA and FLPMA, including consideration of any relevant mineral potential data.

Indicators

Indicators of impacts on locatable minerals are as follows:

- The amount of land open to mineral entry
- The amount of land recommended for withdrawal from locatable mineral entry
- The designation of areas as ACECs that would trigger the requirement under 43 C.F.R. § 3809.411(c) to file a plan of operations for any surface disturbing activities in those areas greater than casual use

Assumptions

The analysis includes the following assumptions:

- Restrictions on locatable mineral development could only occur through existing legal avenues such as the BLM's mandate to prevent unnecessary or undue degradation (43 CFR 3809). The management actions analyzed for this RMPA would not interfere with valid existing rights.
- Areas recommended for withdrawal would be withdrawn by a public land order issued by the Secretary of the Interior (5,000 acres or less) or by an act of Congress (over 5,000 acres).

Alternative 1

Rangewide Environmental Consequences

In all states, Alternative 1 recommended the withdrawal of all SFAs from location and entry under the US mining laws. After publication of the RODs in 2015, the BLM applied for these lands to be withdrawn, and the Secretary accepted the application. The BLM then initiated a process to consider the withdrawal,

pursuant to section 204 of FLPMA. If the Secretary decides to withdraw the proposed lands, this would likely result in a decrease in the exploration and development of locatable minerals in these areas. Application of seasonal restrictions, if deemed necessary in other areas, could restrict the timing, feasibility, or costs associated with locatable mineral development.

Colorado Environmental Consequences

Under Alternative 1, locatable minerals operations in PHMA would require appropriate effective mitigation for conservation to the extent necessary to comply with the standards and requirements under 43 CFR Subparts 3715, 3802, and 3809. Seasonal restrictions would be applied if deemed necessary to comply with the standards and requirements under 43 CFR Subparts 3715, 3802, and 3809. In ADH areas and in PHMA where mitigation is not otherwise required to comply with the standards and requirements, operators could be requested to voluntarily agree to suggested design features.

Access roads needed to access claims or mines would be constructed in accordance with 43 CFR Part 3809.420(b) and applicable MSHA or State standards. If it is determined by the authorized officer that an engineered road is warranted, then the BLM would typically require engineered design by the operator. This would also apply where an engineered road is warranted for exploration activities.

Idaho Environmental Consequences

Under Alternative 1, 2,968,200 acres of federal locatable mineral estate (including all acres in the SFA) were recommended for withdrawal from location and entry under the US mining laws. The BLM initiated a separate process for the Secretary to consider whether to withdraw these lands, pursuant to section 204 of FLPMA. If the Secretary ultimately withdraws all of these lands, when combined with the 5,380,200 acres already withdrawn, the acreage of withdrawn federal lands in the decision area would total 8,348,400 acres, or 28% of the federal locatable mineral estate.

Of the 56 plans of operations and notices currently authorized within the decision area for Alternative 1, 7 (13%) are on lands that would be within the SFA under this alternative and therefore within the area previously recommended for withdrawal.

Nevada-California Environmental Consequences

Under Alternative 1, 2,731,600 acres of the decision area were recommended for withdrawal from mineral entry. Pursuant to the separate process currently underway, if the Secretary withdraws all of these lands, when combined with the 521,600 acres already withdrawn, the acreage of withdrawn federal lands in the decision area would total 3,253,200 acres, or 20% of the federal locatable mineral estate, and 80% (13,273,400 acres) are not recommended for withdrawal.

Alternative 1 would require RDFs to all GRSG habitat as additional conservation measures where necessary to comply with the applicable standards and requirements under 43 CFR Subparts 3715, 3802, and 3809.

North Dakota and South Dakota Environmental Consequences

In North Dakota and South Dakota zero acres were recommended for withdrawal from mineral entry.

Oregon Environmental Consequences

Under Alternative 1, 1,835,800 acres of the decision area, specifically land designated as SFA, were recommended for withdrawal from mineral entry. Pursuant to the separate process currently underway, if the Secretary withdraws all of these lands, when combined with the 1,435,900 acres already withdrawn, the

acreage of withdrawn federal lands in the decision area would total 3,271,700 acres, or 23% of the federal mineral estate decision area.

Under this alternative, 117 mining claims, 1 plan of operations, and 9 exploration notices would be in the SFA. As such, all would be in the area that was recommended for withdrawal. This represents 21% of the 609 claims, plans, and notices in occupied GRSG habitat.

Under Alternative 1, 715,049 acres of BLM-administered surface in the decision area would be designated as ACECs. A plan of operations would be required for exploration operations disturbing five acres or less in these ACECs**.**

Utah Environmental Consequences

Under Alternative 1, 235,000 acres (6%) of the decision area, including the SFA, were recommended for withdrawal from mineral entry. Pursuant to the separate process currently underway, if the Secretary withdraws all of these lands, when combined with the 445,900 acres already withdrawn, the acreage of withdrawn federal lands in the decision area would be total 680,900 acres.

Under Alternative 1, 1,800 acres (less than 1%) of federal mineral estate with high potential in the decision area was recommended for withdrawal.

Of the 39 existing authorized locatable mining operations in the decision area, none would be in the SFA under Alternative 1. However, 11 mining claims would be in the SFA. Pursuant to the separate process currently underway, if the Secretary withdraws all lands in SFA, as recommended under Alternative 1, the BLM would not authorize new operations on any existing mining claims in SFA until the BLM confirmed that the mining claim was valid on the date of the withdrawal and remains valid.

Under Alternative 1, the BLM could limit surface-disturbance in PHMA if necessary to comply with the standards and requirements in 43 CFR Parts 3715, 3802, or 3809. The BLM would apply the disturbance cap, minerals/energy density, RDFs, and seasonal restrictions in PHMA and mitigation for net conservation gain and lek buffers in PHMA and GHMA if necessary to comply with the standards and requirements in 43 CFR Parts 3715, 3802, or 3809 and prevent unnecessary or undue degradation.

Wyoming Environmental Consequences

On BLM-administered lands, the BLM previously recommended for withdrawal from mineral entry within SFA portions of PHMA of 1,146,130 acres. Pursuant to the separate process currently underway, if the Secretary withdraws all of the recommendation, these withdrawals in combination with existing withdrawals on 1,761,550 acres, the total acreage of withdrawn federal lands in the decision area would total 2,907,680 acres.

Alternative 2

Rangewide Environmental Consequences

No recommendations for the withdrawal of SFAs from mineral entry are made under this alternative, except in Montana which would continue the recommendation for withdrawal of SFAs as described under Alternative 1. In all states, except Montana, the removal of any recommendation for withdrawal under Alternative 2 would have no impact. Recommendations to withdraw lands from location and entry under the Mining Law of 1872 have no impact. Only the Secretary or her designee may withdraw lands and this is done not through BLM land use planning but according to a separate process pursuant to section 204 of FLPMA.

Montana Environmental Consequences

Montana did not remove the recommendation for withdrawal of SFAs from mineral entry as described under Alternative 1. Impacts on locatable minerals in Montana under Alternative 2 would be the same as described under the *Montana Environmental Consequences* section of Alternative 1.

Alternative 3

Rangewide Environmental Consequences

Under Alternative 3, all PHMA including proposed ACECs, would be recommended for withdrawal from mineral entry. Impacts would be similar in nature and type to those described under Alternative 1, but a much larger area would be recommended for withdrawal under this alternative (see **Table 2-3** which shows the acres of PHMA by state). If the Secretary were to decide to withdraw these areas, after the completion of the process outlined in section 204 of FLPMA, there may be limited opportunities for locatable mineral development in the decision area as described in the *Nature and Type of Effects*.

Alternatives 4 and 5

Rangewide Environmental Consequences

Alternatives 4 and 5 would not designate any SFAs and would not recommend any areas for withdrawal from mineral entry. The impacts on locatable minerals under this alternative would be the same as described under Alternative 2.

Montana Environmental Consequences

In Montana under Alternative 4, no SFAs would be designated and no recommendations for withdrawal would be made. Just as in Alternative 1, the removal of any recommendation for withdrawal under this alternative would have no impact.

Alternative 6

Rangewide Environmental Consequences

Alternative 6 would designate ACECs in the same areas as under Alternative 3, along with a requirement (per 43 CFR Part 3809.11(c)(3)) to prepare a plan of operations for exploration operations disturbing five acres or less. Processing plans of operations is more time-consuming than processing an exploration notice. Designation of an ACEC would increase costs to those operators who would otherwise conduct exploration under a notice, and potentially reduce development of locatable mineral resources on BLM-administered mineral estate in the planning area that would have resulted from exploration that could have been done under a notice.

10.10.5 Mineral Materials

Methodology

Analysis of impacts on mineral materials focuses on the impacts of conservation measures to protect GRSG. These impacts may be direct or indirect. For example, a direct impact on mineral materials would result from closure of an area to mineral material sales disposal. An indirect impact would result from removal of a road, which could change the economic feasibility of developing a site. The types of actions that can result in these impacts are discussed in more detail in **Section 4.10.5**, Nature and Type of Effects. Additional actions or conditions that might cause direct or indirect impacts on mineral materials are described under Indicators, below.

Indicators

Indicators of impacts on mineral materials are as follows:

- The amount of land closed to mineral material disposal
- Application of disturbance, timing, and other limitations
- The amount of land over which RDFs would be applied to mineral material disposals
- Application of restoration requirements

Assumptions

The analysis includes the following assumptions:

- Future demand for mineral materials will vary depending upon market conditions, which differ according to economic conditions and construction activity. Construction projects within approximately 50 miles of mineral materials deposits may lead to development of these deposits. It is expected that mineral materials activity will continue at roughly the same level for the life of the RMPA.

Alternative 1

Rangewide Environmental Consequences

Under Alternative 1, PHMA would be closed to new mineral material sales, but open for new free use permits, and expansion of existing pits for both free use permits and material sales. This would prevent mineral materials from being sold from new locations but would allow continued use of existing pits. It would also allow new free use permits in both existing and new locations, which would allow state, county, and local governments and non-profit organizations the flexibility to cost-effectively locate mineral material sources. This could result in the displacement of mineral material mining to different areas further from locations where they are needed which would increase costs associated with use. No states would close GHMA to mineral material disposal, but most would apply minimization measures such as RDFs/BMPs and mitigation. Colorado, Idaho and Wyoming would apply state specific management, discussed under the state specific headings for those states below.

Colorado Environmental Consequences

Under this alternative, PHMA would be closed to new mineral material sales, but open to new free use permits and expansion of existing pits where certain criteria are met.

Idaho Environmental Consequences

Under Alternative 1, 15,529,000 acres (56%) of federal mineral material estate in the decision area would be closed to mineral material disposal except for the expansion of existing pits, unlike other states, in Idaho this closure extends to new free use permits. Closing PHMA to new free use permits would result in increased costs to local government road departments for road maintenance and could result in worsening road conditions in these areas. Approximately 3,079,100 acres of federal mineral material estate in the decision area would be open to mineral material disposal but only if the Anthropogenic Disturbance Development and Criteria were satisfied (including the requirement that the project would not exceed the 3% disturbance threshold). Mineral material activities in IHMA and GHMA would also be subject to RDFs, buffers, and seasonal timing restrictions. Mineral material sales from the 47 existing community pits in GRSG habitat would be subject to timing restrictions. These timing restrictions could impact some operations and therefore reduce overall sales of federal materials in the planning area.

Impacts from Anthropogenic Disturbance Management, Adaptive Management, and Coordination

Under the Alternative 1, anthropogenic disturbance, including mineral material development, would be limited to 3% of nesting and wintering habitat within PHMA and IHMA within a Conservation Area (i.e., BSUs). In BSUs where the 3% cap is already exceeded, new development of federal mineral material resources would be prohibited until enough habitat was restored to maintain the area under the threshold. Development of federal mineral material resources that would result in exceedance of the 3% cap in a BSU would also be prohibited. This cap could potentially impact activities on 3,079,100 acres of federal mineral material estate in IHMA.

Nevada Environmental Consequences

Alternative 1 would require a 3% disturbance cap on human surface-disturbing activities in PHMA and would incorporate RDFs consistent with applicable law in PHMA, GHMA, and OHMA. It would also require all human disturbances to result in a net conservation gain for GRSG and their habitat, and lek buffers would be required.

Collectively, these GRSG management actions would result in the impacts described under *Nature and Type of Effects*.

Oregon Environmental Consequences

Application of the 3% disturbance cap and in PHMA and lek buffers in PHMA and GHMA could impact mineral material activities by preventing new surface development. New mineral material pits or expansion of existing pits could be precluded if the cap were exceeded in an Oregon PAC (also known as BSU) and proposed project area. In cases where development was allowed, mitigation requirements would increase the cost of development. Applying lek buffer distances when approving actions would also restrict mineral material development in some areas.

Utah Environmental Consequences

Under Alternative 1, the application of the 3% disturbance cap in PHMA could impact mineral material activities by preventing new surface development. New mineral material pits or expansion of existing pits could be precluded if the cap were exceeded in a BSU or a proposed project analysis area. In cases where development was allowed, mitigation requirements would increase the cost of development.

Applying lek buffer distances when approving actions for surface disturbance could restrict mineral materials development in GHMA and could cause development to move away from desired locations.

Under Alternative 1, all BLM-administered surface within GHMA would be available for ROW location, except for 17,600 acres already managed as exclusion. While these areas would be open, ROW development in GHMA would be subject to lek buffers and net conservation gain requirements, which could impact mineral material development as discussed above. If disturbance is pushed to areas without restrictions, then overall demand for mineral materials will not be affected. However, if the area of new disturbance decreases across the landscape, the demand for mineral materials could be reduced.

Under Alternative 1, PHMA would be closed to mineral material disposal. This includes 1,196,900 acres with mineral material occurrence. Impacts would be somewhat mitigated because new free use permits and expansion of existing pits would be allowed, subject to restrictions. There are approximately 24,000 acres under a mineral material permit within GRSG habitat statewide. Further, with approximately 1,100 acres of existing disturbance associated with those mineral material pits there are opportunities for existing pits to expand within their existing permitted areas. Because less than 5% of the existing permitted area has been

disturbed expansion would fall under the disturbance cap at the project level for most pits. Therefore, while there may be site-specific instances where a new pit in occupied GRSG habitat is denied, the potential for this is low because there is additional development opportunity at existing sites.

Wyoming Environmental Consequences

Under Alternative 1, in Wyoming saleable mineral development (e.g., mineral material exploration, sales and free use permits) would be allowed in GRSG core, connectivity, general habitat areas which would allow for the continued use and development of these resources.

Prohibiting surface disturbing activities on 337,860 acres would result in the same type of impacts on mineral material development as those described under *Nature and Type of Effects*. Restricting surface disturbance on 160,630 acres Density limitations of a 5% disturbance cap within PHMAs (core only) would Prevent the development of new mineral material developments in areas at or above the cap. Prohibiting surface occupancy and disruptive activities within 0.6 miles of occupied leks and seasonal restrictions in GRSG nesting/early brood-rearing habitat and winter concentration areas could result increased cost associated with mineral material development.

Applying RDFs as mandatory stipulations and conservation objectives and applying BMPs to federal mineral estate where the surface ownership is non-federal would result in increased development costs. Avoiding primary and secondary roads within 1.9 miles of the perimeter of occupied GRSG leks and prohibiting other new roads within 0.6 miles of the perimeter of occupied GRSG leks within PHMAs would reduce the area where new roads needed for mineral development could be constructed.

The management of ROW exclusion areas (285,930 acres) within PHMAs and GHMAs would prevent the construction of access roads for mineral material sites, however if mineral material development were otherwise allowed in the area, sites could be constructed along existing roads which could reduce the impacts of this management.

Alternative 2

Rangewide Environmental Consequences

Under Alternative 2 proposed management and impacts would be similar to those described under Alternative 1, except in Idaho and Nevada.

Idaho Environmental Consequences

Under Alternative 2 in PHMA and IHMA managed as closed to mineral material development, Idaho would allow consideration of new free use permits. Compared to Alternative 1 this would reduce impacts on road conditions and high road maintenance costs on local governments which would no longer have to transport mineral materials required for road maintenance from outside these areas. Impacts would otherwise be the same as described under Alternative 1.

Nevada Environmental Consequences

Under Alternative 2 Nevada would exception criteria to the mineral material disposal closure in PHMA. In PHMA, GHMA, and OHMA, the State Director (in coordination with NDOW, Sagebrush Ecosystem Technical Team, and/or CDFW) may grant an exception to the allocations and stipulations proposed if one of the following applies:

i. The location of the proposed activity is determined to be unsuitable (by a biologist with GRSG experience using methods such as (Stiver et al. 2015); lacks the ecological potential to become

marginal or suitable habitat; and would not result in direct, indirect, or cumulative impacts on GRSG and its habitat. Management allocation decisions would not apply to those areas determined to be unsuitable because the area lacks the ecological potential to become marginal or suitable habitat.

ii. The proposed activity's impacts could be offset to result in no adverse impacts on GRSG or its habitat, through use of the mitigation hierarchy consistent with Federal law and the state's mitigation policies and programs. In cases where exceptions may be granted for projects with a residual impact, voluntary compensatory mitigation consistent with the State's management goals could be one mechanism by which a proponent achieves the RMPA goals, objectives, and exception criteria. When a proponent volunteers compensatory mitigation as their chosen approach to address residual impacts, the BLM can incorporate those actions into the rationale used to grant an exception. The final decision to grant a waiver, exception, or modification would be based, in part, on criteria consistent with the state's GRSG management plans and policies.

iii. The proposed activity would be authorized to address public health and safety concerns, specifically as they relate to federal, state, local government and national priorities. iv. Renewals or re-authorizations of existing infrastructure in previously disturbed sites or expansions of existing infrastructure that do not result in direct, indirect, or cumulative impacts on GRSG and its habitat.

iv. The proposed activity would be determined a routine administrative function conducted by federal, state, or local governments, including prior existing uses, authorized uses, existing rights, and existing infrastructure (i.e., rights-of-way for roads) that serve a public purpose and would have no adverse impacts on GRSG and its habitat, consistent with the state's mitigation policies and programs.

v. Exceptions to lands that are identified for retention would be considered for disposal or exchange if they were identified for disposal through previous planning efforts, either as part of the due process of carrying out Congressional Acts (e.g., the respective Lincoln and White Pine County Conservation, Recreation, and Development Acts) or the agency can demonstrate that the disposal, including land exchanges, would have no direct, indirect or cumulative impacts on GRSG and its habitat.

These criteria could increase the time to get approval for new mineral material developments but would also provide certainty about the conditions under which exemptions would be granted.

Alternative 3

Rangewide Environmental Consequences

Under Alternative 3, all areas managed for GRSG would be PHMA and saleable minerals would be closed to disposal in all PHMA. Some states are considering expanding HMAs to include areas of adjacent non-habitat, unoccupied historic habitat, or areas with potential to become habitat as PHMA. Impacts would apply across a much larger area than under Alternative 1, the magnitude of all impacts would increase under this alternative.

ACECs would also be considered under this alternative, though because of the restrictive nature of the PHMA management under this alternative, there would be no different allocations between the PHMA and the potential ACEC boundaries.

Under Alternative 3 all PHMA would be managed as ROW exclusion (outside of designated corridors), however, because all PHMA would be closed to mineral materials disposal under this alternative, the ROW exclusion areas would not impact the mineral materials program.

This alternative has the greatest impacts on saleable minerals because restrictions would be applied to the greatest number of acres, increasing the potential for reduced availability, reduced access, and increased development costs for accessing saleable minerals.

Colorado Environmental Consequences

For existing mineral material disposal sites, no new road construction would be permitted within a 4-mile buffer of a GRSG lek. Road realignments or route upgrades could occur only in certain specified situations, and closing and revegetating unneeded routes to restore GRSG habitat would apply in ADH and PHMA.

Oregon Environmental Consequences

Under Alternative 3, existing mineral materials pits in occupied habitat would also be closed to new sales. Impacts on availability of mineral materials would occur more quickly in Oregon because existing sites in closed areas could not continue to supply mineral materials.

Alternatives 4 and 5

Rangewide Environmental Consequences

Under Alternatives 4 and 5, proposed management and impacts on mineral material development would be the same as described under Alternative 1, except in Idaho as discussed under the state specific heading below.

Idaho Environmental Consequences

In Idaho, exceptions to the mineral material closure in PHMA under Alternative 2 may allow for increased development of mineral materials in some locations.

Alternative 6

Rangewide Environmental Consequences

Under Alternative 6, proposed management and impacts on mineral material development would be the same as described under Alternatives 4 and 5, except that ACECs would also be considered under this alternative. Under Alternative 6, ACECs would be closed to new all new mineral material sales and operations, except for free-use permits issued in order to support maintenance needs for existing local roads to ensure public safety. New mineral material sites for free-use should avoid ACECs, but if avoidance is not possible sites would need to comply with all the minimization measures identified for PHMA.

10.10.6 Oil Shale and Tar Sands

Methodology

Analysis of impacts on oil shale and tar sands focuses on the impacts of conservation measures to protect GRSG. These impacts may be direct or indirect. For example, a direct impact would result from closure of an area to oil shale and tar sand development. An indirect impact would result from removal of a road, which could change the economic feasibility of developing a site. Additional actions or conditions that might cause direct or indirect impacts on mineral materials are described under Indicators, below.

Indicators

Indicators of impacts on oil shale and tar sands are as follows:

- Application of conservation measures for GRSG to existing pending leases
- The amount of land managed as ROW avoidance areas
- The amount of land managed as ROW exclusion areas

Assumptions

There are no assumptions specific to the analysis of oil shale and tar sands.

Alternative 1

Rangewide Environmental Consequences

Colorado, Idaho, Utah, and Wyoming contain significant oil shale resources overlapping the planning area. Colorado, Idaho, and Wyoming manage these resources the same as fluid leasable minerals so management and impacts would be same as described under Fluid Minerals Alternative 1 in **Section 4.10.1**, above.

Proposed management and impacts in Utah are described below. Tar sands resources overlapping the planning area only exist in Utah, management and impacts on tar sands in Utah are described below.

In Utah, the BLM anticipates differing effects for this oil shale and tar sands. See the Utah Environmental Consequences for oil shale and tar sands.

Utah Environmental Consequences

Alternative 1 does not include leasing allocation decisions for oil shale and tar sands in Utah because the ROD for the Allocation of Oil Shale and Tar Sands Resources on Lands Administered by the BLM in Colorado, Utah, and Wyoming closed all mapped occupied GRSG habitat on BLM-administered lands to oil shale and tar sands leasing and development with the exceptions of the pending lease application in the Asphalt Ridge Special Tar Sands Area and the White River Oil Shale Research, Development, and Demonstration site and Preference Lease Right Area (BLM 2013). Within these two areas, leasing and development would be allowed to occur. Management actions and allocation-based decisions being considered could impact the feasibility, amount, and type of development. For example, depending on the alternative selected, GRSG habitat that overlaps the above-mentioned areas may be subject to surface disturbance thresholds, timing restrictions, and other GRSG protection measures. Managing surrounding lands as ROW exclusion or avoidance areas could impact road and facility construction to access and develop those leases.

Under Alternative 1, no disturbance cap would be applied to anthropogenic disturbance in GHMA. The existing and pending leases would be in GHMA under this alternative, soil shale and tar sands development could continue to occur subject to stipulations and other restrictions applied in the Vernal RMP (White River Oil Shale Preference Right Lease Area) and site-specific NEPA analyses.

Oil shale and tar sands development in GHMA would be subject to RDFs, lek buffers, and net conservation gain requirements, which could impact oil shale and tar sands development by restricting new surface development. GHMA would be available for the types of ROW location needed for oil shale and tar sands development. ROW development in GHMA would be subject to lek buffers and net conservation gain requirements. Applying lek buffer distances when approving actions for linear features, infrastructure related to energy development, tall structures, surface disturbance, and noise could also restrict development of infrastructure related to oil shale and tar sands development.

Alternative 2

Rangewide Environmental Consequences

Colorado, Idaho, Utah, and Wyoming contain significant oil shale resources overlapping the planning area. Colorado, Idaho, and Wyoming manage these resources as fluid leasable minerals so management and impacts would be same as described in under Fluid Minerals Alternative 2 in **Section 4.10.1**, above.

Management and impacts in Utah are described below. Tar sands resources overlapping the planning area only exist in Utah, management and impacts on tar sands in Utah are described below.

In Utah, the BLM anticipates differing effects for this oil shale and tar sands. See the Utah Environmental Consequences for oil shale and tar sands.

Utah Environmental Consequences

Alternative 2 does not include leasing allocation decisions for oil shale and tar sands in Utah because the ROD for the Allocation of Oil Shale and Tar Sands Resources on Lands Administered by the BLM in Colorado, Utah, and Wyoming closed all mapped occupied GRSG habitat on BLM-administered lands to oil shale and tar sands leasing and development with the exceptions of the pending lease application in the Asphalt Ridge Special Tar Sands Area and the White River Oil Shale Research, Development, and Demonstration site and Preference Lease Right Area (BLM 2013). Within these two areas, leasing and development would be allowed to occur; however, certain management actions and allocation-based decisions being considered could impact the feasibility, amount, and type of development. Managing surrounding lands as ROW exclusion or avoidance areas could impact road and facility construction to access and develop those leases.

Alternative 2, would allow exceptions for projects to exceed the disturbance and density caps in PHMA, and allow exceptions to avoidance and minimization measures in PHMA if the area is non-habitat and indirect impacts would not occur. Allowing an exceedance to the disturbance and density caps based on site-specific habitat condition, population information, and proponent-volunteered project design elements could allow mineral development to proceed in areas that might otherwise have been precluded by the No-Action Alternative. Allowing consideration or proposed developments that could exceed the 3% disturbance cap or density cap provides the ability to potentially avoid precluding leasing/permitting, development, or consideration of associated infrastructure. Authorizing the exceedances to the disturbance and density caps would only be allowed if voluntarily developed minimization or mitigation improves GRSG habitat. While there is more flexibility and projects may no longer be precluded by the caps, proponents with potential developments may still need to evaluate GRSG conditions or propose habitat improvement projects. While projects may not be precluded by the caps, voluntarily applying the criteria could result in additional costs to implement mitigating measures. This could increase project costs and could make a proposed project uneconomical. Allowing exceptions to avoidance and minimization measures in PHMA if the area is non-habitat and indirect impacts would not occur could allow consideration of leasing/permitting and development for mineral operations.

Alternative 2 would also no longer require proponents to provide for compensatory mitigation on a project-by-project basis to show a net conservation gain. The BLM would cooperate with the State of Utah to analyze applicant-proposed, or state required or recommended compensatory mitigation to offset residual impacts. The BLM may authorize such actions consistent with NEPA analysis and the governing RMP. Not requiring proponents to pay for vegetation and habitat treatments could decrease project costs, providing more opportunities for oil shale and tar sands development projects to move forward in PHMA and former GHMA.

Alternative 3

Rangewide Environmental Consequences

Colorado, Idaho, Utah, and Wyoming contain significant oil shale resources overlapping the planning area. Colorado, Idaho, and Wyoming manage these resources as fluid leasable minerals so management and

impacts would be same as described in under Fluid Minerals Alternative 2 in **Section 4.10.1**, above. Management and impacts in Utah are described below. Tar sands resources overlapping the planning area only exist in Utah, management and impacts on tar sands in Utah are described below.

In Utah, the BLM anticipates differing effects for this oil shale and tar sands. See the Utah Environmental Consequences for oil shale and tar sands.

Utah Environmental Consequences

Under Alternative 3, disturbance in PHMA would be subject to a 3% cap, which would include wildfire. Approximately 2,320 acres of the White River Oil Shale Preference Right Lease Area and all 2,120 acres of the pending federal lease within the Asphalt Ridge Special Tar Sands Area would be in PHMA. The Uintah Population Area, where the White River Oil Shale Preference Right Lease Area is located, is currently just under the 3% disturbance cap. New development could push the area over the cap and prevent new surface disturbance in this portion of the Preference Right Lease Area until areas are reclaimed to the point where disturbance is below the threshold. All BLM-administered surface in PHMA would be managed as exclusion under Alternative 3. There could be indirect impacts resulting from the limits on access and the available means for transporting oil shale and tar sands to processing facilities and markets.

Alternatives 4 and 5

Rangewide Environmental Consequences

Under Alternatives 4 and 5, proposed management and impacts on oil shale and tar sands development would be the same as described under Alternative 1.

Alternative 6

Rangewide Environmental Consequences

Under Alternative 6, proposed management and impacts on oil shale and tar sands development would be the same as described under Alternative 1, except that ACECs would also be considered under this alternative. Under Alternative 6, ACECs would have NSO stipulations applied to leases which could increase the costs of development or prevent the development of some oil shale and tar sands in the planning area.

10.11 SPECIAL DESIGNATIONS

10.11.1 Greater Sage-Grouse ACECs and Key RNAs in Oregon

Impacts of the alternatives on the ACECs proposed for designation under Alternatives 3 and 6 are described in detail in **Appendix 5**, Areas of Critical Environmental Concern for Greater Sage-grouse. Impacts on key RNAs in Oregon are addressed in **Appendix 17**, Proposed RMP Amendment and Analysis for Key Research Natural Areas in Oregon. Management for existing ACECs was determined in the applicable Resource Management Plans to be adequate to support the relevant and important values at the time of their designation. Impacts on these ACECs are not further discussed because the BLM would continue to manage these ACECs to protect their relevant and important values. Management to protect GRSG under the various alternatives could (or would typically) provide additional protections for existing ACECs or provide complementary management. The exception to this is in the High Lakes ACEC in Oregon which would receive PHMA with limited exceptions management direction under the Proposed RMP Amendment. The effects of the alternatives and the Proposed RMP Amendment on the High Lakes ACEC are described in **Appendix 5**, Areas of Critical Environmental Concern for Greater Sage-grouse.

10.12 SOCIAL AND ECONOMIC CONDITIONS (INCLUDING ENVIRONMENTAL JUSTICE)

10.12.1 Methods and Assumptions

Indicators

Fluid Minerals (Oil and Gas)

Potential changes in oil and gas production and development due to the BLM management decisions for the protection of GRSG could impact economic and social conditions. The types of actions that can result in these impacts are discussed in more detail in **Section 4.12.1**, Nature and Type of Effects. The BLM management decisions could change oil and gas production and development by changing the amount of land closed to fluid mineral leasing, the amount of land open to leasing but subject to NSO, CSU, and TL stipulations, and by changing the COAs on fluid mineral exploration and development activities on existing and future leased lands (see **Section 4.9**, Mineral Resources, for more information), and the potential changes in oil and gas production and development could impact economic and social conditions through the following indicators analyzed in this section:

- Change in economic activity, as measured by jobs, income, economic output, and tax revenue and payments to the state and counties.
- Changes to public services associated with potential impacts on tax revenue.
- Changes to way of life, culture, social cohesion, and preservation of nonmarket values, including direct and indirect use and non-use values, for mineral development and production communities of interest, those involved in local governments, local residents, and other communities of interest that may value access to mineral resources.

Nonenergy Leasable Minerals

Potential changes in nonenergy leasable mineral extraction due to the BLM management decisions could impact economic and social conditions through the following indicators:

- Change in economic activity and market conditions associated with impacts on nonenergy leasable minerals due to change in the amount of land closed to mineral leasing and the amount of land open to leasing but subject to NSO, CSU, and TL stipulations.
- Changes to way of life, culture, social cohesion, and preservation of nonmarket values, including direct and indirect use and non-use values, for mineral development and production communities of interest, those involved in local governments, local residents, and other communities of interest that may value access to mineral resources.

Locatable Minerals

Potential changes in locatable mineral exploration and extraction due to the BLM management decisions could impact economic and social conditions through the following indicators:

- Change in economic activity associated with impacts on locatable minerals due to change in the amount of land withdrawn from mineral entry.
- Changes to way of life, culture, social cohesion, and preservation of nonmarket values, including direct and indirect use and non-use values, for mineral development and production communities of interest, those involved in local governments, local residents, and other communities of interest that may value access to mineral resources.

Mineral Materials

Potential changes in mineral materials exploration and extraction due to the BLM management decisions could impact economic and social conditions through the following indicators:

- Change in public access to mineral materials due to changes in the amount of land closed to mineral materials disposal.
- Changes to preservation of nonmarket values, such as access to clean air and water, health and safety impacts, and visitor and viewer enjoyment from changes in air quality associated with potential changes in mineral materials extraction.

Renewable Energy (Geothermal, Wind, and Solar)

Potential changes in renewable energy production and development, including geothermal, wind, and solar, due to the BLM management decisions could impact economic and social conditions through the following indicators:

- Change in economic activity associated with geothermal production and development, as measured by jobs, income, economic output, and tax revenue and payments to the state and counties, that are due to changes in amount of land closed geothermal leasing and open to leasing but subject to NSO, CSU, and TL stipulations and changes in COAs on geothermal development activities on existing and future leased lands for the protection of GRSG.
- Change in economic activity associated with wind and solar due to changes in the amount of land managed as ROW avoidance and exclusion areas.

Change in way of life, culture, visitor and viewer enjoyment, and preservation of nonmarket values, including direct and indirect use and non-use values, for local residents and visitors around renewable energy projects as well as communities of interest that value renewable energy.

Livestock Grazing

Potential changes in livestock grazing due to the BLM management decisions, such as changes in acres of land available for livestock grazing, could impact economic and social conditions through the following indicators:

- Change in economic activity, as measured by jobs, income, and economic output, associated with impacts on billed AUMs.
- Change in economic resilience and stability for ranching and farming communities.
- Changes in way of life, culture, social cohesion, and preservation of nonmarket values, including direct and indirect use and non-use values, associated with livestock grazing for ranchers and farmers and their families, local governments, local residents, and other communities of interest that may value livestock grazing on BLM-administered lands.

Greater Sage Grouse Conservation

Changes in greater sage grouse conservation measures due to the BLM management decisions could impact economic and social conditions through the following indicators:

- Changes to nonmarket values, including direct and indirect use and non-use values, associated with GRSG conservation and healthy sagebrush ecosystems, with particular importance for habitat and resource conservation communities of interest and other communities of interest that value the protection of GRSG for use and non-use values.
- Changes to ecosystem services associated with healthy sagebrush ecosystems.

Environmental Justice

As discussed in Appendix 13, Socioeconomic Baseline Report, and Chapter 3 of this EIS, issues of concern for potential impacts on environmental justice populations were identified (see Appendix 13, Socioeconomic Baseline Report and Section 3.11, Social and Economic Conditions (including Environmental Justice) for more details on the issues of concern). These issues were examined to determine if the BLM-management decisions in each alternative result in adverse and disproportionate impacts on the environment, health, and livelihoods of environmental justice populations.

Assumptions and Methodology

A detailed discussion of the specific methodologies used in the impact analysis is provided in **Appendix 18**, Social and Economic Impact Analysis Methodology. In addition to the assumptions provided in that appendix as well as those provided in **Section 4.1.1**, Analytical Assumptions, this analysis includes the general assumptions described below.

Economic and Social Conditions and Values

- Employment and income (especially labor earnings) would continue to be a driver of economic and population change in the socioeconomic study area.
- Activities and resources available in and around the planning area would continue to be important to the quality of life of current and future residents.
- The pace and timing of mineral development activities is dependent on a variety of factors outside the management decisions of the BLM and Forest Service. These include national and international energy demand and prices, production factors within the planning area, and business strategies of operators. The RFD scenario projects expected rates of well drilling, completion rates, and production decline curves. Together these parameters allow for projection of future oil and gas production volumes for use in the economic impact analysis. Actual economic impacts could vary if development or production deviates from the projections, if prices change, or if the relationships between industry output, intermediate inputs, and labor productivity change.
- The pace and timing of geothermal, wind, and solar energy development activities is also dependent on a variety of factors outside the management decisions of the BLM. These include demand for non-fossil fuel-generated electricity, availability of transmission infrastructure capacity, prices for other energy sources such as coal and natural gas, costs of geothermal, wind and solar energy generation technologies, access and availability of relevant subsidies and incentives, production factors within the planning area, and business strategies of operators. The impacts analysis uses geothermal, wind, and solar deployment scenarios from the RFD. Actual impacts could vary if the rate of development over the study period is different.
- The data collected to calculate projected revenue and well development costs for this impact analysis are based on historical data prior to the passing of the IRA. Revenue and production from new oil and gas leases is expected to change as a result of the changes from the implementation of the IRA, such as the increases in royalty rates and rental rates, which could lead to changes in operational decisions by oil and gas operators.
- While recreation and coal are expected to continue to have impacts on local and regional economic contributions, there are not likely to be impacts on recreation and coal activities and economic contributions across the alternatives from BLM-management decisions related to GRSG. For this reason, economic and social impacts associated with recreation and coal have been dismissed from further analysis. See Section 4.18 and Section 4.9 for more information on BLM-management impacts on recreation and coal, respectively.

- The AMLs for herd management areas are established in RMPs at the outset of planning and adjusted based on monitoring data throughout the life of the RMP. The BLM management decisions could impact wild horses and burros and the ability of herd management areas to support AMLs within the management areas where management options are restricted for the protection of GRSG; however, aside from the initial removal actions of wild horses and burros, there would be no additional impacts to wild horse and burros within herd management areas, under all alternatives. There could be impacts on wild horses and burros outside of herd management areas in OHMA but in adjacent lands that meander in and out of herd management areas and utilize the resources within, because there is potential for removal of resources, particularly water developments. However, these potential changes due to BLM-management decisions are not expected to impact social conditions or access to social values from wild horses through use and non-use values under all alternatives. For this reason, economic and social impacts on wild horses and burros have been dismissed for further analysis. See Section 4.6, Wild Horses, and Burros, for more information on BLM-management impacts on wild horses and burros.
- Economic and social impacts of BLM-management decisions on oil shale and tar sands was dismissed from further analysis due to the limited amount of oil shale and tar sands extraction on federal lands.

Environmental Justice

- Land use planning level decisions do not result directly in development activities. While this analysis looks at impacts on environmental justice populations from potential changes in development activities due to BLM-management decisions, any differences in actual development activities from those included in the discussion below could change the impacts on environmental justice populations. Additional site-specific analyses are required prior to implementation of development activities to determine if and where any disproportionate adverse impacts occur for specific identified environmental justice populations.

10.12.2 Alternative 1

Fluid Minerals (Oil and Gas) Management

Range Wide Environmental Consequences

On annual average, oil and gas production revenue and well development expenditures in the analysis areas is expected to result in a range of about 62,000 to 83,000 total jobs (from 23,000 to 29,000 direct jobs in the drilling oil and gas wells sector and the oil and gas extraction sector), $4.9 billion to $6.7 billion in total labor income (from $2.4 billion to $3.2 billion in direct labor income), and about $26.2 billion to $32.8 billion in economic output (from $18.6 billion to $22.4 billion in direct economic output) combined across 8 states.[2]

A summary of the direct and total average annual number of jobs, labor income, and total economic output that could be supported by projected oil and gas development from 2023 to 2042, under Alternative 1, is provided in **Table 1**, below. **Section 18.4** of **Appendix 18**, Social and Economic Impact and Analysis Methodology and State-Specific Impact Analysis, provides details of the direct and indirect and induced contributions for the analysis area counties combined as well as each state combined, as well as a discussion on the impacts on economic and social conditions for each state in the analysis area with reasonably foreseeable development of oil and gas.

[2] California and Oregon did not have reasonably foreseeable future oil and gas development in the planning area, so they are not included in the discussion.

Table 1. Average Annual Economic Contributions from Oil and Gas, Under Alternative 1

State[1]	Type of Impact[2]	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Colorado (Low Scenario)	Direct	6,574	6,574	790,898,405	790,898,405	3,979,134,548	3,979,134,548
	Total	18,075	22,265	1,487,365,930	1,888,650,265	6,113,421,790	7,023,096,354
Colorado (High Scenario)	Direct	12,791	12,791	1,539,179,946	1,539,179,946	7,738,174,737	7,738,174,737
	Total	35,158	43,301	2,893,316,242	3,672,980,648	11,888,699,355	13,657,026,287
Idaho	Direct	6	6	360,003	360,003	1,873,754	1,873,754
	Total	13	14	705,095	759,269	3,044,425	3,236,789
Montana	Direct	1,922	1,922	284,762,972	284,762,972	1,318,085,631	1,318,085,631
	Total	5,046	5,299	467,912,653	484,846,192	1,893,586,767	1,939,453,416
Nevada	Direct	18	18	249,165	249,165	6,374,761	6,374,761
	Total	41	42	2,133,031	2,182,516	11,445,990	11,681,292
North Dakota	Direct	275	275	31,990,856	31,990,856	406,307,567	406,307,567
	Total	551	573	46,571,864	47,955,782	466,716,295	471,407,239
South Dakota	Direct	89	89	7,090,932	7,090,932	34,541,446	34,541,446
	Total	238	264	14,081,147	15,735,559	61,206,393	66,872,391
Utah	Direct	2,368	2,368	162,438,183	162,438,183	1,619,804,067	1,619,804,067
	Total	5,204	7,059	309,658,031	453,626,368	2,125,280,538	2,450,509,848
Wyoming	Direct	11,727	11,727	1,149,445,274	1,149,445,274	11,250,865,363	11,250,865,363
	Total	26,295	26,318	2,018,370,210	2,019,972,754	14,191,130,372	14,196,131,963
Total Planning Area (Low Colorado Scenario)	Direct	22,980	22,980	2,427,235,790	2,427,235,790	18,616,987,138	18,616,987,138
	Total	55,464	61,833	4,346,797,961	4,913,728,705	24,865,832,571	26,162,389,294
Total Planning Area (High Colorado Scenario)	Direct	29,197	29,197	3,175,517,331	3,175,517,331	22,376,027,327	22,376,027,327
	Total	72,547	82,870	5,752,748,273	6,698,059,088	30,641,110,135	32,796,319,226

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

[1] There were no oil and gas developments projected for California and Oregon.

[2] Total impacts include direct, indirect, and induced impacts.

Fiscal revenue is generated on the production of federal minerals at the federal, state, and in some states at the local level. Many western states and local governments are heavily dependent upon these mineral revenues for a significant portion of their annual budgets. For all states in the planning area, BLM decisions on GRSG HMAs, under Alternative 1, are not expected to change tax revenue and public services from current conditions. The total royalty revenue generated from oil and gas production, combined across 8 states, could range from $2.4 billion to $2.8 billion. Oil and gas activity will continue to support revenue from rents and bonus bids, across all states in the analysis area with reasonably foreseeable future oil and gas development. State severance tax revenue could range from about $723 million to $752 million, across 8 states, combined. Local ad valorem taxes could generate a range of about $759 million to $871 million in county revenues, across 3 states with reasonably foreseeable development of oil and gas and that collect ad

valorem taxes, combine. Additionally, revenue from other state-specific fees and taxes, such as Colorado's oil and gas conservation fee, Montana's privilege and license tax, Nevada's Net Proceeds of Minerals Tax, North Dakota's oil extraction tax, Utah's conservation fee, and Wyoming's oil and gas conservation tax, would range from about $25 million to $28 million, consistent with current conditions. Oil and gas activity would also continue to support revenue to state and local governments through sales and use taxes, across all states in the analysis area with reasonably foreseeable future oil and gas development. A quantitative discussion on royalty and state tax revenues for each state is included in **Appendix 18**. For all states in the planning area, BLM decisions on GRSG HMAs, under Alternative 1, are not expected to change social and nonmarket values and conditions such as lifestyles and culture of those communities of interest that value mineral extraction from current conditions.

Under Alternative 1, in most of the planning area PHMA (IHMA in Idaho) fluid mineral leasing would continue to be managed as NSO, except as noted under the state-specific discussion in Appendix 18, for certain areas in Wyoming and GHMA in Idaho, Nevada, and Utah. In the areas managed as NSO, emissions sources and surface disturbing activities would continue to be eliminated, which would reduce impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and visitor and viewer enjoyment from changes in air quality. Fluid mineral development will likely continue in other locations, which would lead to relocation of impacts on the nonmarket and social conditions associated with air quality and GHG emissions.

See **Appendix 18**, Social and Economic Impact Analysis Methodology and State-Specific Impact Analysis, for additional details of impacts for each state in the analysis area with reasonably foreseeable future oil and gas development in the planning area.

Nonenergy Leasable Minerals Management

Under Alternative 1, most of the PHMA and IHMA in the planning area are closed to new leasing of nonenergy leasable minerals but states can consider expansion of existing leases. Across all states in the planning area, there would continue to be economic activity and nonmarket and social values associated with the extraction of federal nonenergy leasable minerals. There could be economic and social impacts, as detailed in **Section 4.2.1**, *Nature and Type of Effects*, due to current BLM decisions regarding access to nonenergy leasable mineral extractions in certain locations, such as Wyoming, where nonenergy leasable minerals are important to the local economies. It is not anticipated that these impacts would be large due to the adaptive management and allowing the Known Sodium Leasing Area to remain open to exploration and consideration for leasing development.

Locatable Minerals Management

Under the 2015 ROD, carried forward as Alternative 1, all states recommended the withdrawal of all SFAs from locatable mineral entry. The Secretary proposes and makes withdrawals not through BLM land use planning but according to a separate process pursuant to section 204 of FLPMA. In 2015, the Secretary proposed to withdraw the SFA lands and a separate process to consider this withdrawal is currently underway. If The Secretary decided to withdraw these lands, there could be impacts on economic activity and social conditions, as discussed in *Nature and Types of Effects*. There could be a decrease in jobs, labor income, and economic output due to the potential decrease in exploration and development. Potential for impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality from locatable mineral development would continue in all GHMA and PHMA (IHMA in Idaho), except in all SFAs.

Mineral Materials Management

Under Alternative 1, except in Idaho, as discussed below, PHMA in all other states would be closed to new mineral material sales, but open for new free use permits, and expansion of existing pits for both free use permits and material sales, which would lead to continued impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality. Extraction could also take place in other locations outside of GRSG habitat. Given the other opportunities to extract mineral materials in other locations, the impacts on economic activities and social conditions associated with mineral materials is likely to be minimal, under Alternative 1.

Idaho

Under Alternative 1, all PHMA would be closed to mineral material disposal except for the expansion of existing pits, unlike other states, in Idaho this closure extends to new free use permits. Closing PHMA to new free use permits would result in increased costs to local government road departments for road maintenance and could result in worsening road conditions in these areas.

Renewable Energy (Geothermal, Wind, and Solar) Management

Rangewide Environmental Consequences

On annual average, geothermal development, across 7 states in the planning area, is expected to result in about 634 total jobs (about 330 direct jobs), $41.2 million in total labor income (about $20.0 million in direct labor income), and about $120 million in economic output (about $28.4 million in direct economic output).[3]

A summary of impacts on the number of jobs, labor income, and economic output from expenditures on geothermal development for each state in the planning area is included in **Table 2**, below. Details on the direct, indirect, and induced economic contributions as well as a discussion on the impacts on economic and social conditions for each state in the analysis with reasonably foreseeable development of oil and gas are included in **Appendix 18**.

For the 7 states in the planning area that are anticipated to see geothermal development, BLM-management decisions on GRSG HMAs, under Alternative 1, are not expected to change tax revenue and public services from current conditions.

Under Alternative 1, the entire plan area with the exception of Wyoming would limit lands used for ROWs in PHMA (or IHMA in Idaho) and GHMA for Greater Sage-Grouse (see **Appendix 12**, Reasonably Foreseeable Development Scenario, for more detail). These BLM decisions could result in operators relocating development of wind and solar facilities to other locations that are not restricted. If there are constraints on transmission in nearby areas, relocating wind and solar operations might be costly or it might not be possible, because ROW avoidance and exclusion areas would restrict transmission lines as well as renewable energy development. This could result in barriers to development, which could result in impacts on economic contributions of wind and solar. These impacts would more likely occur in Nevada, Oregon, Utah, and Wyoming, where there have been the most wind and solar developed on federal lands. There are various factors that operators use when deciding where to site wind and solar projects that prevent further analysis on state-level impacts on the level of solar and wind development and associated impacts on economic output due to BLM decisions (see **Section 4.9**).

[3] The RFD does not anticipate future geothermal development in Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas.

Table 2. Average Annual Economic Contributions from Geothermal, Under Alternative 1

State[1]	Type of Impact[2]	Employment	Labor Income	Economic Output
California and Nevada Combined	Direct	276	17,088,024	24,364,445
	Total	540	35,982,758	106,272,068
Colorado	Direct	8	536,971	761,363
	Total	16	1,057,306	2,658,444
Idaho	Direct	22	1,020,547	1,413,689
	Total	36	1,795,032	4,930,353
Oregon	Direct	6	297,479	402,124
	Total	11	576,996	1,509,272
Utah	Direct	12	742,958	1,059,324
	Total	22	1,349,977	3,599,534
Wyoming	Direct	6	288,314	388,376
	Total	9	432,268	1,286,669
Total Planning Area	Direct	330	19,974,293	28,389,321
	Total	634	41,194,337	120,256,340

Source: National Renewable Energy Laboratory 2016
[1]There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.
[2] Total impacts include direct, indirect, and induced impacts.

Details for impacts on economic and social conditions due to BLM decisions on renewable energy, including geothermal, wind, and solar energy, for each state are included in **Appendix 18**.

Livestock Grazing Management

Rangewide Environmental Consequences

Table 18-7, in **Appendix 18**, shows the average annual number of jobs, labor income, and total economic output that could be supported from projected billed AUMs (total for cattle and sheep), under Alternative 1, for the analysis area counties combined as well as each state combined. On annual average, livestock grazing on allotments where PHMA accounted for at least 15% of the acreage in the analysis areas for all states combined is expected to support about 2,000 total jobs (about 841 direct jobs in the animal production and ranching sectors), $120 million in total labor income (about $67.6 million in direct labor income), and about $380 million in economic output (about $204 million in direct economic output) across all states in the planning area.

Under Alternative 1, PHMA, IHMA, and GHMA would continue to be available for livestock grazing, which would continue to support current levels of economic and social conditions. BLM decisions on GRSG HMAs, under Alternative 1, are not expected to impact social conditions such as lifestyles and culture of ranchers and farmers and those communities of interest that value livestock grazing on public lands, as those impacts described in the *Nature and Types of Effects* (see **Section 4.8**, Livestock Grazing).

A summary of total and direct impacts on the number of jobs, labor income, and economic output from expenditures on livestock grazing for each state in the planning area is included in **Table 3**, below. Details on the direct, indirect, and induced economic contributions as well as a discussion on impacts on economic and social conditions for each state are included in in **Appendix 18**.

Table 3. Average Annual Economic Contributions from Livestock Grazing in Allotments where PHMA Accounted for 15% or More of the Acreage, Under Alternative 1

State	Type of Impact[1]	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
California	Direct	7	7	2,146,636	2,146,636	4,625,897	4,625,897
	Total	19	22	3,105,261	3,386,449	7,436,887	8,391,031
Colorado	Direct	50	50	1,844,864	1,844,864	5,164,123	5,164,123
	Total	78	82	2,995,610	3,200,447	9,046,152	9,841,613
Idaho	Direct	77	77	13,312,954	13,312,954	28,474,475	28,474,475
	Total	214	221	22,450,229	22,805,297	55,796,422	57,280,261
Montana	Direct	186	186	10,506,213	10,506,213	33,185,106	33,185,106
	Total	364	381	20,177,827	20,978,060	64,895,970	67,265,732
Nevada	Direct	82	82	13,703,178	13,703,178	42,086,589	42,086,589
	Total	230	236	23,293,363	23,567,530	74,802,986	76,657,180
North Dakota	Direct	1	1	39,141	39,141	143,402	143,402
	Total	1	1	62,321	64,077	228,340	235,019
Oregon	Direct	78	78	6,451,505	6,451,505	25,184,996	25,184,996
	Total	197	206	13,466,487	14,139,416	47,731,985	50,012,006
South Dakota	Direct	5	5	185,898	185,898	1,405,882	1,405,882
	Total	10	10	373,256	402,461	2,335,006	2,458,076
Utah	Direct	54	54	4,634,026	4,634,026	10,839,099	10,839,099
	Total	87	90	6,083,969	6,218,740	16,268,163	16,915,273
Wyoming	Direct	301	301	14,742,131	14,742,131	52,633,690	52,633,690
	Total	547	552	24,819,572	25,059,882	90,295,946	91,280,444
Total Planning Area	Direct	841	841	67,566,546	67,566,546	203,743,259	203,743,259
	Total	1,747	1,801	116,827,895	119,822,359	368,837,857	380,336,635

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.
[1] Total impacts include direct, indirect, and induced impacts.

Greater Sage Grouse Conservation

Rangewide Environmental Consequences

Management under Alternative 1 to conserve, enhance, and restore sagebrush ecosystems by separating GRSG habitat into SFAs, PHMAs, IHMAs, and GHMAs, would provide protection for GRSG conservation values. BLM decisions would continue to support nonmarket values associated with GRSG conservation, which would especially impact habitat conservation communities of interest (see discussion in *Nature and Type of Effects* and **Section 3.11**, Social and Economic Conditions).

Under Alternative 1, BLM decisions would support the protection of GRSG ecosystems, which would continue to provide value to the surrounding communities through impacts on tribal interests and cultural resources, especially subsistence, from changes in GRSG populations. Habitat conservation could also result in impacts to communities who would benefit from development. Some examples include impacts to road realignment projects near tribal reservations and plans to expand reservation boundaries if the reservation is surrounded by PHMA.

Environmental Justice

Rangewide Environmental Consequences

Under Alternative 1, cultural resources could be impacted by BLM decisions by allowing surface disturbing activities. These impacts on cultural resources would result in disproportionate and adverse impacts on American Indian and Alaska Native populations who value and use these resources. These impacts could occur across all states in the planning area where there are cultural resources and where there are identified environmental justice populations, such as in Colorado, where there are known concentrations of archaeological resources in pinyon-juniper vegetation that provide value to American Indian and Alaska Native populations, and in California and Nevada, where there are traditional pine nutting areas that are valuable to American Indian and Alaska Native populations. Project-specific Section 106 compliance and government-to-government consultation with tribes should mitigate the effects of development on BLM-administered lands outside of sagebrush-dominated areas. See **Section 4.17**, Tribal Interests and **Section 4.16**, Cultural Resources.

Under Alternative 1, surface-disturbing activities could negatively impact subsistence resource availability. This would likely disproportionately impact environmental justice populations due to the importance of subsistence activities to American Indian and Alaska Native populations, low-income populations, and some minority populations. The disturbance cap, under Alternative 1, could help to reduce the impacts to wildlife and subsistence resources, which could reduce impacts on environmental justice populations. These impacts would occur across the planning area. Level of impact would likely vary geographically depending on the level of subsistence use in the region and the location of surface disturbance; a site-specific analysis would be needed to further analyze the impacts. See **Section 4.5**, Fish and Wildlife and **Section 4.17**, Tribal Interests and **Section 4.16**, Cultural Resources.

Under Alternative 1, in most of the planning area PHMA (IHMA in Idaho), except as noted in **Table 4**, below, and discussed under the state-specific subheadings in **Appendix 18** for Idaho, Nevada, Oregon, Utah, and Wyoming, current stipulations and BLM decisions would continue and would likely reduce the impacts on GHG emissions and air quality from particulate matter, risk of wildfire smoke, and surface-disturbing activities. Mineral development will likely continue in other locations, which would lead to relocation of impacts on the nonmarket and social conditions associated with air quality, such as access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment. The impacts on air quality would affect all communities, including environmental justice populations, and the extent to which these impacts would disproportionately affect environmental justice populations would depend on site-specific factors and would require a site-specific analysis. See **Section 4.13**. Air Resources and Climate.

Impacts from BLM-management decisions on environmental justice populations vary by geographic region. Many impacts would require site-specific analyses to determine if BLM decisions would result in disproportionate and adverse impacts on environmental justice populations at a local level. For the purposes of this rangewide EIS, a summary of the number of counties in the analysis area, the number of counties that meet a criteria for containing environmental justice population, and a summary of impacts by state is included in **Table 4**, below, and a more detailed discussion of adverse and disproportionate impacts on environmental justice populations by state is included in **Appendix 18**.[4]

[4] There were no counties in the North Dakota analysis area that met the threshold for environmental justice populations, so North Dakota is not included in the state-by-state discussion.

Table 4. Impacts on Environmental Justice Populations by State, Under Alternative 1

State	Number of Counties in the Analysis Area	Number of Counties that with Populations that meet the Environmental Justice Criteria	Summary of Impacts[1]
California	2	2	Disproportionate and adverse impacts on environmental justice populations could occur from changes in access to subsistence resources.
Colorado	8	7	Disproportionate and adverse impacts on environmental justice populations could occur from changes in access to cultural and subsistence resources.
Idaho	27	25	Same as Colorado. Additionally, disproportionate and adverse impacts on environmental justice populations could occur due to continued impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality if there would be an increase in mineral and ROW development and activities in GHMA and IHMA.
Montana	26	18	Same as Colorado.
Nevada	10	10	Similar to Idaho, except disproportionate and adverse impacts could occur if there would be an increase in mineral and ROW development activities in PHMA and GHMA.
Oregon	8	7	Similar to Idaho, except disproportionate and adverse impacts could occur if there would be an increase in mineral and ROW development activities in PHMA, where only utility-scale wind and solar projects would be excluded.
South Dakota	2	1	Same as California.
Utah	23	18	Same as Nevada.
Wyoming	21	15	Same as Nevada.

Source: US Environmental Protection Agency 2023; US Census Bureau 2023

[1] See Appendix 18 for more details on impacts by state.

10.12.3 Alternative 2

Fluid Minerals (Oil and Gas) Management

Rangewide Environmental Consequences

The number of wells anticipated to be drilled and completed over the planning period would be the same as under Alternative 1 in Montana, Nevada, North Dakota, South Dakota, Utah, and Wyoming, so the market impacts on jobs, labor, income, economic output from oil and gas development and operations would also be the same as described under Alternative 1 for these states (see **Table 5**, below). Under Alternative 2, oil and gas production revenue and well development expenditures are expected to increase in Colorado and Idaho due to BLM-management decisions (see **Section 4.10**, Mineral Resources). On annual average,

this increase is expected to support about 325 more jobs (almost 100 additional direct jobs), about $27 million more in total labor income (about $11.5 million in additional direct labor income), and about $100 million in additional economic output (about $60 million in additional direct economic output) than under Alternative 1, across these two states. Additional details for state-specific direct, indirect, and induced impacts are included in **Appendix 18**.

Table 5. Average Annual Economic Contributions from Oil and Gas, Under Alternative 2

State[1]	Type of Impact[2]	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Colorado (Low Scenario)	Direct	6,669	6,669	802,283,755	802,283,755	4,036,412,178	4,036,412,178
	Total	18,335	22,585	1,508,776,391	1,915,837,404	6,201,421,407	7,124,192,537
Colorado (High Scenario)	Direct	12,885	12,885	1,550,426,755	1,550,426,755	7,794,700,978	7,794,700,978
	Total	35,415	43,617	2,914,454,009	3,699,811,501	11,975,544,580	13,756,786,294
Idaho	Direct	8	8	480,004	480,004	2,498,339	2,498,339
	Total	17	18	940,127	1,012,359	4,059,233	4,315,719
Montana	Direct	1,922	1,922	284,762,972	284,762,972	1,318,085,631	1,318,085,631
	Total	5,046	5,299	467,912,653	484,846,192	1,893,586,767	1,939,453,416
Nevada	Direct	18	18	249,165	249,165	6,374,761	6,374,761
	Total	41	42	2,133,031	2,182,516	11,445,990	11,681,292
North Dakota	Direct	275	275	31,990,856	31,990,856	406,307,567	406,307,567
	Total	551	573	46,571,864	47,955,782	466,716,295	471,407,239
South Dakota	Direct	89	89	7,090,932	7,090,932	34,541,446	34,541,446
	Total	238	264	14,081,147	15,735,559	61,206,393	66,872,391
Utah	Direct	2,368	2,368	162,438,183	162,438,183	1,619,804,067	1,619,804,067
	Total	5,204	7,059	309,658,031	453,626,368	2,125,280,538	2,450,509,848
Wyoming	Direct	11,727	11,727	1,149,445,274	1,149,445,274	11,250,865,363	11,250,865,363
	Total	26,295	26,318	2,018,370,210	2,019,972,754	14,191,130,372	14,196,131,963
Total Planning Area (Low Colorado Scenario)	Direct	23,077	23,077	2,438,741,141	2,438,741,141	18,674,889,353	18,674,889,353
	Total	55,728	62,158	4,368,443,454	4,941,168,934	24,954,846,996	26,264,564,407
Total Planning Area (High Colorado Scenario)	Direct	29,293	29,293	3,186,884,142	3,186,884,142	22,433,178,152	22,433,178,152
	Total	72,808	83,191	5,774,121,072	6,725,143,031	30,728,970,169	32,897,158,163

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

[1] There were no oil and gas developments projected for California and Oregon.

[2] Total impacts include direct, indirect, and induced impacts.

Mineral development would continue to support federal, state, and local mineral revenues at levels similar to those estimated under Alternative 1, except for impacts in Colorado and Idaho, as described in Appendix 18, which could result in an increase in federal, state, and local revenues, compared with Alternative 1. Changes in mineral revenues available to fund public services and infrastructure in Montana, Nevada, North

Dakota, South Dakota, Utah, and Wyoming would be negligible relative to those under Alternative 1. Across all states in the planning area, compared with Alternative 1, there could be an additional $6.4 to $6.5 million in royalty revenue, $500,000 in state severance tax revenue, $1.7 million in ad valorem tax revenue, and $40,000 in oil and gas conservation fee revenue. Changes in oil and gas activity could lead to an increase in revenue from rents and bonus bids, compared with Alternative 1. Additionally, an increase in oil and gas activity would likely lead to more direct and indirect spending, which would lead to an increase in sales and use tax, compared with Alternative 1.

Under Alternative 2, impacts on nonmarket and social conditions such as impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality would be the same as under Alternative 1, except in Colorado as described in **Appendix 18**. Social values in terms of way-of-life, culture, and social cohesion for the communities who value mineral extraction in Montana, Nevada, North Dakota, South Dakota, Utah, and Wyoming would be similar to those described under Alternative 1.

See **Appendix 18** for additional detail of state-level impacts for Colorado and Idaho.

Nonenergy Leasable Minerals Management

Rangewide Environmental Consequences

Under Alternative 2, economic and social impacts from changes in nonenergy leasable minerals due to BLM-management decisions would be the same as under Alternative 1 for all states in the planning area, except Nevada.

Nevada

Nevada added exception criteria to the closure in PHMA, allowing leasing of nonenergy leasable minerals under certain circumstances. This would improve the access of nonenergy leasable minerals in the planning areas compared to Alternative 1, which could improve economic and social conditions associated with nonenergy leasable minerals, such as lifestyle, culture, employment, and economic output, through greater extraction of these mineral resources. However, BLM-management decisions under Alternative 2 could also lead to less access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality.

Locatable Minerals Management

Rangewide Environmental Consequences

Except for Montana, where recommendation for withdrawal of SFAs language would be as described under Alternative 1, Alternative 2 does not include recommendations for the withdrawal of SFAs from locatable mineral entry. Recommendations for withdrawal have no impact on economic activity.

Under Alternative 2, removing the recommendation for withdrawal of locatable mineral entry in SFA in all states (except in Montana/Dakotas, which did not have a 2019 amendment) would not change impacts on nonmarket and social conditions from changes in air quality and GHG emissions because as discussed under Alternative 1, enacting the recommendation would be separate action and not occur under this RMPA.

Mineral Materials Management

Rangewide Environmental Consequences

Under Alternative 2, impacts on public access to mineral materials and social and nonmarket values associated with mineral material extraction would likely be similar to under Alternative 1, for all states except for Idaho and Nevada.

Under Alternative 2, impacts on nonmarket and social conditions due to changes in air quality and GHG emissions from proposed management of BLM-administered federal mineral estate as closed to or available for saleable mineral sales or disposal in PHMA and GHMA would be the same as under Alternative 1, except in Idaho IHMA and Nevada PHMA as described in the state-specific sub-headings below.

Idaho

Under Alternative 2, PHMA and IHMA would be managed as closed to mineral material sales, however, Idaho would allow consideration of new free use permits. Compared to Alternative 1, this would reduce impacts on road conditions and high road maintenance costs on local governments which would no longer have to transport mineral materials required for road maintenance from outside these areas. Impacts would otherwise be the same as described under Alternative 1.

Under Alternative 2, allowing consideration of new free use permits for saleable minerals in Idaho IHMA, would increase the potential for associated impacts on nonmarket and social conditions due to changes in air quality and GHG emissions compared with Alternative 1. This is because there would be a greater chance for more acres of saleable mineral activities to occur in these areas.

Nevada

Under Alternative 2, Nevada would allow exception criteria to the mineral material disposal closure in PHMA. These criteria could increase the time to get approval for new mineral material sales but would also provide certainty about the conditions under which exemptions would be granted and would reduce social and economic impacts associated with sourcing mineral materials from alternative locations.

Under Alternative 2, adding an exception criterion to saleable and nonenergy mineral closures for Nevada PHMA would increase the potential for associated impacts on nonmarket and social conditions due to changes in air quality and GHG emissions. This is because there would be a greater chance for more area of saleable mineral activities to occur in these areas.

Renewable Energy (Geothermal, Wind, and Solar) Management

Rangewide Environmental Consequences

The number of geothermal plants developed, under Alternative 2, would be the same as those anticipated under Alternative 1 in all states (see **Appendix 12**, Reasonably Foreseeable Development Scenario), so the impacts on economic activity in terms of jobs, labor, income, economic output from future geothermal development would also be the same as those described under Alternative 1 (see **Table 6**, below for a summary of direct and total impacts, and **Table 18-9** in **Appendix 18**, for details on direct, indirect, and induced impacts).

Under Alternative 2, BLM decisions related to ROWs for wind and solar energy would be the same as Alternative 1 for all states, except for Nevada, Utah, and Wyoming). While BLM decisions vary slightly in Nevada, Utah, and Wyoming, the impacts of these decisions on ROWs for wind and solar energy would be minimal due to the projected small change in restricted acres in Nevada and Wyoming and the greater flexibility for infrastructure projects in Utah compared to Alternative 1. This means that for all states, economic contributions from wind and solar energy development would be similar to those under Alternative 1.

Table 6. Average Annual Economic Contributions from Geothermal, Under Alternative 2

State[1]	Type of Impact[2]	Employment	Labor Income	Economic Output
California and Nevada Combined	Direct	276	17,088,024	24,364,445
	Total	540	35,982,758	106,272,068
Colorado	Direct	8	536,971	761,363
	Total	16	1,057,306	2,658,444
Idaho	Direct	22	1,020,547	1,413,689
	Total	36	1,795,032	4,930,353
Oregon	Direct	6	297,479	402,124
	Total	11	576,996	1,509,272
Utah	Direct	12	742,958	1,059,324
	Total	22	1,349,977	3,599,534
Wyoming	Direct	6	288,314	388,376
	Total	9	432,268	1,286,669
Total Planning Area	Direct	330	19,974,293	28,389,321
	Total	634	41,194,337	120,256,340

Source: National Renewable Energy Laboratory 2016
[1]There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.
[2] Total impacts include direct, indirect, and induced impacts.

Under Alternative 2, impacts on nonmarket and social conditions due to changes in air quality and GHG emissions from changes in GRSG habitat protected from major and minor ROWs and from solar and wind development would be the same as under Alternative 1, except in Nevada for solar energy development and major ROWs, and in Nevada and Utah for wind energy development, as described in the state-specific analysis in **Appendix 18**.

Details for impacts on economic and social conditions due to BLM decisions on renewable energy, including geothermal, wind, and solar energy, by state are included in **Appendix 18**.

Livestock Grazing Management

Rangewide Environmental Consequences

Estimated billed AUMs, under Alternative 2, would be the same as under Alternative 1 for all states and analysis areas, so impacts on economic activity in terms of jobs and income from livestock grazing would also be the same as described under Alternative 1 (see **Table 7**, below, for a summary of direct and total impacts by state, and see **Table 18-10** in **Appendix 18** for direct, indirect, and induced impacts by state). In addition, social impacts in terms of way-of-life, culture, and social cohesion would be similar to those described under Alternative 1.

Impacts on livestock grazing operations and associated non-market values would be similar to those described for Alternative 1.

Table 7. Average Annual Economic Contributions from Livestock Grazing in Allotments where PHMA Accounted for 15% or More of the Acreage, Under Alternative 2

State	Type of Impact[1]	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
California	Direct	7	7	2,146,636	2,146,636	4,625,897	4,625,897
	Total	19	22	3,105,261	3,386,449	7,436,887	8,391,031
Colorado	Direct	50	50	1,844,864	1,844,864	5,164,123	5,164,123
	Total	78	82	2,995,610	3,200,447	9,046,152	9,841,613
Idaho	Direct	77	77	13,312,954	13,312,954	28,474,475	28,474,475
	Total	214	221	22,450,229	22,805,297	55,796,422	57,280,261
Montana	Direct	186	186	10,506,213	10,506,213	33,185,106	33,185,106
	Total	364	381	20,177,827	20,978,060	64,895,970	67,265,732
Nevada	Direct	82	82	13,703,178	13,703,178	42,086,589	42,086,589
	Total	230	236	23,293,363	23,567,530	74,802,986	76,657,180
North Dakota	Direct	1	1	39,141	39,141	143,402	143,402
	Total	1	1	62,321	64,077	228,340	235,019
Oregon	Direct	78	78	6,451,505	6,451,505	25,184,996	25,184,996
	Total	197	206	13,466,487	14,139,416	47,731,985	50,012,006
South Dakota	Direct	5	5	185,898	185,898	1,405,882	1,405,882
	Total	10	10	373,256	402,461	2,335,006	2,458,076
Utah	Direct	54	54	4,634,026	4,634,026	10,839,099	10,839,099
	Total	87	90	6,083,969	6,218,740	16,268,163	16,915,273
Wyoming	Direct	301	301	14,742,131	14,742,131	52,633,690	52,633,690
	Total	547	552	24,819,572	25,059,882	90,295,946	91,280,444
Total Planning Area	Direct	841	841	67,566,546	67,566,546	203,743,259	203,743,259
	Total	1,747	1,801	116,827,895	119,822,359	368,837,857	380,336,635

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

[1] Total impacts include direct, indirect, and induced impacts.

Greater Sage Grouse Conservation

Rangewide Environmental Consequences

Management under Alternative 2 to conserve, enhance, and restore sagebrush ecosystems would have similar impacts on nonmarket and social values of GRSG as those described in Alternative 1. Nonmarket impacts under Alternative 2 would be similar to those described in Alternative 1, with state analysis area specific differences. For GRSG conservation related values, removing SFAs in UT, WY, NV, and ID would reduce protections from development and provide fewer safeguards for nonmarket values associated with self-sustaining populations of GRSG.

Requirements for mitigation that achieves a net conservation gain in all HMA types in MT/DK, NV/CA, and OR, and impacts would be the same as described for Alternative 1. Enforcement of mitigation resulting in no net loss in HMA CO and ID would increase potential impacts to non-market values such as the nonuse values of preserving the species for future generations compared to the net-conservation gain requirements under Alternative 1. In UT and WY, the net conservation gain requirement would be removed, which would increase potential for impacts to conservation related values. Voluntary implementation of compensatory mitigation in CO, ID, NV/CA, OR, UT, and WY HMA, could also increase the potential for impacts on nonmarket values associated with GRSG preservation compared to Alternative 1.

Environmental Justice

Rangewide Environmental Consequences

Impacts on cultural resources under Alternative 2 would be similar to under Alternative 1, except as noted in **Table 8** below for Colorado, Idaho, Nevada, Utah, and Wyoming. **Table 8**, below, provides a summary of the number of counties in the analysis area, the number of counties that meet a criteria for containing environmental justice population, and a summary of impacts by state, and a more detailed discussion of adverse and disproportionate impacts on environmental justice populations by state is included in **Appendix 18**. See **Section 4.17**, Tribal Interests and **Section 4.16**, Cultural Resources.

Table 8. Impacts on Environmental Justice Populations by State, Under Alternative 2

State	Number of Counties in the Analysis Area	Number of Counties that with Populations that meet the Environmental Justice Criteria	Summary of Impacts[1]
Colorado	8	7	Disproportionate and adverse impacts on environmental justice populations could occur from changes in access to cultural resources, due to exposure of PHMAs to potential fluid mineral leasing. Future site-specific implementation analysis would be needed to determine the level and intensity of impacts as well as methods for avoiding, minimizing, and/or compensating for identified impacts. Additionally, disproportionate and adverse impacts on environmental justice populations could occur due to potential impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality, compared with Alternative 1.
Idaho	27	25	Similar to Colorado, except the disproportionate and adverse impacts on environmental justice populations could occur from removing SFAs and allowing consideration of new free us permits for saleable minerals. Future site-specific implementation analysis would be needed to determine the level and intensity of impacts as well as methods for avoiding, minimizing, and/or compensating for identified impacts.
Nevada	10	10	Same as Idaho.
Utah	23	18	Same as Idaho. Additionally, disproportionate and adverse impacts on environmental justice populations could occur in areas outside PHMAs that are within 5 miles of leks, which would be avoidance for wind development, due to the potential for impacts on nonmarket and social conditions due to changes in air quality and GHG emissions compared with Alternative 1.
Wyoming	21	15	Same as Idaho. There are protections in place for cultural resources within existing RMPs that would mitigate impacts on environmental justice populations. Future site-specific implementation analysis would be needed to determine the level and intensity of impacts.

Source: US Environmental Protection Agency 2023; US Census Bureau 2023

[1] See Appendix 18 for more details on impacts by state.

Under Alternative 2, impacts on subsistence resources would be similar to those under Alternative 1, except for areas with fewer restrictions on fluid mineral development, and/or more allocable permits for saleable minerals, where subsistence resources would likely be more at risk due to surface disturbance. Impacts on subsistence resources could disproportionately impact environmental justice populations. The extent to which the impacts on subsistence affects environmental justice populations depends on site-specific factors and analysis. See **Section 4.5**, Fish and Wildlife and **Section 4.17**, Tribal Interests and **Section 4.16**, Cultural Resources.

Under Alternative 2, impacts on air quality and GHG emissions would be the same as under Alternative 1, except as noted under the state-specific subheadings below for Colorado, Idaho, Nevada, and Utah. Impacts on air quality from risks of wildfire smoke and fugitive dust, under Alternative 2, would be the same as under Alternative 1. See **Section 4.13**, Air Resources and Climate.

10.12.4 Alternative 3

Fluid Minerals (Oil and Gas) Management

Rangewide Environmental Consequences

On annual average, oil and gas production revenue and well development expenditures in the analysis area for 8 states combined is expected to result in about 17,000 to 29,000 fewer total jobs (about 7,000 to 11,000 fewer direct jobs), about $1.3 billion to $2.3 billion less in total labor income (about $746 million to $1.1 billion less in direct labor income), and about $8.0 billion to $11.6 billion less in economic output (about $6.1 billion to $8.1 billion less in direct economic output) than under Alternative 1. The large changes in economic conditions, under Alternative 3, could lead to higher levels of unemployment and underemployment in some mineral dependent economies. Displaced workers in more diversified economies are likely to have an easier time finding new employment while rural residents may have to commute further for work or may have to consider re-locating out of the area. Those lacking financial resources to either commute further or relocate will be especially impacted.

A summary of the direct and total average annual number of jobs, labor income, and total economic output that could be supported by projected oil and gas development from 2023 to 2042, under Alternative 3, is provided in **Table 9**, below. **Section 18.4.4** of **Appendix 18**, Social and Economic Impact and Analysis Methodology and State-Specific Impact Analysis, provides details of the direct and indirect and induced contributions for the analysis area counties combined as well as each state combined as well as a discussion on the impacts on economic and social conditions for each state in the analysis area with reasonably foreseeable development of oil and gas.

Table 9. Average Annual Economic Contributions from Oil and Gas, Under Alternative 3

State[1]	Type of Impact[2]	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Colorado (Low Scenario)	Direct	6,263	6,263	755,042,456	755,042,456	3,769,457,803	3,769,457,803
	Total	17,169	21,052	1,413,389,813	1,784,540,707	5,791,291,470	6,632,710,393
Colorado (High Scenario)	Direct	9,122	9,122	1,099,726,614	1,099,726,614	5,488,012,722	5,488,012,722
	Total	24,999	30,651	2,058,115,395	2,598,211,191	8,431,632,887	9,656,427,089
Idaho	Direct	5	5	312,003	312,003	1,623,920	1,623,920
	Total	11	12	611,082	658,033	2,638,502	2,805,218

State[1]	Type of Impact[2]	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Montana	Direct	1,373	1,373	208,532,284	208,532,284	981,019,294	981,019,294
	Total	3,661	3,877	343,504,881	358,265,225	1,402,864,733	1,440,567,225
Nevada	Direct	5	5	75,848	75,848	1,872,389	1,872,389
	Total	12	12	628,603	643,276	3,364,313	3,433,985
North Dakota	Direct	233	233	27,075,375	27,075,375	343,845,594	343,845,594
	Total	467	485	39,416,233	40,587,679	394,972,555	398,943,340
South Dakota	Direct	85	85	6,798,604	6,798,604	32,968,114	32,968,114
	Total	227	252	13,472,426	15,034,497	58,380,452	63,731,498
Utah	Direct	2,122	2,122	145,452,892	145,452,892	1,453,148,321	1,453,148,321
	Total	4,664	6,332	277,459,904	406,910,285	1,906,353,700	2,198,817,217
Wyoming	Direct	5,662	5,662	537,821,720	537,821,720	5,948,302,548	5,948,302,548
	Total	12,702	12,708	971,432,220	971,907,423	7,391,473,976	7,392,957,101
Total Planning Area (Low Colorado Scenario)	Direct	15,748	15,748	1,681,111,182	1,681,111,182	12,532,237,982	12,532,237,982
	Total	38,912	44,730	3,059,915,162	3,578,547,126	16,951,339,701	18,133,965,977
Total Planning Area (High Colorado Scenario)	Direct	18,607	18,607	2,025,795,340	2,025,795,340	14,250,792,901	14,250,792,901
	Total	46,743	54,329	3,704,640,744	4,392,217,610	19,591,681,118	21,157,682,673

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

[1] There were no oil and gas developments projected for California and Oregon.

[2] Total impacts include direct, indirect, and induced impacts.

Management actions that restrict oil and gas development in PHMA would likely adversely affect fiscal revenues. Under Alternative 3, there could be a reduction in federal royalty revenue by a range of $1.1 billion to $1.4 billion, a reduction in state severance tax revenue by $252 million to $269 million, a reduction in local ad valorem tax revenue by $262 million to $324 million, and a reduction in other state taxes and fees by $4.9 million to $6.4 million (including revenue from Colorado's oil and gas conservation fee, Montana's privilege and license tax, Nevada's Net Proceeds of Minerals Tax, North Dakota's oil extraction tax, Utah's conservation fee, and Wyoming's oil and gas conservation tax). Additionally, the reductions in oil and gas activity due to BLM decisions, under Alternative 3, across all states with reasonably foreseeable future oil and gas developments, could lead to a reduction in revenue from rents and bonus bids, compared with Alternative 1. The reduction in oil and gas activity would also likely lead to less direct and indirect spending, which would lead to a decrease in sales and use tax, compared with Alternative 1. The large decrease in fiscal revenues, under Alternative 3, could contribute to future state and local government budget shortfalls, especially in jurisdictions that rely on the taxation of minerals in place of income taxes or where taxes on mineral production currently represent the single largest source of revenue. These budget shortfalls may affect the ability of states and local governments to maintain infrastructure and provide public services at current levels. Insufficient funding for infrastructure and public services would adversely affect quality of life in affected communities and could further limit rural residents' access to educational opportunities, health care, and social safety net programs.

Under Alternative 3, all PHMA would close all areas in PHMA to mineral and ROW development, and would make PHMA unavailable to livestock grazing, which would reduce potential impacts on nonmarket and social conditions due to changes in air quality and GHG emissions from actions such as surface disturbance from mineral development. Due to closing PHMA, the effects on these nonmarket and social conditions would be the lowest out of the alternatives.

BLM decisions to manage all PHMA as closed to leasing could lead to further impacts on economic and social conditions due to potential changes in oil and gas activity on adjacent nonfederal lands and minerals, as described under the *Nature and Types of Effects*. These impacts would likely occur in areas where the BLM-administered lands are not contiguous, and where it is not economical develop the nonfederal minerals due to limitations on expanding operations across federal and nonfederal minerals, or where pipelines and transmission lines are needed on federal lands to access the nonfederal minerals (see Section 4.10.1, Fluid Minerals (Including Geothermal), for more information on impacts on oil and gas activity on nonfederal minerals and land due to BLM decisions on BLM-administered land). Impacts on economic and social conditions due to changes in oil and gas activity on nonfederal lands include are similar to those described above, and could include reductions in jobs, labor income, economic output, tax revenue, and impacts on social cohesion, way of life, and culture for those communities that rely on mineral development for economic opportunities. If there is a reduction in oil and gas activity on state lands due to BLM decisions on nearby federal lands and minerals, there could be impacts on revenue to the state, which could result in budget shortfalls. Budget shortfalls for the states could adversely impact access and quality of public services, such as education, which is funded by revenue collected from mineral production on state trust lands in states across the analysis area.

See **Appendix 18**, Social and Economic Impact Analysis Methodology and State-Specific Impact Analysis, for additional details of impacts for each state in the analysis area with reasonably foreseeable oil and gas development in the planning area.

Nonenergy Leasable Minerals Management

Rangewide Environmental Consequences

Under Alternative 3, all PHMA would be closed to new nonenergy mineral leasing, which would result in the economic and social impacts. This closure would result in impacts on economic contributions associated with nonenergy mineral extraction, such as reductions in jobs, labor income, economic output, and tax revenue, compared with Alternative 1. The reductions in tax revenues could put strain on local governments' budgets and could impact public services that are offered to the communities. There could be impacts from BLM decisions on lifestyles and culture for those in mineral development communities of interest, especially for those individuals who rely on mineral extraction for employment. These impacts would have a larger effect on communities in northwestern Colorado, in Caribou County, Idaho, central Utah, and southwestern Wyoming, where the local economies have relied on nonenergy leasable mineral extraction on federal estate.

Closures in land to new nonenergy mineral leasing could result in increases in prices in the short term of household products, such as products made from trona due to an increase in cost that would likely occur to mining operators. Restrictions on mineral leasing will likely not result in immediate closures of mines. If restrictions on nonenergy leasing continue in the long term, there could be impacts on the availability of household products made from trona due to the potential continued constraints on nonenergy leasable mineral extractions. Increases in prices and decreases in availability of household products can put large strains on households, especially those with limited resources for alternative products or those with low income, where the products already make up a larger percentage of disposable income. If closures in mines

continue to put pressure on prices and limit availability, it could cause even more stress on the surrounding communities, including increases in conflicts and decreases in social cohesion and health and safety. See **Section 4.10.2**, Nonenergy Leasable Minerals, for more information regarding impacts on trona and other nonenergy leasable minerals due to BLM-Management decisions.

Under Alternative 3, all PHMA would be closed to nonenergy mineral leasing, which would reduce potential impacts on nonmarket and social conditions due to changes in air quality and GHG emissions from actions such as surface disturbance from mineral development, as described under the *Nature and Types of Effects*. Due to closing PHMA, the effects on these nonmarket and social conditions would be the lowest out of the alternatives.

Locatable Minerals Management

Rangewide Environmental Consequences

Under Alternative 3, all lands in PHMA would be recommended for withdrawal from locatable mineral entry. Recommending areas for closure to the mining laws for locatable exploration or development does not restrict any activities and therefore, such recommendation does not have any impacts. However, the BLM could ask the Secretary of the Interior to propose and make a withdrawal of the land from location and entry under the Mining Law of 1872 pursuant to Section 204(a) of FLPMA. Proposing and making a withdrawal is not a land use planning process. Should the Secretary propose a withdrawal, the proposal would require environmental and other analysis under NEPA and other applicable authorities before the land could be withdrawn. For purposes of this planning initiative, the alternatives analysis includes a description of the likely environmental effects should the Secretary propose and make a withdrawal in the future. If the Secretary decided to withdraw the land, such a withdrawal would likely result in a reduction of economic activity in mining sectors, compared with under Alternative 1, as described in the *Nature and Type of Effects*. The reduction in economic activity could result in impacts on market and nonmarket conditions, such as reductions in jobs, labor income, economic output, tax revenue, public services, access to lifestyles and culture associated with mining. For mining operators with existing mining claims that might survive a withdrawal, costs could increase due to the additional requirement to verify mining claim validity before the BLM will approve a notice or plan of operations. These impacts could put strain on communities, especially those that are dependent on the mining industry. These impacts would likely be larger in areas with high potential for locatable mineral development, assuming that there are existing mining claims on those lands as of the date of withdrawal. Such a withdrawal, if made by the Secretary, would not impact nonmarket and social conditions associated with changes in air quality and GHG emissions.

Mineral Materials Management

Rangewide Environmental Consequences

Under Alternative 3, all areas managed for GRSG would be PHMA and would be closed to mineral materials disposal. This would reduce federal, state, territorial, municipality, and non-profit access to mineral materials through free use permits and would increase costs for these users by relocating mineral materials operations to nonpublic lands or to public lands that are further away from where the minerals are going to be used, which would increase transportation costs. The increases in cost of mineral materials extraction could cause delays or cancelations of public projects that use mineral materials, such as road maintenance and construction of infrastructure by states and municipalities. Delays and cancelations in construction and maintenance projects would impact surrounding communities who rely on the roads and infrastructures and could increase public safety concerns and residents' frustration with road construction and repairs. These impacts would likely be larger in areas with high potential for mineral materials extraction. If historical

extraction is an indication of potential, then the analysis areas in Colorado, Idaho, Montana, Nevada, and Wyoming would likely be impacted more by BLM decisions on lands closed to mineral materials disposal.

Under Alternative 3, closing PHMA to mineral materials disposal could reduce potential impacts on nonmarket and social conditions due to changes in air quality and GHG emissions from actions such as surface disturbance, associated with mineral development. However, if mineral materials operations shift to state or private lands due to closing PHMA to mineral materials disposal, then impacts on social conditions and access and quality of nonmarket values would shift to these locations as well and there would be no overall change in impacts on nonmarket and social conditions, compared with Alternative 1.

Renewable Energy (Geothermal, Wind, and Solar) Management

Rangewide Environmental Consequences

Impacts on economic activity from BLM-management decisions that could impact geothermal development, under Alternative 3, are discussed each state with reasonably foreseeable development in **Appendix 18**. Montana, North Dakota, and South Dakota did not have any projected geothermal development in the analysis areas due to the limited geothermal potential. On annual average, across the 7 states with projected geothermal development, geothermal development is expected to result in about 76 fewer total jobs (about 43 fewer direct jobs), $4.3 million less in total labor income (about $2.4 million less in direct labor income), and about $11.5 million less in economic output (about $3.3 million less in direct economic output), compared with Alternative 1 (see **Table 10**, below, for a summary of direct and total impacts by state, and see **Appendix 18** for a more detailed discussion of impacts, including direct, indirect, and induced impacts by state).

Table 10. Average Annual Economic Contributions from Geothermal, Under Alternative 3

State[1]	Type of Impact[2]	Employment	Labor Income	Economic Output
California and Nevada Combined	Direct	276	17,088,024	24,364,445
	Total	540	35,982,758	106,272,068
Colorado	Direct	0	0	0
	Total	0	0	0
Idaho	Direct	11	514,407	711,614
	Total	18	902,749	2,476,407
Oregon	Direct	0	0	0
	Total	0	0	0
Utah	Direct	0	0	0
	Total	0	0	0
Wyoming	Direct	0	0	0
	Total	0	0	0
Total Planning Area	Direct	287	17,602,431	25,076,059
	Total	558	36,885,507	108,748,475

Source: National Renewable Energy Laboratory 2016

[1]There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.

[2] Total impacts include direct, indirect, and induced impacts.

Under Alternative 3, there would be the most restrictions on ROWs for wind and solar development out of all alternatives (see **Appendix 12**, Reasonably Foreseeable Development Scenario, for more detail). These BLM decisions could result in operators relocating development of wind and solar facilities to other

non-federal locations. Relocating wind and solar operations might not be feasible in certain locations due to constraints on transmission line availability, and it could be very costly or not possible to develop transmission lines to the nearby area, because ROW avoidance and exclusion areas would apply to transmission lines as well. If additional lines of transmission are needed, this could result in impacts on economic contributions of wind and solar. Under Alternative 3, impacts on economic conditions may be increased compared to Alternative 1 due to the highest level of restrictions on solar and wind site development. There are many factors that operators consider when siting solar and wind development that are not influenced by BLM-management decisions, including resource potential, electricity prices, business decisions, among others. These factors can vary by site, operator, and technology, so a site-specific analysis would need to be conducted to further understand the economic impacts from changes in wind and solar development due to BLM decisions (see **Section 4.9**, Lands and Realty).

Under Alternative 3, all PHMAs would be managed as exclusion areas for major ROWs and wind or solar energy. Prohibiting development of wind, solar, and other major ROWs would eliminate the likelihood for impacts on nonmarket and social conditions from changes in air quality and GHG emissions from surface-disturbing activities in these areas.

Details for impacts on economic and social conditions due to BLM decisions on renewable energy, including geothermal, wind, and solar energy, by state are included in **Appendix 18**.

Livestock Grazing Management

Rangewide Environmental Consequences

Under Alternative 3, all HMA (PHMA) would be unavailable for domestic livestock grazing, which would result in a substantial reduction in forage availability on federal lands. This reduction in forage availability would adversely affect ranching activity, including reducing billed AUMs, market, nonmarket, and social impacts associated with livestock grazing on public lands across communities. On annual average, livestock grazing on allotments where PHMA accounted for at least 15% of the acreage in the analysis areas for all 10 states combined is expected to result in about 2,000 fewer total jobs (about 841 fewer direct jobs), $120 million less in total labor income (about $67.6 million less in direct labor income), and about $380 million less in economic output (about $204 million less in direct economic output), compared with Alternative 1 (see **Table 11**, below, for a summary of direct and total impacts by state, and see **Appendix 18** for a more detailed discussion of impacts, including direct, indirect, and induced impacts by state).

Table 11. Average Annual Economic Contributions from Livestock Grazing in Allotments where PHMA Accounted for 15% or More of the Acreage, Under Alternative 3

State	Type of Impact[1]	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
California	Direct	0	0	0	0	0	0
	Total	0	0	0	0	0	0
Colorado	Direct	0	0	0	0	0	0
	Total	0	0	0	0	0	0
Idaho	Direct	0	0	0	0	0	0
	Total	0	0	0	0	0	0
Montana	Direct	0	0	0	0	0	0
	Total	0	0	0	0	0	0
Nevada	Direct	0	0	0	0	0	0
	Total	0	0	0	0	0	0

State	Type of Impact[1]	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
North Dakota	Direct	0	0	0	0	0	0
	Total	0	0	0	0	0	0
Oregon	Direct	0	0	0	0	0	0
	Total	0	0	0	0	0	0
South Dakota	Direct	0	0	0	0	0	0
	Total	0	0	0	0	0	0
Utah	Direct	0	0	0	0	0	0
	Total	0	0	0	0	0	0
Wyoming	Direct	0	0	0	0	0	0
	Total	0	0	0	0	0	0
Total Planning Area	Direct	0	0	0	0	0	0
	Total	0	0	0	0	0	0

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.
[1] Total impacts include direct, indirect, and induced impacts.

The restrictions on livestock grazing in large portions of federal allotments would impact the economic resilience of ranching and farming communities, as discussed in *Nature and Type of Effects,* especially in areas that are also reliant on mineral development due to the boom and bust economic cycle of the resources.

In many cases, BLM lands may have importance for a broader level of ranch operations, for example when providing important seasonal rotation pastures, and impacts limiting access to livestock grazing on BLM lands can result in large economic and social impacts for affected ranchers. Making PHMA unavailable to livestock grazing could result in increases in costs to ranchers and farmers who would have to find alternatives for federal forage for their livestock. The cost increases may lead to increases in meat prices if passed on to consumers and, in the long term, decreases in availability of meat and animal products. Increases in prices and decreases in availability of meat and animal products could put additional strain on households, especially those with lower incomes in rural areas, where food prices tend to be higher and a larger percentage of their disposable income goes towards food purchases.

Under Alternative 3, BLM decisions to restrict livestock grazing would likely have large market and nonmarket impacts on the local communities and economies across the analysis areas. There could be higher potential for closures of ranches or ranches selling lands to create ranchettes, which could have substantial impacts on social and economic conditions in some surrounding communities. These impacts include impacts on communities' well-being and social cohesion and impacts on access and quality of the ranching lifestyle, culture, and sense of place for those who rely on access to forage from federal land for their farming and ranching operations as well as for those who are part of the farming and ranching communities of interest and value livestock grazing on public lands. The regions that would be disproportionately affected include those communities and economies that rely on the agriculture industry and that have large quantities of small and midsize family farms and ranches where the operators' primary occupation is farming or ranching.[5] These

[5] Small family ranches are those with annual gross cash farm income less than $350,000 and midsize family ranches are those with annual gross cash farm income of at least $350,000 but less than $1 million. See **Section 3.11**, Social and Economic Conditions (Including Environmental Justice) and **Appendix 13**, Socioeconomic Baseline Report for more information on the types of ranches in the analysis area).

small and midsize ranches are located across most of the analysis area in each state of the planning area (see **Section 3.11**, Social and Economic Conditions) and **Appendix 13**, Socioeconomic Baseline Report).

Details for impacts on economic and social conditions due to BLM decisions on livestock grazing by state are included in **Appendix 18**.

Greater Sage Grouse Conservation

Rangewide Environmental Consequences

Alternative 3 would have the highest level of restrictions on development in all HMAs, including the fewest acres open and the most stringent restrictions for mineral extraction. Alternative 3 would also provide the most protection for wildlife and habitat within GRSG management areas because of increased restrictions, and in some cases the prohibition of surface disturbing activities (including mineral development, renewable energy development, and ROW development). Alternative 3 would provide the highest level of support for conservation related values.

BLM decisions, under Alternative 3, would support the protection of GRSG ecosystems, which would continue to provide value to the surrounding communities through impacts on tribal interests and cultural resources, especially subsistence, from changes in GRSG populations. Conversely, habitat conservation could negatively impact road realignment projects near tribal reservations and plans to expand reservation boundaries if the reservation is surrounded by PHMA.

Environmental Justice

Rangewide Environmental Consequences

Alternative 3 would offer the highest level of protection to cultural resources in GRSG habitat across all alternatives. This would result in reduced impacts on environmental justice populations, as those described in Nature and Type of Effects. See **Section 4.17**, Tribal Interests and **Section 4.16**, Cultural Resources.

Adverse impacts on subsistence resource availability, under Alternative 3, would be minimal due to the highest level of restrictions for mineral development and other surface-disturbing activities, compared with Alternative 1. See **Section 4.5**, Fish and Wildlife and **Section 4.17**, Tribal Interests and **Section 4.16**, Cultural Resources.

The impacts on nonmarket and social conditions due to changes in air quality from mineral exploration and development and surface disturbing activities would substantially reduce, compared with Alternative 1, due to the increase in restrictions on mineral development. This would reduce the impacts on environmental justice populations. Due to restrictions in vegetation management, impacts on air quality from increased wildfire risk could increase. These impacts could disproportionately impact environmental justice populations, but the impacts would depend on site-specific factors such as location of changes in air quality compared with the locations of environmental justice populations that cannot be determined in this analysis. See **Section 4.13**, Air Resources and Climate.

Large swaths of public land would be unavailable for livestock grazing and closed to mineral leasing, which would likely increase production costs to ranchers and nonenergy leasable mineral operators as they use alternative lands for forage and mining operations, if available. Depending on the ability of the affected permittees and mining leases to adapt and mitigate to the loss of public land forage and public lands for mineral leasing, the increases in costs could lead to either higher prices of meat and household products if the costs are passed on to consumers or closures in ranching and mining operations, which would lead to a decrease in availability of meat and household products. These impacts would disproportionately affect low-

income environmental justice populations, because marginal increases in prices of meat and household products make up a larger percentage of the disposable income from low-income households than the general public and low-income households tend to have fewer alternatives if meat and household products become unavailable. The restrictions in livestock grazing and nonenergy leasable mineral development that could lead to impacts on prices and availability are localized and vary across geographic regions. The impacts of meat and household product prices and availability would likely be observed regionally and nationally, especially in areas with higher low-income populations. See subsections in this section on *Nonenergy Leasable Minerals* and *Livestock Grazing* as well as **Section 4.10.2**, Nonenergy Leasable Minerals, and **Section 4.8**, Livestock Grazing.

Restrictions on mineral development in PHMA under Alternative 3 could contribute to budget shortfalls for state and local governments that are highly dependent on mineral revenues, like many counties in Wyoming, and may affect their ability to provide public services. Reductions in public services could adversely affect the quality of life in affected communities. Since some public services are more heavily used by low-income individuals and families, insufficient funding for programs may disproportionately adversely impact low-income populations if access to those services was reduced.

Economic impacts, such as impacts on environmental justice populations from greater restrictions in livestock grazing and mineral and oil and gas development are not included in the discussion on environmental justice. This issue was dismissed from the discussion because, at the time of this analysis, there is a lack of evidence that the types of operations that are most likely to impacted by BLM management decisions (such as mining, renewable energy, and small family-owned ranching and livestock operations) employ a higher percentage of people who meet the criteria for environmental justice. Therefore, there is not evidence that impacts on economic conditions due to BLM decisions will lead to disproportionate impacts on environmental justice populations. Impacts on economic conditions may occur across the analysis area, and these impacts on economic output, jobs, and labor income from changes in livestock grazing, mineral, oil and gas, and renewable energy development activity are discussed and analyzed in other subsections in this section, as it relates to all populations in the analysis area (see the *Fluid Minerals (Oil and Gas), Renewable Energy (Geothermal, Wind, and Solar),* and *Livestock Grazing* subsections). Additional screening and consideration of environmental justice populations and analysis of any disproportionate and adverse impacts will occur at the implementation stage at a scale commensurate with the scope and scale of management actions being considered to provide additional protections for local GRSG populations. Depending on conditions at that time, communities with environmental justice concerns may change.

10.12.5 Alternative 4

Fluid Minerals (Oil and Gas) Management

Rangewide Environmental Consequences

The number of wells drilled and completed would be the same as under Alternative 1 in Montana, Nevada, North Dakota, South Dakota, Utah, and Wyoming, so the impacts on jobs, labor, income, economic output from oil and gas development and operations would also be the same as described under Alternative 1 for these states (see **Table 12**, below). Under Alternative 4, oil and gas production revenue and well development expenditures are expected to increase in Colorado and Idaho due to more areas available for leasing and addition of more exceptions and waivers and oil and gas production revenue and well development expenditures are expected to decrease in Wyoming due to all land in PHMA managed as NSO (see **Section 4.6**, Mineral Resources). On annual average, this change is expected to result in about 5,000 to 6,000 fewer total jobs (about 3,000 fewer direct jobs), about $375 million to $435 million less in total labor income (about $250 million to $274 million less in direct labor income), and about $3.1 million to $2.9

million less in economic output (about $2.4 to $2.5 million less in direct economic output) than under Alternative 1, across these three states. Additional details for state-specific direct, indirect, and induced impacts are included in **Appendix 18**.

Table 12. Average Annual Economic Contributions from Oil and Gas, Under Alternative 4

State[1]	Type of Impact[2]	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Colorado (Low Scenario)	Direct	6,948	6,948	835,579,681	835,579,681	4,210,876,842	4,210,876,842
	Total	19,116	23,572	1,572,945,903	1,999,834,792	6,469,461,097	7,437,254,132
Colorado (High Scenario)	Direct	13,366	13,366	1,607,628,515	1,607,628,515	8,094,956,453	8,094,956,453
	Total	36,759	45,318	3,024,814,147	3,844,614,938	12,436,843,453	14,296,431,664
Idaho	Direct	10	10	600,005	600,005	3,122,924	3,122,924
	Total	21	23	1,175,158	1,265,448	5,074,042	5,394,649
Montana	Direct	1,922	1,922	284,762,972	284,762,972	1,318,085,631	1,318,085,631
	Total	5,046	5,299	467,912,653	484,846,192	1,893,586,767	1,939,453,416
Nevada	Direct	18	18	249,165	249,165	6,374,761	6,374,761
	Total	41	42	2,133,031	2,182,516	11,445,990	11,681,292
North Dakota	Direct	275	275	31,990,856	31,990,856	406,307,567	406,307,567
	Total	551	573	46,571,864	47,955,782	466,716,295	471,407,239
South Dakota	Direct	89	89	7,090,932	7,090,932	34,541,446	34,541,446
	Total	238	264	14,081,147	15,735,559	61,206,393	66,872,391
Utah	Direct	2,368	2,368	162,438,183	162,438,183	1,619,804,067	1,619,804,067
	Total	5,204	7,059	309,658,031	453,626,368	2,125,280,538	2,450,509,848
Wyoming	Direct	8,563	8,563	830,351,311	830,351,311	8,484,142,024	8,484,142,024
	Total	19,203	19,217	1,472,154,155	1,473,168,664	10,643,320,357	10,646,486,671
Total Planning Area (Low Colorado Scenario)	Direct	20,194	20,194	2,153,063,106	2,153,063,106	16,083,255,261	16,083,255,261
	Total	49,421	56,049	3,886,631,943	4,478,615,322	21,676,091,480	23,029,059,639
Total Planning Area (High Colorado Scenario)	Direct	26,611	26,611	2,925,111,940	2,925,111,940	19,967,334,873	19,967,334,873
	Total	67,064	77,795	5,338,500,188	6,323,395,467	27,643,473,836	29,888,237,171

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

[1] There were no oil and gas developments projected for California and Oregon.

[2] Total impacts include direct, indirect, and induced impacts.

Mineral development would continue to support federal, state, and local mineral revenues at levels similar to those estimated under Alternative 1, except for impacts in Colorado, Idaho, and Wyoming, as described in **Appendix 18**, which could lead to an overall decrease in federal, state, and local revenues, compared with Alternative 1. Changes in mineral revenues available to fund public services and infrastructure in Montana, Nevada, North Dakota, South Dakota, and Utah would be negligible relative to those under Alternative 1. Across Colorado, Idaho, and Wyoming, there could be a reduction in royalty revenue by $295

million to $312 million, in state severance tax revenue by $120 million to $121 million, ad valorem tax revenue by $117 million to $121 million, and other taxes and fees by $720,000 to $829,000. Overall changes in oil and gas activity, across the 3 states, could lead to a decrease in revenue from rents and bonus bids, compared with Alternative 1. Additionally, the reduction in oil and gas activity would likely lead to less direct and indirect spending, which would lead to a decrease in sales and use tax, compared with Alternative 1.

Impacts on nonmarket and social conditions associated with changes in air quality and GHG emissions from fluid mineral leasing would be similar to Alternative 1, except in Colorado and Wyoming, as discussed in **Appendix 18**. Alternative 4 would minimize impacts on nonmarket and social conditions associated with air quality and GHG emissions by promoting project designs that avoid, minimize, reduce, rectify, and mitigate for direct and indirect impacts. Social impacts from way-of-life, culture, and social cohesion for the communities who value mineral extraction in Idaho, Montana, Nevada, North Dakota, South Dakota, and Utah would be similar to those described under Alternative 1.

See **Appendix 18** for additional detail of state-level impacts for Colorado Idaho, and Wyoming.

Nonenergy Leasable Minerals Management

Rangewide Environmental Consequences

Under Alternative 4, many of the economic and social impacts from changes in nonenergy leasable minerals due to BLM-management decisions would be the same as under Alternative 1 for all states in the planning area.

Under Alternative 4, the BLM would manage minerals to minimize land use conflict and associated impacts from subsequent development through project designs that avoid, minimize, reduce, rectify, and mitigate for indirect impacts. The BLM would take a more adaptive approach to management and consider existing data and best available science to determine if conservation measures are reasonable. While the impacts on nonmarket and social conditions related to air quality and GHG emissions would be reduced or removed in some cases, compared with Alternative 1, impacts could increase due to an increase in development and surface disturbing activities, compared with Alternative 1.

Nevada/California

In Nevada and northeastern California, exceptions to the nonenergy leasable mineral closure in PHMA under Alternative 1 may allow for increased development of nonenergy leasable minerals, which could lead to impacts on nonmarket and social conditions such as access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality, in some locations.

Locatable Minerals Management

Rangewide Environmental Consequences

Under Alternative 4, there would be no areas recommend for withdrawal from locatable mineral entry. As noted above, recommendations for withdrawal do not restrict any activities; therefore, they have no effects. Similarly, not recommending an area for withdrawal does not have any effects. There would be no impact to jobs, income, economic output and social conditions, as discussed in *Nature and Types of Effects*, under Alternative 4 different from those under Alternative 1.

Mineral Materials Management

Rangewide Environmental Consequences

Under Alternative 4, impacts on public access to mineral materials and social and nonmarket values of mineral material extraction would likely be similar to under Alternative 1, for all states, except for Idaho.

Idaho

In Idaho, under Alternative 4, economic and social impacts from proposed management and impacts on mineral material development would be the same as described under the Alternative 2 *Idaho* section.

Renewable Energy (Geothermal, Wind, and Solar) Management

Rangewide Environmental Consequences

The number of geothermal plants developed would be the same as under Alternative 1 in all states (see **Appendix 12**, Reasonably Foreseeable Development Scenario, for more detail), so the impacts on jobs, labor, income, economic output from geothermal development would also be the same as described under Alternative 1 (see **Table 13**, below, for a summary of direct and total impacts by state, and see **Table 18-15** in **Appendix 18** for direct, indirect, and induced impacts by state).

Table 13. Average Annual Economic Contributions from Geothermal, Under Alternative 4

State[1]	Type of Impact[2]	Employment	Labor Income	Economic Output
California and Nevada Combined	Direct	276	17,088,024	24,364,445
	Total	540	35,982,758	106,272,068
Colorado	Direct	8	536,971	761,363
	Total	16	1,057,306	2,658,444
Idaho	Direct	22	1,020,547	1,413,689
	Total	36	1,795,032	4,930,353
Oregon	Direct	6	297,479	402,124
	Total	11	576,996	1,509,272
Utah	Direct	12	742,958	1,059,324
	Total	22	1,349,977	3,599,534
Wyoming	Direct	6	288,314	388,376
	Total	9	432,268	1,286,669
Total Planning Area	Direct	330	19,974,293	28,389,321
	Total	634	41,194,337	120,256,340

Source: National Renewable Energy Laboratory 2016

[1]There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.

[2] Total impacts include direct, indirect, and induced impacts.

Utility scale wind and solar projects in PHMA would be managed as ROW exclusion areas, under Alternative 4 (see **Appendix 12**, Reasonably Foreseeable Development Scenario, for more detail). These BLM-management decisions could result in operators relocating development of wind and solar facilities to other locations that are not restricted. However, relocating wind and solar operations might not be possible or feasible, if access to transmission lines is limited, due to the high costs associated with building transmission lines and because ROW avoidance and exclusion areas would impact transmission lines as well. As noted in Alternative 1 discussion, if additional lines of transmission are needed, this could result in impacts on

economic contributions of wind and solar. Under Alternative 4, impacts may be increased compared to the Alternative 1 due to increased restrictions on solar and wind site development due to ROW exclusion areas.

Livestock Grazing Management

Rangewide Environmental Consequences

Estimated billed AUMs, under Alternative 4, would be the same as under Alternative 1 for all states and analysis areas, so market impacts on jobs and income from livestock grazing would also be the same as described under Alternative 1 (see **Table 14**, below, for a summary of direct and total impacts by state, and see **Table 18-16** in **Appendix 18** for direct, indirect, and induced impacts by state). In addition, social impacts from way-of-life, culture, and social cohesion would be similar to those described under Alternative 1.

Impacts on livestock grazing operations and associated non-market values from designating GRSG habitat as HMAs would be similar to those described for Alternative 1.

Table 14. Average Annual Economic Contributions from Livestock Grazing in Allotments where PHMA Accounted for 15% or More of the Acreage, Under Alternative 4

State	Type of Impact[1]	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
California	Direct	7	7	2,146,636	2,146,636	4,625,897	4,625,897
	Total	19	22	3,105,261	3,386,449	7,436,887	8,391,031
Colorado	Direct	50	50	1,844,864	1,844,864	5,164,123	5,164,123
	Total	78	82	2,995,610	3,200,447	9,046,152	9,841,613
Idaho	Direct	77	77	13,312,954	13,312,954	28,474,475	28,474,475
	Total	214	221	22,450,229	22,805,297	55,796,422	57,280,261
Montana	Direct	186	186	10,506,213	10,506,213	33,185,106	33,185,106
	Total	364	381	20,177,827	20,978,060	64,895,970	67,265,732
Nevada	Direct	82	82	13,703,178	13,703,178	42,086,589	42,086,589
	Total	230	236	23,293,363	23,567,530	74,802,986	76,657,180
North Dakota	Direct	1	1	39,141	39,141	143,402	143,402
	Total	1	1	62,321	64,077	228,340	235,019
Oregon	Direct	78	78	6,451,505	6,451,505	25,184,996	25,184,996
	Total	197	206	13,466,487	14,139,416	47,731,985	50,012,006
South Dakota	Direct	5	5	185,898	185,898	1,405,882	1,405,882
	Total	10	10	373,256	402,461	2,335,006	2,458,076
Utah	Direct	54	54	4,634,026	4,634,026	10,839,099	10,839,099
	Total	87	90	6,083,969	6,218,740	16,268,163	16,915,273
Wyoming	Direct	301	301	14,742,131	14,742,131	52,633,690	52,633,690
	Total	547	552	24,819,572	25,059,882	90,295,946	91,280,444
Total Planning Area	Direct	841	841	67,566,546	67,566,546	203,743,259	203,743,259
	Total	1,747	1,801	116,827,895	119,822,359	368,837,857	380,336,635

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

[1] Total impacts include direct, indirect, and induced impacts.

Greater Sage Grouse Conservation

Rangewide Environmental Consequences

Impacts would be similar to that described in Alternative 1, with some additional state analysis area variation in level of protection for GRSG and associated impacts on those groups prioritizing development or conservation values. The level of impacts to non-market values associated with GRSG would therefore vary by area based on the determination of site-specific development restrictions determined by state.

Environmental Justice

Rangewide Environmental Consequences

Impacts from BLM-management decisions on environmental justice populations through cultural resource disturbance would be similar to Alternative 1. See **Section 4.17**, Tribal Interests and **Section 4.16**, Cultural Resources.

Impacts on subsistence resource availability, could be reduced due to minerals management strategies that reduce possibilities of consequences from potential development in GRSG habitats or giving preference to lands that would not obstruct the suitability and proper operation of GRSG habitats. See **Section 4.5**, Fish and Wildlife and **Section 4.17**, Tribal Interests and **Section 4.16**, Cultural Resources.

Impacts on nonmarket and social conditions from changes in air quality and GHG emissions from mineral development may increase compared with Alternative 1 due to the wavers, exceptions, and modifications that would be allowed under Alternative 4, which could increase mineral extraction. This would likely result in adverse and disproportionate impacts on environmental justice populations. See **Section 4.13**, Air Resources and Climate.

10.12.6 Alternative 5

Fluid Minerals (Oil and Gas) Management

Rangewide Environmental Consequences

The number of wells drilled and completed would be the same as under Alternative 1 in Montana, Nevada, North Dakota, South Dakota, and Utah, so the impacts on jobs, labor, income, economic output from oil and gas development and operations would also be the same as described under Alternative 1 for these states (see **Table 15**, below). Under Alternative 5, oil and gas production revenue and well development expenditures are expected to increase in Colorado and Idaho due to more areas available for leasing and addition of more exceptions and waivers and oil and gas production revenue and well development expenditures are expected to decrease in Wyoming due to all land in PHMA managed as NSO, relative to Alternative 1 (see **Section 4.6**, Mineral Resources). On annual average, this change is expected to result in about 130 to 840 more total jobs (about 150 fewer direct jobs to 50 more direct jobs), about $20 million to $81 million more in total labor income (about $8.5 million less in direct labor income to $15.3 million more in direct labor income), and about $179 million less in total economic output to $46.6 million more in total economic output (about $106 million to $231 million less in direct economic output) than under Alternative 1, across these three states. Additional details for state-specific direct, indirect, and induced impacts are included in **Appendix 18**.

Table 15. Average Annual Economic Contributions from Oil and Gas, Under Alternative 5

State[1]	Type of Impact[2]	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Colorado (Low Scenario)	Direct	6,948	6,948	835,579,681	835,579,681	4,210,876,842	4,210,876,842
	Total	19,116	23,572	1,572,945,903	1,999,834,792	6,469,461,097	7,437,254,132
Colorado (High Scenario)	Direct	13,366	13,366	1,607,628,515	1,607,628,515	8,094,956,453	8,094,956,453
	Total	36,759	45,318	3,024,814,147	3,844,614,938	12,436,843,453	14,296,431,664
Idaho	Direct	10	10	576,005	576,005	2,998,007	2,998,007
	Total	20	22	1,128,152	1,214,830	4,871,080	5,178,863
Montana	Direct	1,922	1,922	284,762,972	284,762,972	1,318,085,631	1,318,085,631
	Total	5,046	5,299	467,912,653	484,846,192	1,893,586,767	1,939,453,416
Nevada	Direct	18	18	249,165	249,165	6,374,761	6,374,761
	Total	41	42	2,133,031	2,182,516	11,445,990	11,681,292
North Dakota	Direct	275	275	31,990,856	31,990,856	406,307,567	406,307,567
	Total	551	573	46,571,864	47,955,782	466,716,295	471,407,239
South Dakota	Direct	89	89	7,090,932	7,090,932	34,541,446	34,541,446
	Total	238	264	14,081,147	15,735,559	61,206,393	66,872,391
Utah	Direct	2,368	2,368	162,438,183	162,438,183	1,619,804,067	1,619,804,067
	Total	5,204	7,059	309,658,031	453,626,368	2,125,280,538	2,450,509,848
Wyoming	Direct	11,198	11,198	1,096,050,568	1,096,050,568	10,787,200,027	10,787,200,027
	Total	25,108	25,129	1,926,942,851	1,928,447,281	13,596,694,725	13,601,390,097
Total Planning Area (Low Colorado Scenario)	Direct	22,828	22,828	2,418,738,362	2,418,738,362	18,386,188,347	18,386,188,347
	Total	55,326	61,960	4,341,373,633	4,933,843,320	24,629,262,886	25,983,747,279
Total Planning Area (High Colorado Scenario)	Direct	29,246	29,246	3,190,787,196	3,190,787,196	22,270,267,959	22,270,267,959
	Total	72,969	83,706	5,793,241,877	6,778,623,466	30,596,645,242	32,842,924,810

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

[1] There were no oil and gas developments projected for California and Oregon.

[2] Total impacts include direct, indirect, and induced impacts.

Mineral development would continue to support federal, state, and local mineral revenues at levels similar to those estimated under Alternative 1, except for impacts in Colorado, Idaho, and Wyoming, as described in **Appendix 18**. Changes in mineral revenues available to fund public services and infrastructure in Montana, Nevada, North Dakota, South Dakota, and Utah would be negligible relative to those under Alternative 1. Across Colorado, Idaho, and Wyoming, compared with Alternative 1, there could be an reduction in royalty revenue by $11 million to $28 million, a decrease in state severance tax revenue by $17 million to $19 million, a reduction in ad valorem tax revenue ranging from $10 million to $14 million, and an increase in other fees and taxes on oil and gas production by $22,000 to $131,000. Changes in oil and gas activity, under Alternative 5, could lead to a change in revenue from rents, bonus bids, and sales and use tax, compared with Alternative 1. The magnitude and direction of the change in revenue from rents, bonus bids

and sales and use tax depend on state- and site-specific factors (see Appendix 18 for more discussion on these revenues by state for Colorado, Idaho, and Wyoming).

Impacts on nonmarket and social conditions associated with air quality and climate change to the surrounding communities and regions would be similar as described under Alternative 1. Social impacts from way-of-life, culture, and social cohesion for the communities who value mineral extraction in Montana, Nevada, North Dakota, South Dakota, and Utah would be similar to those described under Alternative 1.

See **Appendix 18** for additional detail of state-level impacts for Colorado Idaho, and Wyoming.

Nonenergy Leasable Minerals Management

Rangewide Environmental Consequences

Economic and social impacts from changes in nonenergy leasable minerals due to BLM-management decisions would be the same as under Alternative 1 for all states in the planning area.

Locatable Minerals Management

Rangewide Environmental Consequences

The impacts on the economic activities and social conditions associated with locatable mineral resources would be the same as described under Alternative 4 above.

Mineral Materials Management

Rangewide Environmental Consequences

Impacts on public access to mineral materials and social and nonmarket values of mineral material extraction would likely be the same as under Alternative 4.

Renewable Energy (Geothermal, Wind, and Solar) Management

Rangewide Environmental Consequences

The number of geothermal plants developed would be the same as under Alternative 1 in all states (see **Appendix 12**, Reasonably Foreseeable Development Scenario), so the impacts on jobs, labor, income, economic output from geothermal development would also be the same as described under Alternative 1 (see **Table 16**, below, for a summary of direct and total impacts by state, and see **Table 18-18** in **Appendix 18** for direct, indirect, and induced impacts by state).

Lands encompassing major ROWs and utility scale wind and solar in PHMA would be managed as ROW avoidance areas, while in GHMA they would be managed as open to ROWs. The impacts of BLM decisions on economic activity and market conditions from wind, solar, and transmission line development across all states would be the same as under Alternative 4.

Table 16. Average Annual Economic Contributions from Geothermal, Under Alternative 5

State[1]	Type of Impact[2]	Employment	Labor Income	Economic Output
California and Nevada Combined	Direct	276	17,088,024	24,364,445
	Total	540	35,982,758	106,272,068
Colorado	Direct	8	536,971	761,363
	Total	16	1,057,306	2,658,444
Idaho	Direct	22	1,020,547	1,413,689
	Total	36	1,795,032	4,930,353

State[1]	Type of Impact[2]	Employment	Labor Income	Economic Output
Oregon	Direct	6	297,479	402,124
	Total	11	576,996	1,509,272
Utah	Direct	12	742,958	1,059,324
	Total	22	1,349,977	3,599,534
Wyoming	Direct	6	288,314	388,376
	Total	9	432,268	1,286,669
Total Planning Area	Direct	330	19,974,293	28,389,321
	Total	634	41,194,337	120,256,340

Source: National Renewable Energy Laboratory 2016
[1]There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.
[2] Total impacts include direct, indirect, and induced impacts.

Livestock Grazing Management

Rangewide Environmental Consequences

Estimated billed AUMs, under Alternative 5, would be the same as under Alternative 1 for all states and analysis areas, so impacts on jobs and income from livestock grazing would also be the same as described under Alternative 1 (see **Table 17**, below, for a summary of direct and total impacts by state, and see **Table 18-19** in **Appendix 18** for direct, indirect, and induced impacts by state). Social impacts from way-of-life, culture, and social cohesion would be similar to those described under Alternative 1.

Impacts on livestock grazing operations and associated non-market values from designating GRSG habitat as HMAs would be similar to those described for Alternative 1.

Table 17. Average Annual Economic Contributions from Livestock Grazing in Allotments where PHMA Accounted for 15% or More of the Acreage, Under Alternative 5

State	Type of Impact[1]	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
California	Direct	7	7	2,146,636	2,146,636	4,625,897	4,625,897
	Total	19	22	3,105,261	3,386,449	7,436,887	8,391,031
Colorado	Direct	50	50	1,844,864	1,844,864	5,164,123	5,164,123
	Total	78	82	2,995,610	3,200,447	9,046,152	9,841,613
Idaho	Direct	77	77	13,312,954	13,312,954	28,474,475	28,474,475
	Total	214	221	22,450,229	22,805,297	55,796,422	57,280,261
Montana	Direct	186	186	10,506,213	10,506,213	33,185,106	33,185,106
	Total	364	381	20,177,827	20,978,060	64,895,970	67,265,732
Nevada	Direct	82	82	13,703,178	13,703,178	42,086,589	42,086,589
	Total	230	236	23,293,363	23,567,530	74,802,986	76,657,180
North Dakota	Direct	1	1	39,141	39,141	143,402	143,402
	Total	1	1	62,321	64,077	228,340	235,019
Oregon	Direct	78	78	6,451,505	6,451,505	25,184,996	25,184,996
	Total	197	206	13,466,487	14,139,416	47,731,985	50,012,006
South Dakota	Direct	5	5	185,898	185,898	1,405,882	1,405,882
	Total	10	10	373,256	402,461	2,335,006	2,458,076
Utah	Direct	54	54	4,634,026	4,634,026	10,839,099	10,839,099
	Total	87	90	6,083,969	6,218,740	16,268,163	16,915,273

State	Type of Impact[1]	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Wyoming	Direct	301	301	14,742,131	14,742,131	52,633,690	52,633,690
	Total	547	552	24,819,572	25,059,882	90,295,946	91,280,444
Total Planning Area	Direct	841	841	67,566,546	67,566,546	203,743,259	203,743,259
	Total	1,747	1,801	116,827,895	119,822,359	368,837,857	380,336,635

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.
[1] Total impacts include direct, indirect, and induced impacts.

Greater Sage Grouse Conservation

Rangewide Environmental Consequences

Impacts would be similar to that described in Alternative 1, with some additional state analysis area variation in level of protection for GRSG and associated impacts on those groups prioritizing development or conservation values. The level of impacts to non-market values associated with GRSG would therefore vary by area based on the determination of site-specific development restrictions determined by state.

Environmental Justice

Rangewide Environmental Consequences

Iimpacts from BLM-management decisions on environmental justice populations through cultural resource disturbance would be similar to Alternative 1. See **Section 4.17**, Tribal Interests and **Section 4.16**, Cultural Resources.

Impacts on environmental justice populations from changes in subsistence resource availability, under Alternative 5, would be similar to Alternative 1. See **Section 4.5**, Fish and Wildlife and **Section 4.17**, Tribal Interests and **Section 4.16**, Cultural Resources.

Impacts on nonmarket and social conditions due to changes in air quality and GHG emissions from mineral development would be minimized by promoting project designs that avoid, minimize, reduce, rectify, and mitigate for indirect impacts. This would reduce the impacts on environmental justice populations, compared with Alternative 1. See **Section 4.13**, Air Resources and Climate.

10.12.7 Alternative 6

All impacts would be the same as described for Alternative 5 except for the impacts described below.

Fluid Minerals (Oil and Gas) Management

The number of wells anticipated to be drilled and completed over the planning period would be the same as under Alternative 5 in all states except for Wyoming, so the market impacts on jobs, labor, income, economic output from oil and gas development and operations would also be the same as described under Alternative 5 for these states (see **Table 18**, below). Under Alternative 6, compared with Alternative 1, oil and gas production revenue and well development expenditures are expected to decrease in Wyoming (see **Section 4.10**, Mineral Resources). On annual average, oil and gas production revenue and well development expenditures in the Wyoming analysis area is expected to result in about 1,400 fewer total jobs (about 600 fewer direct jobs), about $110 million less in total labor income (about $64 million less in direct labor income), and about $717 million less in economic output (about $559 million less in direct economic output),

than under Alternative 1, throughout the state. Additional details for state-specific direct, indirect, and induced impacts are included in **Appendix 18**.

Table 18. Average Annual Economic Contributions from Oil and Gas, Under Alternative 6

State[1]	Type of Impact[2]	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Colorado (Low Scenario)	Direct	6,948	6,948	835,579,681	835,579,681	4,210,876,842	4,210,876,842
	Total	19,116	23,572	1,572,945,903	1,999,834,792	6,469,461,097	7,437,254,132
Colorado (High Scenario)	Direct	13,366	13,366	1,607,628,515	1,607,628,515	8,094,956,453	8,094,956,453
	Total	36,759	45,318	3,024,814,147	3,844,614,938	12,436,843,453	14,296,431,664
Idaho	Direct	10	10	576,005	576,005	2,998,007	2,998,007
	Total	20	22	1,128,152	1,214,830	4,871,080	5,178,863
Montana	Direct	1,922	1,922	284,762,972	284,762,972	1,318,085,631	1,318,085,631
	Total	5,046	5,299	467,912,653	484,846,192	1,893,586,767	1,939,453,416
Nevada	Direct	18	18	249,165	249,165	6,374,761	6,374,761
	Total	41	42	2,133,031	2,182,516	11,445,990	11,681,292
North Dakota	Direct	275	275	31,990,856	31,990,856	406,307,567	406,307,567
	Total	551	573	46,571,864	47,955,782	466,716,295	471,407,239
South Dakota	Direct	89	89	7,090,932	7,090,932	34,541,446	34,541,446
	Total	238	264	14,081,147	15,735,559	61,206,393	66,872,391
Utah	Direct	2,368	2,368	162,438,183	162,438,183	1,619,804,067	1,619,804,067
	Total	5,204	7,059	309,658,031	453,626,368	2,125,280,538	2,450,509,848
Wyoming	Direct	11,089	11,089	1,085,144,628	1,085,144,628	10,691,456,750	10,691,456,750
	Total	24,865	24,886	1,908,227,615	1,909,712,421	13,474,139,017	13,478,773,144
Total Planning Area (Low Colorado Scenario)	Direct	22,720	22,720	2,407,832,421	2,407,832,421	18,290,445,070	18,290,445,070
	Total	55,083	61,717	4,322,658,396	4,915,108,461	24,506,707,178	25,861,130,327
Total Planning Area (High Colorado Scenario)	Direct	29,137	29,137	3,179,881,256	3,179,881,256	22,174,524,682	22,174,524,682
	Total	72,726	83,463	5,774,526,641	6,759,888,606	30,474,089,534	32,720,307,858

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

[1] There were no oil and gas developments projected for California and Oregon.

[2] Total impacts include direct, indirect, and induced impacts.

The decrease in projected oil and gas activity in Wyoming, under Alternative 6, would result in reductions in tax revenues by about $69 million in royalty revenue, $25 million in state severance tax revenue, $26 million in ad valorem tax revenue, and $208,000 in and gas conservation tax revenue, compared with Alternative 1. Additionally, a reduction in oil and gas activity, in Wyoming, under Alternative 6, could lead to a decrease in revenue from rents, bonus bids, and sales and use taxes, compared with Alternative 1. The reductions in tax revenues could put strain on local governments' budgets and could impact public services that are offered to the communities, including education. There could be impacts from BLM decisions on

lifestyles and culture for those in mineral development communities of interest, especially for those individuals who rely on oil and gas extraction for employment.

The reduction in the acreage available for fluid mineral leasing, in Wyoming, could reduce the development-related impacts on nonmarket and social conditions associate with changes in air and GHG emissions, compared with Alternative 1.

Nonenergy Leasable Minerals Management

Impacts would be the same as described under Alternative 5 except that any existing nonenergy leasable operations within ACECs would not be able to expand on federal mineral estate and no new operations would be permitted in ACECs. This limitation on expansion and new operations would result in the economic and social impacts. The impacts would be limited to areas within ACECs.

Locatable Minerals Management

Under Alternative 6, requiring a plan of operations for exploration operations disturbing five acres or less in ACECs would increase administrative process and cost for operators conducting exploration. This could result in a reduction in exploration in ACECs which could lead to a reduction in development and production in these areas as well. If this results in a reduction development, there could be impacts on economic and social conditions in the surrounding communities.

Mineral Materials Management

Restrictions on mineral material development in ACECs could result in impacts on economic and social conditions. Due to mineral materials being available in other locations, the impacts are not anticipated to be large.

10.13 Air Resources and Climate

10.13.1 Air Quality

Methodology

Implementation of GRSG conservation measures may indirectly impact air quality, following the assumption that existing operations would remain unchanged and could continue to affect air quality. Future air impacts will be directly evaluated during their individual NEPA processes and air quality impacts will remain unchanged until a project is implemented. The air quality impact analysis focuses on how changes in allowable uses under each alternative would impact air pollution. The types of actions that can result in impacts on air quality are discussed in more detail in **Section 4.13.1**, Nature and Type of Effects.

The analysis assumes that oil and gas development would be the dominant source of criteria air pollutant and HAP emissions and impacts on air quality from BLM-authorized activity in the planning area; therefore, overall impacts are assessed using emission estimates from oil and gas development. The BLM has conducted the 2032 Western US Photochemical Air Quality Modeling study to assess the impacts of fossil fuel development and production and other cumulative sources on air quality and air quality related values in BLM-administered lands in the seven US intermountain western states (Colorado, Montana, New Mexico, North Dakota, South Dakota, Utah, and Wyoming. Modeling results represent emission sources for year 2032 based on anticipated future oil, gas, and coal development, other human-caused (anthropogenic) emissions, and natural sources on air quality and air quality related values such as visibility and deposition (Ramboll 2023). Quantitative estimate of average annual emissions under each alternative from federal oil and gas development are shown in **Table 4-1**; these were estimated by scaling circa 2032 modeled emissions in states that overlap with the planning area (Ramboll 2023; see **Appendix 12, Section 12.11**, Air Pollutant and Greenhouse Gas Emission Calculation).

Analysis of impacts from other activities including from other mineral development (saleable and locatable minerals), solar and wind energy development, ROWs, traffic and road construction, and livestock grazing is discussed qualitatively. Potential impacts on air quality from implementing Alternatives 2, 3, 4, 5, and 6 are qualitatively compared to Alternative 1, as the No Action Alternative, to determine what changes, if any, can be expected to air quality under each alternative.

Indicators

Indicators of impacts on air quality are as follows:

- Tons of annual criteria air pollutant emission changes from oil and gas development.
- Acres closed to nonenergy solid mineral leasing, mineral entry, and sale or disposal of mineral material resources.
- Area of land with the potential for disturbance due to solar and wind energy development and associated facilities, and from other major and minor ROWs.
- Amount of road traffic from construction, daily operation, and road maintenance.
- Changes in the level of livestock grazing, supporting activities, and range maintenance.
- A substantial change in the likelihood or severity of wildland fire (based on level of restrictions on uses that may introduce sources of ignition)

Assumptions

In addition to the assumptions in **Section 4.1.1**, Analytical Assumptions, this analysis includes the following assumptions:

- Air resource impacts can be localized or regional.
- Weather-related events and wildfires may cause or contribute to local or regional air resource impacts.

Alternative 1

Rangewide Environmental Consequences

Under Alternative 1, in most of the planning area PHMA (IHMA in Idaho), except as noted under the state-specific sub-headings below, fluid mineral leasing would continue to be managed as NSO. While this would continue to eliminate emission sources in PHMA (IHMA in Idaho), impacts could be relocated within the planning area, and continue to impact air quality as described in the *Nature and Types of Effects*. Fluid mineral development and production would continue to be the primary source of emissions from BLM-authorized activity in the planning area. Under Alternative 1, potential emissions from oil and gas development in the Greater Sage-Grouse planning area represent 0.19% of annual carbon monoxide, 3.11% of nitrogen oxide, 0.03% of PM_{10}, 0.08% of $PM_{2.5}$, 3.15% of sulfur dioxide, and 1.49% of VOC emissions from the planning area counties. For more detail on average annual emission estimates for each state see **Table 4-1.**

Under Alternative 1, except as noted under the state-specific sub-headings below, potential impacts on air quality from proposed management of BLM-administered federal mineral estate as closed to or available for saleable mineral sales or disposal within the planning area GHMA where there is no specific allocation, and within PHMA (IHMA in Idaho) from new free use permits and expansion of existing leases would continue.

Under Alternative I, potential for impacts on air quality from locatable mineral development would continue in all GHMA and PHMA (IHMA in Idaho).

Under Alternative 1, except as noted under the state specific sub-heading below, potential impacts on air quality from major and minor ROWs in PHMA/IHMA and GHMA, where it would continue to be managed as avoidance for major ROWs and open to minor ROWs, would continue. Under Alternative 1, except as noted under the state-specific sub-headings below, wind and solar development would continue to be managed as avoidance in GHMA and as exclusion in PHMA (IHMA in Idaho). This would continue to reduce potential impacts on air quality associated with emissions and surface-disturbing activities in GHMA and eliminate sources of impacts on air quality in PHMA, as described in the *Nature and Types of Effects*.

Under Alternative 1, impacts on air quality from changes in livestock grazing would continue in PHMA (IHMA in Idaho) and GHMA across the planning area. Impacts would continue to largely be determined by variations in site-specific management actions that minimize surface-disturbing actions. These management actions would continue to indirectly reduce impacts on air quality from changes in livestock grazing described in the *Nature and Types of Effects*.

Colorado Environmental Consequences

Under Alternative 1, Colorado GHMA would continue to be managed as closed to fluid mineral leasing within 1 mile of leks, NSO within 2 miles of leks, and seasonal limitations elsewhere, and PHMA would continue to be closed to fluid mineral leasing within 1 mile of leks. While in areas that remain as closed or as open with NSO stipulations for fluid mineral leasing, sources of impacts on air quality would be removed, impacts may be relocated to elsewhere within the planning area where fewer restrictions on fluid mineral leasing exists.

Idaho Environmental Consequences

Under Alternative 1, fluid mineral leasing would continue to be managed as NSO in Idaho IHMA and as CSU in GHMA. Within GHMA, potential for impacts on air quality from fluid mineral leasing would continue to exist while in areas that remain designated NSO for fluid mineral leasing, emissions sources would be eliminated. However, the potential for displacement of impacts to elsewhere within the planning area where fewer restrictions on fluid mineral leasing exist would continue.

Under Alternative 1, potential impacts on air quality from proposed management of BLM-administered federal mineral estate as closed to or available for saleable mineral sales or disposal would continue to exclude impacts from new free use permits and continue to be limited to impacts from expansion of existing permits.

Under Alternative 1, potential for impacts on air quality from wind, solar, and other major ROWs would continue within GHMA in Idaho where it would continue to be open to such use. Potential for impacts on air quality from solar and wind development in Idaho IHMA, where it would continue to be managed as avoidance for solar and wind development and only excluded for utility scale projects, would continue to be higher compared with PHMA in other planning area states.

Nevada/California Environmental Consequences

Under Alternative 1, potential for impacts on air quality from fluid mineral leasing would continue in Nevada and California GHMA where it would continue to be open to fluid mineral leasing, subject to CSU stipulations.

Under Alternative 1, potential for impacts on air quality from solar and wind projects would continue to exist in Nevada and California PHMA from non-utility-scale solar and wind, and from major ROWs or wind projects in GHMA, which would continue to be managed as avoidance. No air quality impacts from solar

development within the Nevada and California PHMA would occur, where it would continue to be managed as exclusion for solar projects.

Oregon Environmental Consequences

Under Alternative 1, while potential for impacts on air quality from fluid mineral leasing within 1 mile of leks would continue to be eliminated, potential for impacts outside of the 1-mile radius, where it would continue to be open to fluid mineral leasing and subject to CSU stipulations, would continue to exit.

Under Alternative 1, potential for impacts on air quality from solar and wind projects would continue in Oregon PHMA, where it would continue to be managed as avoidance for solar and wind development and only excluded for utility scale projects (except in Lake, Harney, and Malheur Counties where it is avoidance and impacts could occur within PHMA).

Utah Environmental Consequences

Under Alternative 1, potential impacts on air quality from fluid mineral leasing in Utah GHMA would continue, where it would continue to be managed as NSO near leks or CSU based on allocations in plans that predated the 2015 amendment. While in areas that remain designated as NSO for fluid mineral leasing, sources of impacts on air quality would be removed, impacts may be relocated to elsewhere within the planning area, where fewer restrictions on fluid mineral leasing exists. In areas open to fluid mineral leasing with CSU stipulations, potential for impacts on air quality would continue to exist.

Under Alternative 1, GHMA in Utah would continue to be open to wind and other major ROWs (subject to minimization and mitigation), which would continue to result in air quality impacts that are associated with emissions and surface-disturbing activities. Under Alternative 1, potential for impacts on air quality from wind projects would continue to exist in PHMA in Utah to within 5 miles of leks.

Wyoming Environmental Consequences

Under Alternative 1, in Wyoming, GHMA would be managed as NSO within 0.25 miles of leks, and seasonal limitations within 2 miles of leks, while PHMA would continue to be managed as NSO within 0.6 miles of leks and as CSU or with timing limitations outside. While in areas that remain designated as NSO for fluid mineral leasing, sources of impacts on air quality would be removed, impacts may be relocated to elsewhere within the planning area, where fewer restrictions on fluid mineral leasing exists. In areas open to fluid mineral leasing with CSU stipulations or timing limitations, potential for impacts on air quality would continue to exist.

Under Alternative 1, potential impacts on air quality from proposed management of BLM-administered federal mineral estate as closed to or available for saleable sales or disposal would continue to exist within PHMA in Wyoming, where it would continue to be managed as open, subject to occupancy, seasonal limitations, disturbance, and density for such use.

Under Alternative 1, potential impacts on air quality would continue to exist from major and minor ROWs, and from solar and wind development, in Wyoming PHMA, where it would be open to such use.

Alternative 2

Rangewide Environmental Consequences

Under Alternative 2, impacts on air quality from closure to leasing or stipulations applied to fluid mineral leasing in PHMA and GHMA would be the same as under Alternative 1, except in Colorado as described under the state-specific sub-heading below.

Under Alternative 2, impacts on air quality from proposed management of BLM-administered federal mineral estate as closed to or available for saleable mineral sales or disposal in PHMA and GHMA would be the same as under Alternative 1, except in Idaho IHMA and Nevada PHMA as described in the state-specific sub-headings below.

Under Alternative 2, removing the recommendation for withdrawal of locatable mineral entry in SFA in all states (except in Montana/Dakotas, which did not have a 2019 amendment) would not change impacts on air quality because as discussed under Alternative 1, recommending areas for closure to the mining laws for locatable exploration or development does not restrict any activities and therefore, such recommendation does not have any impacts. The Secretary proposes and makes withdrawals not through BLM land use planning but according to a separate process pursuant to section 204 of FLPMA.

Under Alternative 2, impacts on air quality from changes in GRSG habitat protected from major and minor ROWs and from solar and wind development would be the same as under Alternative 1, except in Nevada for solar energy development and major ROWs, and in Nevada and Utah for wind energy development, as described in the state-specific sub-headings below.

Under Alternative 2, impacts on air quality from changes in livestock grazing would be similar to those described under Alternative 1. However, there would be more exceptions to restrictions on livestock grazing than under Alternative 1, which could result in increased potential localized impacts on air quality in PHMA or IHMA.

Colorado Environmental Consequences

Under Alternative 2, PHMAs in Colorado would be designated as NSO for fluid mineral development. Compared with Alternative 1, under which areas within 1 mile of leks would remain closed to fluid mineral leasing, this would increase potential impacts on air quality. Compared with Alternative 1, changing GHMA from closed to fluid mineral leasing within 1 mile of leks and NSO within 2 miles of leks under Alternative 1 to NSO within 1 mile of leks under this alternative would likely result in an increase in air emissions because the amount of federal mineral estate available for leasing and development would be greater under this alternative. Under Alternative 2, annual emissions from fluid mineral leasing would increase on average by 0.7% compared with Alternative 1.

Idaho Environmental Consequences

Under Alternative 2, allowing consideration of new free use permits for saleable minerals in Idaho IHMA, would increase the potential for associated impacts on air quality compared with Alternative 1. This is because there would be a greater chance for more acres of saleable mineral activities to occur in these areas.

Nevada/California Environmental Consequences

Under Alternative 2, adding an exception criterion to saleable and nonenergy mineral closures for Nevada PHMA would increase the potential for associated impacts on air quality. This is because there would be a greater chance for more area of saleable mineral activities to occur in these areas.

Under Alternative 2, there would be an exception criterion avoidance for ROWs and to the closure to wind and solar development in Nevada PHMA and to wind development in Nevada/California GHMA. Compared with Alternative 1, this could increase the potential for impacts on air quality associated with changes in land protected from or open to renewable energy development because there would be a higher chance of development. However, the exception criteria would likely avoid impacts on air quality.

Utah Environmental Consequences

Under Alternative 2, areas outside PHMAs that are within 5 miles of leks in Utah would be avoidance for wind development. This could increase the potential for impacts on air quality associated with changes in land protected from wind development compared with Alternative 1. This is because there would be a higher chance of development in an avoidance area as opposed to an exclusion area that includes an exception criterion to closure.

Alternative 3

Rangewide Environmental Consequences

Under Alternative 3, closing PHMA to fluid mineral leasing, saleable mineral sales and disposal, and nonenergy mineral leasing would reduce potential impacts on air quality from actions such as surface disturbance, associated with mineral development as described under the *Nature and Types of Effects*. Effects would be reduced compared with Alternative 1. The recommendation to withdraw all PHMA from location and entry under the US mining laws would not impact air quality because considering whether to withdraw certain lands is a separate action with its own NEPA analysis.

New infrastructure development would be substantially limited compared with Alternative 1. Under Alternative 3, prohibiting development of wind, solar, and other major ROWs would eliminate the likelihood for impacts on air quality from changes in land protected from or open to such surface-disturbing activities in these areas.

Compared with Alternative 1, Alternative 3 contains greater restrictions on other resources and would most greatly reduce the potential for impacts on air quality from changes in land protected from or open to livestock grazing as described under the *Nature and Type of Effects*. However, removing grazing may result in the accumulation of fine fuels, potentially leading to wildfires that could impact air quality.

Colorado Environmental Consequences

Under Alternative 3, annual emissions from fluid mineral leasing in Colorado would on average decrease by 27.7%, compared with Alternative 1.

Montana Environmental Consequences

Under Alternative 3, annual emissions from fluid mineral leasing in Montana would on average decrease by 40.5%, compared with Alternative 1.

North Dakota Environmental Consequences

Under Alternative 3, annual emissions from fluid mineral leasing in North Dakota would on average decrease by 15.4%, compared with Alternative 1.

South Dakota Environmental Consequences

Under Alternative 3, annual emissions from fluid mineral leasing in South Dakota would on average decrease by 1.2%, compared with Alternative 1.

Utah Environmental Consequences

Under Alternative 3, annual emissions from fluid mineral leasing in Utah would on average decrease by 9.8%, compared with Alternative 1.

Wyoming Environmental Consequences

Under Alternative 3, annual emissions from fluid mineral leasing in Wyoming would on average decrease by 38.0%, compared with Alternative 1.

Alternative 4

Rangewide Environmental Consequences

Under Alternative 4, impacts on air quality from fluid mineral leasing would be similar to Alternative 1. Under Alternative 4, impacts on air quality from management of BLM-administered federal mineral estate as closed to or available for saleable mineral sales or disposal, would be the same as under Alternative 1, except in some states as discussed under state-specific subheadings below.

Under Alternative 4, PHMA in all states, and IHMA to within 3.1 miles from active leks, would be managed as exclusion for utility-scale wind and solar energy projects. Therefore, no air quality impacts from utility-scale wind or solar projects would be expected in those areas, similar to IHMA in Idaho, and PHMA in Nevada/California and Oregon (except in Lake, Harney, and Malheur Counites where potential for impacts remain, because it would be managed as avoidance under Alternative 1). Under Alternative 4, potential for impacts on air quality from utility-scale solar or wind development would be less than the potential for impacts from construction of such projects in Wyoming and Utah under Alternative 1, where the management action is either avoidance, or exclusion with exception criterion.

Under Alternative 4, site-specific management actions would continue to have impacts on air quality resulting from changes in livestock grazing as described under the *Nature and Type of Effects*. The emphasized flexibility under Alternative 4, compared to Alternative 1, would help ensure that grazing practices remain in compliance with established guidelines, reducing impacts on air quality compared with Alternative 1.

Colorado Environmental Consequences

Under Alternative 4, annual emissions from fluid mineral leasing in Colorado would on average increase by 4.1%, compared with Alternative 1.

Wyoming Environmental Consequences

Under Alternative 4, annual emissions from fluid mineral leasing in Wyoming would on average decrease by 19.9%, compared with Alternative 1.

Alternative 5

Rangewide Environmental Consequences

Under Alternative 5, impacts on air quality from mineral development would be similar to Alternative 1, except in some states as discussed under state-specific subheadings below. Under Alternative 5, PHMA would be designated as avoidance for utility-scale wind and solar projects, prioritizing the protection of GRSG habitat and, in turn, reducing the impacts on air quality as described under the *Nature and Type of Effects*. In contrast, GHMA would remain open for utility-scale wind and solar development, accompanied by specific minimization measures to mitigate potential impacts on air quality as described under the *Nature and Type of Effects*.

The measures under Alternative 5, compared with Alternative 1, would improve disturbance management and mitigate potential degradation, which could have long-term benefits on air quality conditions for GRSG's sagebrush habitat across different states and specific boundaries.

Under Alternative 5, like Alternative 1, livestock grazing would generally remain available in PHMA, IHMA, and GHMA for GRSG, except for certain RNAs in Oregon that may be partially or entirely unavailable for grazing. Changes in livestock grazing would be determined by site-specific management actions aiming to decrease surface disturbance activities which would have impacts on air quality as described under the *Nature and Types of Effects*.

Alternative 5 introduces a targeted approach for the inclusion of thresholds and responses. which, compared with Alternative 1, would focus efforts on the priority areas, promoting the establishment of suitable habitat and thus minimizing impacts on air quality by reducing land disturbance as described under the *Nature and Type of Effects*.

Colorado Environmental Consequences

Under Alternative 5, annual emissions from fluid mineral leasing in Colorado would be the same as Alternative 4.

Wyoming Environmental Consequences

Under Alternative 5, annual emissions from fluid mineral leasing in Wyoming would on average decrease by 3.3%, compared with Alternative 1.

Alternative 6

Rangewide Environmental Consequences

Under Alternative 6, impacts on air quality would be similar to Alternative 5, except in some states as discussed under state-specific subheadings below. ACECs under Alternative 6 would restrict some uses, in accordance with the ACEC boundaries and restrictions under Alternative 3, which could reduce potential sources of pollutants.

Wyoming Environmental Consequences

Under Alternative 6, annual emissions from fluid mineral leasing in Wyoming would on average decrease by 3.9%, compared with Alternative 1.

10.13.2 Climate Change and Greenhouse Gases

Methodology

Impacts to climate change depend on changes in emission of GHGs and carbon sequestration of the land. GHG emissions from oil and gas development (**Table 4-2**) was estimated by scaling the circa 2032 modeled emissions for states that overlap with the planning area (Ramboll 2023; see **Appendix 12, Section 12.11**, Air Pollutant and Greenhouse Gas Emission Calculation). Grazing emissions were estimated by evaluating methane emissions from enteric fermentation and manure management, and nitrous oxide emissions from manure deposited on rangeland according to methodologies included in USDA guidelines (USDA 2023), and the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhous Gas Inventories, Volume 4, Agriculture, Forestry and Other Land Use (IPCC 2019). Grazing emissions were based on the 5-year averaged billed AUM values in each state (see Table 3-10 in **Appendix 14**, Socioeconomic Baseline Report). Potential impacts on climate change from implementing Alternatives 2, 3, 4, 5, and 6 are compared to Alternative 1, as the No Action Alternative, to determine what changes, if any, can be expected to GHG emissions or carbon sequestration under each alternative.

Indicators

Indicators of impacts of climate change include:

- Acres closed or subject to stipulations on fluid mineral leasing, and potential changes in oil and gas production.
- Acres closed to nonenergy solid mineral leasing, locatable mineral entry, and sale or disposal of mineral material resources.
- Area of land managed as open, exclusion, or avoidance areas for renewable energy development and ROWs (e.g., transmission lines).
- Level of road traffic from daily travel and amount of road maintenance and construction activities.
- Changes in permitted AUMs and level of livestock grazing supporting activities (e.g., rangeland improvement or livestock transportation).
- A substantial change in the likelihood or severity of wildland fire (based on level of restrictions on uses that may introduce sources of ignition)

Assumptions

In addition to the assumptions in **Section 4.1.1**, Analytical Assumptions, this analysis assumes wild horses and burros, wild ungulates, livestock, and wildlife species all contribute similar GHG emissions.

Alternative 1

Rangewide Environmental Consequences

Except as noted under the state-specific subheading below, in most of the planning area PHMA (IHMA in Idaho), fluid mineral leasing would continue to be managed as NSO. While this would continue to eliminate emission sources and improve carbon sequestration in PHMA (IHMA in Idaho), development could be relocated within the planning area, and continue to result in increased GHG emissions and changes to carbon sequestration.

Under Alternative 1, potential emissions from oil and gas development in the Greater Sage-Grouse planning area represent 0.03% of state-wide GHG emissions in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming (29,436 million metric tons of CO_2e; **Table 3-18**). Social cost of GHGs from oil and gas development for the 20-year life of the project would be 2,263 million dollars (2020 dollars) at the 5% discount rate and 7,179 million dollars at 3% discount rate calculated using methodology developed by the Interagency Working Group on Social Cost of Greenhouse Gases (IWG 2021).

Except as noted below, potential impacts on GHG emissions and carbon sequestration from management of BLM-administered federal mineral estate as closed to or available for saleable mineral sales or disposal within the planning area GHMA where there is no specific allocation, and within PHMA (IHMA in Idaho) from new free use permits and expansion of existing leases would continue.

Potential for impacts on GHG emissions and carbon sequestration from locatable mineral development would continue in all GHMA and PHMA (IHMA in Idaho).

Most states would continue to manage PHMAs (or IHMA in Idaho) as avoidance areas for major ROWs, and exclusion for wind and solar ROWs (Idaho, Nevada/California, and Oregon have exclusion for utility scale solar and wind projects only). In most states, GHMAs would continue to be managed as either avoidance or open for major ROWS, wind, and solar projects. In exclusion areas which do not allow for ROWs, there would be no impacts on GHG emissions or changes to carbon sequestration. In avoidance

areas, while the potential for impacts would remain, this would be less than the potential for impacts in areas that would remain open to ROWs or have fewer restrictions.

Restrictions on surface-disturbing activities on BLM lands, including mineral development and ROWs, might push development onto private land, which could result in indirect impacts as described under *Nature and Types of Effects*.

Impacts on GHG emissions and carbon sequestration from changes in livestock grazing would continue to largely be determined by variations in AUMs and site-specific management actions that involve surface-disturbing actions. Under Alternative 1, livestock grazing would result in 24,400 metric tons of methane and from enteric fermentation and manure management and 19,782,000 metric tons of nitrous oxide from direct and indirect emissions due to manure deposited on rangeland. This would result in 5,401 million metric tons of 100-year CO_2e and 5,402 million metric tons of 20-year CO_2e, representing 18% of total GHG emissions from state-wide grazing emissions in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming. Social cost of GHGs for the 20-year life of the project would be 1,960,000 million dollars at the 5% discount rate and 6,886,000 million dollars at 3% discount rate (IWG 2021).

Management actions that would continue to indirectly reduce impacts on climate change from changes in livestock grazing include managing for riparian vegetation, applying the principles of prescriptive livestock grazing to control time and timing of grazing during the hot season, and retiring grazing privileges on a voluntary basis.

Impacts on GHG emissions and carbon sequestration from changes in wild horse and burro management would continue to largely be determined by variations in AMLs and site-specific management actions that involve surface-disturbing actions. Management actions that would continue to indirectly reduce impacts on climate change from changes in wild horse and burro management include implementing wild horse and burro gathers and fertility treatments.

Colorado Environmental Consequences

Colorado GHMA would continue to be managed as closed to fluid mineral leasing within 1 mile of leks, NSO within 2 miles of leks, and seasonal limitations elsewhere, while PHMA would continue to be closed to fluid mineral leasing within 1 mile of leks. Emission sources and impacts to carbon sequestration could be displaced and would continue to result in overall impacts on climate change.

Idaho Environmental Consequences

Fluid mineral leasing would continue to be managed as NSO in Idaho IHMA and as CSU in GHMA. Within GHMA. Emission sources and impacts to carbon sequestration could be displaced and would continue to result in overall impacts on climate change.

Potential impacts on GHG emissions and carbon sequestration from management of BLM-administered federal mineral estate as closed to or available for saleable mineral sales or disposal would continue to exclude impacts from new free use permits and continue to be limited to impacts from expansion of existing permits.

Potential for impacts on GHG emission and carbon sequestration from wind, solar, and other major ROWs would continue within GHMA in Idaho where it would continue to be open to such use. Potential for impacts on GHG emissions and carbon sequestration from solar and wind development in Idaho IHMA, where it

would continue to be managed as avoidance for solar and wind development and only excluded for utility scale projects, would continue to be higher compared with PHMA in other planning area states.

Nevada/California Environmental Consequences

Potential for impacts on GHG emissions and carbon sequestration from fluid mineral leasing would continue in Nevada and California GHMA where it would continue to be open to fluid mineral leasing, subject to CSU stipulations.

Potential for impacts on GHG emissions and carbon sequestration from solar and wind projects would continue to exist in Nevada and California PHMA from non-utility-scale solar and wind, and from major ROWs or wind projects in GHMA, which would continue to be managed as avoidance. No impacts from solar development within the Nevada and California PHMA would occur, where it would continue to be managed as exclusion for solar projects.

Oregon Environmental Consequences

While potential for impacts on GHG emissions and carbon sequestration from fluid mineral leasing within 1 mile of leks would continue to be eliminated, potential for impacts outside of the 1-mile radius, where it would continue to be open to fluid mineral leasing and subject to CSU stipulations, would continue to exit.

Potential for impacts on GHG emissions and carbon sequestration from solar and wind projects would continue in Oregon PHMA, where it would continue to be managed as avoidance for solar and wind development and only excluded for utility scale projects (except in Lake, Harney, and Malheur Counties where it is avoidance and impacts could occur within PHMA).

Utah Environmental Consequences

Potential impacts on GHG emissions and carbon sequestration from fluid mineral leasing in Utah GHMA would continue, where it would continue to be managed as NSO near leks or CSU based on allocations in plans that predated the 2015 amendment. Emission sources and impacts to carbon sequestration would be displaced and would continue to result in overall impacts on climate change.

GHMA in Utah would continue to be open to wind and other major ROWs (subject to minimization and mitigation), which would continue to result in GHG emissions and carbon sequestration impacts that are associated with emissions and surface-disturbing activities. Under Alternative 1, potential for impacts on climate change from development of wind projects would continue to exist in PHMA in Utah to within 5 miles of leks.

Wyoming Environmental Consequences

Wyoming, GHMA would be managed as NSO within 0.25 miles of leks, and seasonal limitations within 2 miles of leks, while PHMA would continue to be managed as NSO within 0.6 miles of leks and as CSU or with timing limitations outside. While in areas that remain designated as NSO for fluid mineral leasing, emission sources and impacts on carbon sequestration would be removed, impacts may be relocated to elsewhere within the planning area, where fewer restrictions on fluid mineral leasing exists. In areas open to fluid mineral leasing with CSU stipulations or timing limitations, potential for impacts on GHG emissions and carbon sequestration would continue to exist.

Potential impacts on GHG emissions and carbon sequestration from proposed management of BLM-administered federal mineral estate as closed to or available for saleable sales or disposal would continue to

exist within PHMA in Wyoming, where it would continue to be managed as open, subject to occupancy, seasonal limitations, disturbance, and density for such use.

Potential impacts on GHG emissions and carbon sequestration would continue to exist from major and minor ROWs, and from solar and wind development, in Wyoming PHMA, where it would be open to such use.

Alternative 2

Rangewide Environmental Consequences

Impacts on GHG emissions and carbon sequestration from changes in land protected from or open to fluid minerals in PHMA and GHMA would be the same as under Alternative 1, except as described below. Under Alternative 2, the social cost of GHGs from oil and gas development for the 20-year life of the project would be 2,269 million dollars at the 5% discount rate and 7,199 million dollars at 3% discount rate (IWG 2021).

Impacts on GHG emissions and carbon sequestration from changes in land protected from or open to saleable minerals in PHMA and GHMA would be same as under Alternative 1, except in Idaho IHMA and Nevada PHMA as described in the state-specific sub-headings below.

Impacts on GHG emissions and carbon sequestration from nonenergy mineral management in PHMA and GHMA would be the same as under Alternative 1, except in Nevada PHMA as described in the state-specific sub-headings below.

Removing the recommendation for withdrawal of locatable mineral entry in SFA in all states (except in Montana/Dakotas, which did not have a 2019 amendment) would not change impacts on GHG emissions and carbon sequestration compared with Alternative 1, because as discussed under Alternative 1, recommending areas for closure to the mining laws for locatable exploration or development does not restrict any activities and therefore, such recommendation does not have any impacts. The Secretary proposes and makes withdrawals not through BLM land use planning but according to a separate process pursuant to section 204 of FLPMA.

Impacts on GHG emissions and carbon sequestration from changes in land protected from or open to renewable energy management would be the same as under Alternative 1, except in Nevada and Utah as described in the state-specific sub-headings below.

Impacts on GHG emissions and carbon sequestration from changes in livestock grazing would be similar to those described under Alternative 1. There would be more exceptions to restrictions on livestock grazing than under Alternative 1, which could have increased potential impacts on climate change in PHMA or IHMA.

Impacts on GHG emissions and carbon sequestration from changes in wild horse and burro management would be the same as those described under Alternative 1.

Colorado Environmental Consequences

PHMAs in Colorado would be designated as NSO for fluid mineral development. Compared with Alternative 1, under which areas within 1 mile of leks would remain closed to fluid mineral leasing. Under Alternative 2, annual GHG emissions from fluid mineral leasing would increase by 0.7, compared with Alternative 1. This would increase potential impacts on climate change from increased emissions and surface disturbance.

Idaho Environmental Consequences

Allowing consideration of new free use permits for saleable minerals in Idaho IHMA, would increase the potential for associated impacts on GHG emissions and carbon sequestration. This is because there would be a greater chance for more area of saleable and/or nonenergy mineral open to activities to occur, increasing potential GHG emissions and reducing carbon storage in the land from surface disturbance.

Nevada/California Environmental Consequences

Adding an exception criterion to saleable and nonenergy mineral closures for Nevada PHMA would increase the potential for associated impacts on GHG emissions and carbon sequestration as described in the Nature and Types of Effects. This is because there would be a greater chance for more area of saleable and/or nonenergy mineral open to activities to occur in these areas, increasing potential GHG emissions and reducing carbon storage in the landscape from surface disturbance.

There would be additional exception criteria for areas open to wind/solar development in Nevada PHMA and for wind development in Nevada/California GHMA. Compared with Alternative 1, this could increase the potential for development, increasing impacts on GHG emissions and carbon sequestration associated with changes in land protected from or open to renewable energy development because there would be a higher chance of development.

Utah Environmental Consequences

Areas outside PHMAs in Utah would be avoidance for wind development. This could increase the potential for impacts on GHG emissions and carbon sequestration associated with changes in land protected from wind development compared with Alternative 1. This is because there would be a higher chance of development in avoidance areas as opposed to exclusion areas under Alternative 1, which would not allow any development.

Alternative 3

All GRSG management areas would be managed as PHMAs which would be closed to fluid mineral leasing, saleable minerals, and nonenergy minerals and would be recommended for withdrawal from locatable mineral entry. Under Alternative 3, the social cost of GHGs from oil and gas development for the 20-year life of the project would be 1,535 million dollars at the 5% discount rate and 4,915 million dollars at the 3% discount rate (IWG 2021).

All PHMAs would be managed as exclusion areas for major ROWs and wind or solar energy, unavailable to livestock grazing, and wild horses and burros would be removed. ROW exclusion would preclude development of Class VI projects. Under Alternative 3, GHG emissions from livestock grazing would be reduced to zero. Due to a reduction in the level of use from added restrictions, including removal of most major surface disturbing activities, livestock grazing, and wild horse and burros, Alternative 3 would result in the least amount of GHG emissions and surface disturbance on BLM-administered lands, compared with all alternatives. However, such restrictions could shift such development and associated impacts to state, tribal, or private lands, where GHG emissions and surface disturbance would still occur. Any reduction in development of minerals under the Mining Law of 1872 would only occur if the Secretary were to propose and make a withdrawal pursuant to section 204 of FLPMA.

Colorado Environmental Consequences

Under Alternative 3, annual GHG emissions from fluid mineral leasing in Colorado would decrease by 27.3% compared with Alternative 1.

Montana Environmental Consequences
Under Alternative 3, annual GHG emissions from fluid mineral leasing in Montana would decrease by 41.6% compared with Alternative 1.

North Dakota Environmental Consequences
Under Alternative 3, annual GHG emissions from fluid mineral leasing in North Dakota would decrease by 15.4% compared with Alternative 1.

South Dakota Environmental Consequences
Under Alternative 3, annual GHG emissions from fluid mineral leasing in South Dakota would decrease by 1.1% compared with Alternative 1.

Utah Environmental Consequences
Under Alternative 3, annual GHG emissions from fluid mineral leasing in Utah would decrease by 9.8% compared with Alternative 1.

Wyoming Environmental Consequences
Under Alternative 3, annual GHG emissions from fluid mineral leasing in Wyoming would decrease by 36.7% compared with Alternative 1.

Alternative 4
Impacts on GHG emissions and carbon sequestration would be the same as those described for Alternative 1 except as discussed below. The BLM would manage minerals to minimize land use conflict and associated impacts from subsequent development through project designs that avoid, minimize, reduce, rectify, and mitigate for indirect impacts. Under Alternative 4, the social cost of GHGs from oil and gas development for the 20-year life of the project would be 2,135 million dollars at the 5% discount rate and 6,777 million dollars at the 3% discount rate.

PHMAs and IHMAs would be managed as avoidance for major ROWs within 0.5-mile buffer zone. GHMA would be managed as avoidance areas within breeding, nesting, and limited-seasonal habitats where mapped. Under this alternative, the BLM would take a more adaptive approach to management and consider existing data and best available science to determine if conservation measures are reasonable. While the impacts on climate change would be reduced or removed in some cases, under the scenario which management would allow more development, impacts would include an increase in GHG emissions and reduction of carbon sequestration would increase compared with Alternative 1.

Colorado Environmental Consequences
Under Alternative 4, annual emissions from fluid mineral leasing in Colorado would increase by 4.0%, compared with Alternative 1.

Wyoming Environmental Consequences
Under Alternative 4, annual emissions from fluid mineral leasing in Wyoming would decrease by 19.3%, compared with Alternative 1.

Alternative 5
Impacts on GHG emissions and carbon sequestration would be the same as those described for Alternative 1 except as discussed below. The BLM would apply a balanced approach to development by managing to minimize potential for conflict in important habitat. This would result in an increase in GHG emissions and

carbon sequestration in situations where more development would occur while can result in a reduction in impacts where less development would occur. Under Alternative 5, the social cost of GHGs from oil and gas development for the 20-year life of the project would be 2,271 million dollars at the 5% discount rate and 7,208 million dollars at the 3% discount rate.

Alternative 5 would be less restrictive than Alternative 4 in terms of allowing for mineral and renewable energy development. Alterations in impacts, wherein a decrease in development is anticipated under Alternative 4 compared to Alternative 1, would likely result in a greater reduction of impacts under Alternative 5.

Colorado Environmental Consequences

Under Alternative 5, annual emissions from fluid mineral leasing in Colorado would be the same as Alternative 4.

Wyoming Environmental Consequences

Under Alternative 5, annual emissions from fluid mineral leasing in Wyoming would decrease by 3.2%, compared with Alternative 1.

Alternative 6

Impacts on GHG emissions and carbon sequestration would be the same as described for Alternative 5, except in Wyoming where there would be an increase in oil and gas emissions. ACECs under Alternative 6 would restrict some uses, in accordance with the ACEC boundaries and restrictions under Alternative 3, which could reduce surface disturbance and potential sources of GHGs. Similar to Alternative 3, such restrictions in ACECs could shift surface disturbance and development and associated impacts to state, tribal, or private lands. Under Alternative 6, the social cost of GHGs from oil and gas development for the 20-year life of the project would be 2,266 million dollars at the 5% discount rate and 7,193 million dollars at the 3% discount rate.

Wyoming Environmental Consequences

Under Alternative 6, annual emissions from fluid mineral leasing in Wyoming would decrease by 3.7%, compared with Alternative 1.

10.14 SOIL RESOURCES

10.14.1 Methods and Assumptions

Methodology

The types of actions that can result in impacts on soil resources are discussed in more detail in **Section 4.14.1**, Nature and Type of Effects. Wide ranging impacts are described because the nature and type of impacts would not change at different levels, though they may be concentrated in different areas based on how surface-disturbing activities are distributed across the landscape and area-specific soil resources. The following activities are considered surface-disturbing and would have similar impacts on soils: minerals development, renewable energy development, and ROW development.

Indicators

Indicators of impacts on soil resources are as follows for assessing soil productivity and erosion:

- Changes in livestock grazing
- Changes in surface-disturbing activities (minerals development, renewable energy development, and ROW development)

- Changes in vegetation treatments, prescribed burns, and potential for wildfire
- Changes in wild horse and burro management

Assumptions

This analysis is based on the assumptions in **Section 4.1.1**. The analysis also includes the following assumptions:

- Soils on BLM-administered lands will be managed to maintain inherent productivity and promote sustained yields, while keeping erosional mechanism at minimal and acceptable levels thus preventing physical or chemical degradation. Proposed surface-disturbing projects will be analyzed to determine suitability of soils to support or sustain such projects and will be designed to minimize soil loss.
- Achieving or maintaining Standards for Rangeland Health and Guidelines for Livestock Grazing Management (described in **Section 3.7**, Livestock Grazing) generally are effective in managing the effects on soils from livestock grazing when properly implemented and monitored. Grazing authorizations will be adjusted on a case-by-case basis when site-specific studies indicate changes in management are needed.
- BLM management actions and objectives will be consistent with soil resource capabilities.
- Vegetation treatment projects and planned or unplanned wildland fires that contribute to establishing a more natural fire regime would have long-term benefits to soil health. However, wildfire can have detrimental soil health impacts (e.g. in high intensity or sensitive soil types) in some locations or when the disturbance leads to the establishment of invasive plant species.
- Wild horses and burros exceeding AML can degrade soil resources. However, wild horse and burro management would reduce the impacts on soils.

10.14.2 Alternative 1

Livestock Grazing Management

Under Alternative 1, PHMA, IHMA (Idaho only), and GHMA would continue to be available for livestock grazing, except in Oregon where all or portions of 13 key RNAs would be unavailable. The BLM would continue to prioritize monitoring and permit renewal of grazing per IM 2018-024 or subsequent updated policy. SFAs and PHMA outside of SFAs should be considered high priority areas to assess. Impacts on soil productivity and erosion from changes in livestock grazing would be determined by variations in site-specific management actions that strive to minimize concentrated compaction and aim to maintain or improve soil conditions. Within the areas available for livestock grazing, the BLM Authorized Officer may include or adjust permit terms and conditions needed to meet land health standards and GRSG habitat objectives. In turn, these management actions would continue to help minimize local impacts on soil productivity and erosion from the changes in livestock grazing, which would continue to also help minimize rangewide impacts for long-term soil productivity as described in the *Nature and Types of Effects*.

Wild Horse and Burro Management

Under Alternative 1, wild horses and burros would be managed within their established AML levels with priority of wild horse and burro management actions occurring within PHMA and where herd management areas or herd areas overlap GRSG habitat. Soil health would improve under Alternative 1 since a reduction in the current population of wild horses and burros within the planning would reduce soil impacts caused by trampling and excessive forage use by wild horses and burros. Forage and plant community conditions would improve under Alternative 1 allow for soil productivity to increase and erosion to be reduced.

Management of Surface-disturbing Activities

Management actions proposed in this alternative that minimize, preclude, or stipulate surface disturbance would help maintain or improve soil productivity, such as the 3% disturbance cap. Management of fluid minerals, saleable minerals, and nonenergy mineral development in PHMA, GHMA, and IHMA varies by state and includes areas that are open, closed, and withdrawn (see **Chapter 2** alternatives for minerals management).These various restrictions on land protected from surface-disturbing activities and areas closed to surface-disturbing activities from mineral activities within PHMA, IHMA, and GHMA would continue to help minimize impacts on soil productivity and erosion as described under the *Nature and Types of Effects*.

PHMA and IHMA in all states would continue to be identified as ROW avoidance areas to allow for management flexibility, except for minor ROWs in Wyoming. PHMA would continue to be designated as ROW exclusion for wind and solar (utility scale solar only in Idaho, Nevada/California, and Oregon) development, with exceptions in Wyoming, Oregon, and Idaho. Classifying PHMA as exclusion or avoidance areas would decrease the potential for impacts on soil productivity and erosion associated with ROW development, such as the surface-disturbing activities described in the *Nature and Types of Effects*. This is because development of ROWs would be prohibited in exclusion areas and would be considered on a case-by-case basis in avoidance areas.

New ROWs in PHMA would continue to not be allowed except in accordance with the Anthropogenic Disturbance Screening Criteria. In IHMA, new ROWs could be considered if in accordance with the IHMA Anthropogenic Disturbance Development Criteria. The BLM would continue to collocate new ROWs with existing infrastructure when possible. The BLM would retain management flexibility to route ROWs to minimize overall impacts on soil productivity and erosion. Existing ROW corridors are preferred for collocation of new ROWs but could not be widened more than 50% greater than the original footprint. These measures would continue to reduce negative impact to soil productivity from the surface-disturbing activities as described in *Nature and Types of Effects*. GHMA in all states would be open to minor ROWs with mitigation measures, except Wyoming would not require mitigation. Impacts on soil productivity and erosion associated with these surface-disturbing activities could occur in these areas if developed, but mitigation measures would help to lessen the impacts.

10.14.3 Alternative 2

Livestock Grazing Management

Under Alternative 2, impacts from changes in livestock grazing would be similar to those described above under Alternative 1.

Wild Horse and Burro Management

Under Alternative 2, references to management within SFA's would be removed in some states with the reference removed for GHMA in Utah. Management of wild horses and burros in herd management areas and AMLs would be the same as described in Alternative 1. Impacts to soil resources from wild horse and burro actions would be the same as Alternative 1, except for areas where SFA references are removed. This could cause forage and other vegetation to be removed in areas that were once references as SFAs. Soil productivity would be reduced and soil erosion could be increased in these areas under Alternative 2.

Management of Surface-disturbing Activities

Changes to the disturbance cap would apply and include allowing the cap to be exceeded in all states except Oregon under certain circumstances. This action could impact soil productivity and erosion as described in the *Nature and Type of Effects*.

Under Alternative 2, impacts from changes in land open to fluid minerals in PHMA and GHMA would be similar to those described above under Alternative 1, except in Colorado PHMA and Colorado GHMA where fluid mineral development would be open and would increase potential for surface-disturbing impacts on soil productivity and erosion, as compared to Alternative 1. This is because mineral development activities could occur in previously closed areas and cause negative impacts as described under *Nature and Types of Effects*. Changing GHMA from closed to fluid mineral development to NSO would likely not change impacts on soil resources because the NSO stipulation would avoid potential for land available to surface-disturbing activities.

Impacts from changes in land open to saleable mineral management in PHMA and GHMA would be similar to those described under Alternative 1, except in Idaho IHMA and Nevada PHMA. Impacts from changes in land open to nonenergy mineral management in PHMA and GHMA would be similar to those described under Alternative 1, except in Nevada PHMA. As compared with Alternative 1, the additional exception criterion to saleable and nonenergy mineral closures for Nevada PHMA and allowing consideration of new free use permits for saleable minerals in Idaho IHMA would increase the potential for associated impacts on soil productivity and erosion as described under the *Nature and Types of Effects*. This is because there would be a greater chance for saleable and/or nonenergy mineral activities to occur in these areas.

Removing the recommendation for locatable mineral withdrawal in SFAs in all states (except in MT/DK, which did not have a 2019 amendment) has no impact. This is because a recommendation to withdraw lands under the Mining Law of 1872 has no impact. Withdrawals are considered through a separate process pursuant to section 204 of FLPMA.

Impacts from changes in land protected from or open to ROW and renewable energy management would be similar to those described under Alternative 1, with additional exception criteria in Nevada/California. Under Alternative 2, there would be an additional exception criterion for ROW and wind and solar development in Nevada PHMA and for wind development in Nevada/California GHMA. As compared to Alternative 1, this could increase the potential for impacts on soil productivity and erosion associated with ROW and renewable energy development because there would be a higher chance of development. However, the exception criteria would likely avoid major impacts on soil productivity and erosion as described under the *Nature and Type of Effects*.

Under Alternative 2, removing the prioritization objective for PHMA and GHMA, which involves determining the order or preference for leasing decisions, would not directly impact soil productivity and erosion because prioritization does not permit or preclude leasing in PHMA.As compared with Alternative 1, the NSO stipulations and conservation measures in place for PHMA would protect soil resources; however, the prioritization objective could potentially result in temporarily deferring a parcel in PHMA from leasing to a later sale, but only in instances of large lease sales where staff capacity would be incapable to analyzing all the nominated parcels. In an area with high levels of disturbance, such a delay could provide time for vegetation conditions and soil productivity to improve before new developments are implemented. As the amount of development increases in former GHMA, the consecutive effects of mitigating disturbances in PHMA could mount and could possibly affect soil productivity and erosion as described in the *Nature and Type of Effects*. Site-specific planning and other management from local resource management plans, and adhering to the land health standards, would reduce impacts on soil productivity and erosion in former GHMA with the use of BMP and other project mitigation design features.

10.14.4 Alternative 3

Livestock Grazing Management

Management of PHMA as unavailable for livestock grazing would eliminate the possibility of the short-term, site-specific impacts from changes in livestock grazing and the associated impacts on soil productivity and erosion as described under the *Nature and Types of Effects*. Compared with Alternative 1, Alternative 3 contains greater restrictions on livestock grazing and would be more protective of soil productivity from impacts related to livestock grazing.

Wild Horse and Burro Management

Under Alternative 3, there would be no new designation of herd management area in any herd areas that overlap with PHMA unless the area outside of the PHMA boundary could still support a herd management area. All wild horse and burros would be removed from existing PHMA. Soils in the planning area would experience short term impacts from wild horse and burro round up activities (i.e, off road vehicular travel and temporary corrals) that could cause soil erosion. The long terms impacts to soil resources in the planning area in comparison to Alternative 1 would be more beneficial because all wild horse and burro activity that impacts soils would be eliminated from PHMA.

Management of Surface-disturbing Activities

Application of a 3% disturbance cap and calculating disturbance at the project scale and HAF fine scale habitat selection area may prevent some development, and therefore reduce impacts to soil productivity and erosion. Compared with Alternative 1, Alternative 3 would have greater restrictions on new areas of land protected from or open to ROWs, fluid mineral leasing, and other mineral development and thus on development in these areas that would otherwise have the potential to impact soil productivity and erosion. PHMA in all states would be closed to fluid mineral leasing, saleable minerals, and nonenergy minerals would reduce potential impacts on soil productivity and erosion, such as areas available to surface-disturbance activities associated with mineral development as described under the *Nature and Types of Effects*. Effects would be reduced to a greater extent than under Alternative 1. This is because areas closed to leasing could not be developed at any point. Recommendation to withdraw PHMA from location and entry under the US mining laws does not restrict any activities and therefore would not have any impact on soil productivity and erosion. The Secretary proposes and makes withdrawals not through BLM land use planning but according to a separate process pursuant to section 204 of FLPMA.

New infrastructure development would be substantially limited as compared with Alternative 1. All PHMA would be excluded from new ROW authorizations. New linear ROWs would be allowed only in designated ROW corridors. The inability to site ROWs in PHMA would decrease the potential for impacts on soil productivity and erosion associated with ROW development and as described under the *Nature and Type of Effects*. The inability to site ROWs in PHMA could lead to longer ROW routes to bypass closed areas. Longer routes would increase surface disturbance and other impacts of ROW siting on soil productivity and erosion outside of PHMA and may result in increased impacts on soil productivity and erosion on adjacent state, tribal, or private lands.

Under Alternative 3, PHMA would be ROW exclusion for wind and solar energy development. Prohibiting wind energy development would eliminate impacts on soil productivity and erosion from changes in land protected from or open to this type of surface-disturbing activity in these areas. However, these prohibitions could result in the shifting of surface-disturbing activity and impacts on soil productivity and erosion to state, tribal or private lands.

10.14.5 Alternative 4

Livestock Grazing Management

Under Alternative 4, same as Alternative 1, livestock grazing would remain available in PHMA, IHMA, and GHMA, with the exception of 13 key RNAs in Oregon that may be fully or partially unavailable for grazing. Site-specific management actions would play a crucial role in determining the impacts on soil productivity and erosion resulting from changes in livestock grazing as described under the *Nature and Type of Effects*. These actions would minimize concentrated compaction and aim to maintain or improve soil productivity and minimize erosion, thereby mitigating effects on soil productivity and erosion as described under the *Nature and Type of Effects*. The BLM Authorized Officer would retain the authority to include or adjust permit terms and conditions within the areas available for livestock grazing. As compared with Alternative 1, the emphasized flexibility under Alternative 4 would ensure that grazing practices comply with existing land health standards under 43 CFR Part 4180 (or subsequent changes to regulations or policy) and contributes to minimizing local and implementation level impacts on soil productivity and erosion resulting from changes in livestock grazing as described in the *Nature and Types of Effects*.

Wild Horse and Burro Management

Under Alternative 4, wild horse and burro impacts would be similar to Alternative 1 with the direction to remove SFAs. Impacts to soil resources from wild horse and burro would be similar to was described in Alternative 1 and Alternative 2 with the exception of having reference to GHMA in Utah not being removed.

Management of Surface-disturbing Activities

Alternative 4 would include a 3% cap within the HAF fine scale habitat selection area in PHMA. Additionally, Alternative 4 would address habitat loss from wildfire and agriculture through existing sagebrush availability and habitat objectives. These measures under Alternative 4 would aim to manage and minimize disturbance, preserve vegetation communities, and mitigate the potential for further degradation while balancing impacts on soil productivity and erosion as described under the *Nature and Types of Effects*.

Under Alternative 4, additional management actions would be included compared with Alternative 1, specifically addressing fluid mineral leasing and development within GRSG PHMA, IHMA, and GHMA. Under Alternative 4, the proposed measures would include evaluating parcels identified in Expressions of Interest within GRSG habitat management areas giving preference to lands that would not result in impairing habitat suitability and proper function. Alternative 4 would consider the management of areas already leased for fluid minerals, emphasizing the application of lease stipulations, minimization measures, and compliance with NEPA. With that, under Alternative 4 and similar to Alternative 1, the BLM would aim to minimize impacts on soil productivity and erosion by promoting project designs that avoid, minimize, reduce, rectify, and mitigate for direct and indirect impacts, while considering site-specific considerations and project specific COAs. However, a blanket NSO restriction on new leases in an area with existing leases complicates the effectiveness of the described efforts. Alternative 4 would also include enhanced collaboration with project proponents and state wildlife agencies to promote effective conservation and connectivity of habitats, while reducing impacts on soil productivity and erosion.

Alternative 4 would maintain the exclusion of PHMA for utility-scale wind and solar projects and would designate IHMA as exclusion within 3.1 miles from active leks, while the remaining IHMA areas are avoidance. Avoidance areas would also be designated within 0.5 miles of PHMA/IHMA to address indirect impacts. GHMA would be avoidance for utility-scale wind/solar projects. PHMA/IHMA would be avoidance for major ROWs, and areas within 0.5 miles of PHMA/IHMA would also be avoidance. GHMA would be avoidance

within breeding/nesting/limited-seasonal habitats or entirely if not mapped, and designated corridors remain open. These modifications in Alternative 4, compared with Alternative 1, would help reduce impacts on soil productivity and erosion, as described under the *Nature and Types of Effects*, while allowing for managed development in specific areas.

10.14.6 Alternatives 5 and 6

Livestock Grazing Management

Under Alternatives 5 and 6, similar to Alternative 1, livestock grazing would generally remain available in PHMA, IHMA, and GHMA, with the exception of certain RNAs in Oregon that may be partially or entirely unavailable for grazing (pending final determinations). The impacts on soil productivity and erosion resulting from changes in livestock grazing would be determined by variations in site-specific management actions. These actions would strive to minimize concentrated compaction and aim to maintain or improve soil productivity and erosion as described under the *Nature and Type of Effects*.

Under Alternatives 5 and 6, livestock grazing within GRSG PHMA, IHMA, and GHMA would be managed to meet land health standards, informed by the site-scale HAF suitability. The BLM Authorized Officer would have the flexibility to include or adjust permit terms and conditions within the available livestock grazing areas, ensuring compliance with land health standards and GRSG habitat objectives. Under Alternatives 5 and 6, construction of range infrastructure, such as water sources, structures, and fences, would be guided by guidelines that minimize impacts on GRSG and soil productivity and erosion as described under the *Nature and Type of Effects*, similar to the consolidation and simplification efforts of Alternative 1.

While Alternative 1 does not specify the areas where thresholds and responses would be required, Alternatives 5 and 6 would introduce a targeted approach. Under Alternatives 5 and 6, areas with the greatest potential to impact GRSG if suitable habitat conditions were not met would be prioritized for the inclusion of thresholds and responses. Accordingly, by focusing efforts on these priority areas, proactive conservation measures would be implemented, promoting the establishment of suitable habitat and minimizing impacts on soil productivity and erosion as described under the *Nature and Type of Effects*.

Wild Horse and Burro Management

Under Alternatives 5 and 6, wild horse and burro impacts to soil resources within the decision area would be similar to what is described in Alternative 1.

Management of Surface-disturbing Activities

Alternatives 5 and 6 include varying caps on disturbance at the project scale within PHMA, depending on the state. These measures under Alternatives 5 and 6 would aim to manage disturbance, protect vegetation communities, and mitigate potential degradation while reducing impacts on soil productivity and erosion, as described under the *Nature and Type of Effects*, across states and specific boundaries.

Alternatives 5 and 6 would include additional management actions compared to Alternative 1, specifically addressing fluid mineral leasing and development within GRSG PHMA, IHMA, and GHMA. The proposed measures under Alternatives 5 and 6 would include evaluating parcels identified in Expressions of Interest within GRSG habitat management areas giving preference to lands that would not result in impairing habitat suitability and proper function. Additionally, Alternatives 5 and 6 would consider the management of areas already leased for fluid minerals, emphasizing the application of lease stipulations, minimization measures, and compliance with NEPA. Under Alternatives 5 and 6, the BLM would aim to minimize impacts to soil productivity and erosion as described under the *Nature and Type of Effects* by promoting project designs that avoid, minimize, reduce, rectify, and mitigate for direct and indirect impacts, while considering site-specific

considerations and project specific COAs. Collaboration with project proponents and state wildlife agencies would be encouraged to promote effective conservation and connectivity of habitats while reducing impacts to soil productivity and erosion.

Alternatives 5 and 6 would include notable changes compared to Alternative 1 for wind and solar development and major transmission ROW. Specifically, PHMA would be designated as avoidance for utility-scale wind and solar projects as well as major ROWs, prioritizing the protection of soil productivity. In contrast, GHMA would be open for utility-scale wind and solar development with the implementation of specific minimization measures to mitigate potential impacts on soil productivity and erosion. The designated corridors would remain open to accommodate transmission infrastructure. These modifications in Alternatives 5 and 6 would strike a balance between facilitating renewable energy development, ensuring transmission infrastructure access, and safeguarding the impacts on soil productivity and erosion as described under the *Nature and Type of Effects.*

10.15 WATER RESOURCES

10.15.1 Methods and Assumptions

Methodology

The types of actions that can result in impacts on water resources are discussed in more detail in **Section 4.15.1**, Nature and Type of Effects. Wide ranging impacts are described because the nature and type of impacts would not change at different levels, though they may be concentrated in different areas based on how surface-disturbing activities are distributed across the landscape and watershed resources. The following activities are considered surface-disturbing and would have similar impacts on water resources: minerals development, renewable energy development, and ROW development.

Indicators

Indicators of impacts on water resources are as follows for assessing water resource conditions, and water quality and quantity:

- Changes in livestock grazing
- Changes in surface-disturbing activities (minerals development, renewable energy development, and ROW development)
- Changes in vegetation treatments, prescribed burns, and potential for wildfire
- Changes in wild horse and burro management

Assumptions

This analysis is based on the assumptions in **Section 10.1.3**. Also, the analysis includes the following assumptions:

- Projects that help restore watersheds, desirable vegetation communities, or wildlife habitats (including surface disturbance associated with these efforts) would benefit water resources over the long term.
- The degree of impact attributed to any one disturbance or series of disturbances would be influenced by several factors. These are proximity to running streams, drainages and groundwater wells, location within the watershed, time and degree of disturbance, reclamation potential of the affected area, vegetation present, precipitation, and mitigating actions applied to the disturbance.
- Areas closed to ROWs, mineral resource development, or with NSO stipulations would result in less potential for water erosion and sedimentation to surface water.

- Surface-disturbing actions related to fluid mineral development would comply with Gold Book (BLM 2007) surface operating standards (and subsequent updates), and all federal and state water quality standards.
- Fluid mineral operations on existing federal leases, regardless of surface ownership, would be subject to COAs by the BLM Authorized Officer. The BLM can deny surface occupancy on portions of leases with COAs to avoid or minimize resource conflicts if this action does not eliminate reasonable opportunities to develop the lease or does not affect lease rights.
- The quantity of water stored in the landscape either as surface water or groundwater varies over time depending upon precipitation and human extractions of that water. Management measures that reduce or prevent water use involving mineral development, livestock grazing, wild horses and burros, and pinyon-juniper vegetation would have a net benefit on the quantities of water stored in the landscape.

10.15.2 Alternative 1

Livestock Grazing Management

Under Alternative 1, PHMA, IHMA, and GHMA would continue to be available for livestock grazing. In Oregon all or portions of 13 key RNAs would be unavailable to livestock grazing. The BLM would continue to prioritize monitoring and renewal of grazing in SFAs and PHMA outside of SFAs. This prioritization includes permit renewals in SFAs and PHMA, with the exception of cases outlined in IM 2018-024. These exceptions may encompass areas that have never undergone assessment or that comply with court orders. Impacts on water resource conditions from changes in livestock grazing would continue to largely be determined by variations in site-specific management actions. Some of the management actions could minimize surface-disturbing actions. In turn, these management actions would continue to help minimize local impacts on water resource conditions from changes in livestock grazing, which would also continue to help minimize rangewide impacts for long-term benefits to water resource conditions as described in the *Nature and Types of Effects*.

Wild Horse and Burro Management

Under Alternative 1, wild horse and burro would be managed within their established AML levels with priority of wild horse and burro management actions occurring within PHMA and where herd management areas or herd areas overlap GRSG habitat. These management actions would address overpopulated wild horse and burro areas, which are crucial for reducing strain on water quality, as these animals contribute to overgrazing and contamination, further impacting water resource conditions Water resources would improve under Alternative 1 as that a reduction in the current population of wild horse and burro within the planning area would reduce direct impacts wild horses and burros have on water resources.

Management of Surface-disturbing Activities

Within the rangewide planning area, impacts on water resource conditions are largely a result of variations in management actions. Management actions proposed in this action that minimize, preclude, or stipulate surface disturbance would help maintain or improve water resource conditions. Management of fluid minerals, saleable minerals, and nonenergy mineral development in PHMA, GHMA, and IHMA varies by state and includes areas that are open, closed, and withdrawn (see **Chapter 2** alternatives for minerals management). These various restrictions land protected from or open to surface disturbing activities within PHMA and GHMA would continue to help reduce impacts on water resource conditions as described under the *Nature and Types of Effects*. However, water flows across jurisdictional boundaries and such restrictions

could potentially shift such surface disturbance and associated impacts on water resource conditions from BLM lands to state, tribal, or private lands

PHMA and IHMA in all states would continue to be identified as ROW avoidance areas to allow for management flexibility, except for minor ROWs in Wyoming. PHMA would continue to be designated exclusion for wind and solar (utility scale solar only in Idaho, Nevada/California and Oregon) development, with exceptions in Wyoming, Oregon, and Idaho IHMA. Classifying PHMA as exclusion or avoidance areas would continue to decrease the potential for impacts on water resource conditions associated with changes in land open to ROW development, such as the surface-disturbing activities as described in the *Nature and Types of Effects*. This is because development of ROWs would continue to be prohibited in exclusion areas and would be considered on a case by-case basis in avoidance areas.

New ROWs in PHMA would continue to not be allowed except in accordance with the Anthropogenic Disturbance Screening Criteria outlined in the 2015 approved plan. In IHMA, new ROWs could be considered if in accordance with the IHMA Anthropogenic Disturbance Development Criteria. The BLM would continue to collocate new ROWs with existing infrastructure when possible. The BLM would continue to retain management flexibility to route ROWs to minimize overall impacts on water resource conditions. Existing ROW corridors are preferred for collocation of new ROWs but could not be widened more than 50% greater than the original footprint. These measures would continue to reduce negative impact to water resource conditions from surface-disturbing impacts described in the *Nature and Types of Effects*. However, water flows across jurisdictional boundaries, so BLM restrictions could potentially shift surface disturbance and associated impacts on water resources from BLM lands to state, tribal, or private lands. GHMA in all states would continue to be open to minor ROWs with mitigation measures, except Wyoming does not require mitigation. Impacts on water resource conditions associated with changes in land open to ROW development, such as surface disturbance could occur in these areas if developed, but mitigation measures, such as erosion control practices and revegetation, would help to lessen the impacts.

GRSG Management

Watershed health would continue to be affected by reducing water infiltration rates, increase overland flow and sediment loading, which could affect turbidity, temperature, and nutrient loading in water systems.

10.15.3 Alternative 2

Livestock Grazing Management

Under Alternative 2, impacts on water resource conditions from changes in livestock grazing would be similar to those described under Alternative 1. In Oregon, all or portions of the 13 key RNAs would be available to livestock grazing.

Wild Horse and Burro Management

Under Alternative 2, references to management within SFA's would be removed in some states with the reference removed for GHMA in Utah. Management of wild horses and burros in herd management areas and AMLs would be the same as described in Alternative 1. Impacts to water resources from wild horse and burro management actions would be the same as Alternative 1, except for areas where SFA references are removed. This could cause degradation of water resources that are present in areas that were once references as SFAs. Water quality would be reduced and competition between wildlife and wild horses and burros for water resources would increase under Alternative 2.

Management of Surface-disturbing Activities

Impacts on water resource conditions from changes in land protected from or open to fluid minerals in PHMA and GHMA would be the similar to those described under Alternative 1, except in Colorado PHMA and Colorado GHMA. Removing the closure of Colorado PHMA to fluid mineral development would increase potential for surface-disturbing impacts on water resource conditions. This is because fluid mineral development activities could occur in previously closed areas and cause impacts on water resource conditions as described under the *Nature and Types of Effects*. Compared with Alternative 1, changing GHMA from closed to fluid mineral development to NSO would likely not change impacts on water resource conditions because the NSO stipulation would avoid potential for these surface-disturbing activities.

Impacts on water resource conditions from changes in land protected from or open to saleable minerals in PHMA and GHMA would be similar to those described for Alternative 1, except in Idaho IHMA and Nevada PHMA. Impacts from nonenergy mineral management in PHMA and GHMA would be similar to those described under Alternative 1, except in Nevada PHMA. Under Alternative 2, adding an exception criterion to saleable and nonenergy mineral closures for Nevada PHMA, and allowing consideration of new free use permits for saleable minerals in Idaho IHMA, would increase the potential for associated impacts on water resource conditions as described in the *Nature and Types of Effects*. This is because there would be a greater chance for more area of saleable and/or nonenergy mineral open to activities to occur in these areas.

Under Alternative 2, removing the recommendation for locatable minerals in SFA in all states (except in Montana/Dakotas, which did not have a 2019 amendment, and Oregon, which retained SFA designation through a plan maintenance action and not an amendment.) would increase the potential for impacts on water resource conditions compared with Alternative 1. This is because locatable mineral activities could occur and cause impacts as described under the *Nature and Types of Effects*.

Impacts on water resource conditions from changes in land protected from or open to renewable energy management would be the similar to those described under Alternative 1, with additional exception criteria in Nevada/California. Under Alternative 2, there would be additional exception criteria for areas land open to wind/solar development in Nevada PHMA and for wind development in Nevada/California GHMA. Compared with Alternative 1, this could increase the potential for impacts on water resource conditions, as described under the *Nature and Type of Effects*, associated with changes in land protected from or open to renewable energy development because there would be a higher chance of development. However, the exception criteria would likely avoid impacts on water resource conditions.

Impacts on water resource conditions from changes in land protected from or open to ROW would be the similar to those described under Alternative 1, with additional exception criteria in Nevada/California. Under Alternative 2, there would be additional exception criteria for areas land open to ROW in Nevada PHMA and for wind development in Nevada/California GHMA. Compared with Alternative 1, this could increase the potential for impacts on water resource conditions, as described under the *Nature and Type of Effects*, associated with changes in land protected from or open to ROW development because there would be a higher chance of development. However, the exception criteria would likely avoid impacts on water resource conditions.

GRSG Management

Impacts on water resource conditions from changes in potential for wildfire would be the same as those described under Alternative 1 and as described under the *Nature and Type of Effects*.

10.15.4 Alternative 3

Livestock Grazing Management

All areas managed for GRSG would be PHMA. Compared with Alternative 1, Alternative 3 contains greater restrictions on other resources and would most greatly reduce the potential for impacts on water resource conditions as described under the *Nature and Type of Effects*. However, while Alternative 3 would be more protective of water resource conditions from impacts related to changes in land protected from or open to livestock grazing compared with Alternative 1, it could also make BLM lands more susceptible to wildfire. This increased wildfire risk could negatively impact water resources, as detailed in **Section 4.4**, which describes the increased likelihood of fire in greater detail.

Management of PHMA as unavailable for livestock grazing would eliminate the possibility of the short-term, site-specific impacts from changes in land protected from or open to livestock grazing and the associated impacts on water resource conditions as described under the *Nature and Type of Effects*. Alternative 3 would be more protective of water resource conditions from impacts related to changes in land protected from or open to livestock grazing compared with Alternative 1.

Wild Horse and Burro Management

Under Alternative 3, there would be no new designation of herd management area in any herd areas that overlap with PHMA unless the area outside of the PHMA boundary could still support a herd management area. All wild horse and burros would be removed from existing PHMA. Water resources within PHMA would improve with the direct impacts of wild horses and burros on water resources being eliminated.

Management of Surface-disturbing Activities

Compared with Alternative 1, Alternative 3 would have greater restrictions on new ROWs, fluid mineral leasing, and other mineral development and thus on areas land open to development in these areas that would otherwise have the potential to impact water resource conditions. Under Alternative 3, closing PHMA to fluid mineral leasing, saleable minerals, and nonenergy minerals would reduce potential impacts on water resource conditions, such as surface disturbance, associated with mineral development as described under the *Nature and Types of Effects*. Effects would be reduced to a greater extent than those under Alternative 1. This is because areas closed to leasing could not be developed at any point. Recommendation to withdraw PHMA from location and entry under the US mining laws would not restrict any activities and therefore would have no impact on water resource conditions. The Secretary proposes and makes withdrawals not through BLM land use planning but according to a separate process pursuant to section 204 of FLPMA.

Under Alternative 3, PHMA would be designated ROW exclusion for wind and solar energy development. Prohibiting wind energy development would eliminate the likelihood for impacts on water resource conditions from changes in land protected from or open to these surface-disturbing activities in these areas.

Because many water-consuming activities would be restricted, Alternative 3 is also likely to result in increased water retention through improved infiltration across the landscape. Restrictions from Alternative 3 would reduce surface disturbances that cause runoff and erosion, improving the likelihood of more waters fully supporting beneficial uses and maintaining or increasing the stream miles meeting state and federal water quality standards and designated beneficial uses.

New infrastructure development would be substantially limited compared with Alternative 1. All PHMA would be excluded from new ROW authorizations. New linear ROWs would be allowed only in designated ROW corridors. The inability to site ROWs in PHMA would decrease the potential for impacts on water resource conditions associated with changes in land open to ROW development as described under the

Nature and Type of Effects. However, the inability to site ROWs in PHMAs could lead to longer ROW routes to bypass closed areas. Longer routes would increase surface disturbance and other impacts of ROW siting on water resource conditions outside of PHMA and may result in increased impacts on water resource conditions on adjacent state, tribal, or private lands.

GRSG Management

Alternative 3 would have more restrictions and result in fewer areas treated when compared with Alternative 1. Under these restrictions, impacts on water resource conditions as described under the *Nature and Type of Effects* would be more prone to impacts from potential wildfires in those areas.

10.15.5 Alternative 4

Livestock Grazing Management

Under Alternative 4, same as Alternative 1, livestock grazing would generally remain available in PHMA, IHMA, and GHMA, except for all or portions of 13 key RNAs in Oregon that may be fully or partially unavailable for grazing. Under Alternative 4, same as Alternative 1, the BLM would maintain its focus on monitoring and renewing grazing activities in PHMA areas. Under Alternative 4, site-specific management actions would continue to play a crucial role in determining the impacts on water resource conditions resulting from changes in livestock grazing as described under the *Nature and Type of Effects*. These actions would strive to minimize concentrated compaction and aim to maintain or improve water resource conditions, thereby mitigating effects on water resource conditions as described under the *Nature and Type of Effects*. Under Alternative 4, to align with land health standards and GRSG habitat objectives, the BLM Authorized Officer would retain the authority to include or adjust permit terms and conditions within the areas available for livestock grazing. The emphasized flexibility under Alternative 4, compared with Alternative 1, would help ensure that grazing practices remain in compliance with established guidelines and contribute to minimizing local impacts on water resource conditions resulting from changes in livestock grazing as described under the *Nature and Types of Effects*.

Wild Horse and Burro Management

Under Alternative 4, wild horse and burro impacts would be similar to Alternative 1 with the direction to remove SFAs. Impacts to water resources from wild horses and burros would be similar to was described in Alternative 1 and Alternative 2 with the exception of having reference to GHMA in Utah not being removed. Site-specific management actions would also address the impacts on water resource conditions from overpopulated wild horse and burro areas, which affect water quality through overgrazing and contamination.

Management of Surface-disturbing Activities

Alternative 4, compared with Alternative 1, would introduce additional management actions specifically addressing fluid mineral leasing and development within GRSG Habitat Management Areas (PHMA, GHMA, IHMA). Under Alternative 4, the BLM would evaluate parcels identified in Expressions of Interest within GRSG habitat management areas giving preference to lands that would not result in impairing habitat suitability and proper function. Furthermore, Alternative 4 emphasizes the management of already leased areas for fluid minerals, including the application of lease stipulations, minimization measures, and compliance with NEPA. Alternative 4 would minimize impacts on water resource conditions as describes under the *Nature and Type of Effects* by promoting project designs that avoid, minimize, reduce, rectify, and mitigate for direct and indirect impacts.

Alternative 4 would direct the exclusion of PHMA for utility-scale wind and solar projects and designate IHMA as exclusion within 3.1 miles from active leks, with the remaining IHMA areas being avoidance. Avoidance areas would also be designated within 0.5 miles of PHMA/IHMA to address indirect impacts. GHMA would be avoidance for utility-scale wind/solar projects.

Under Alternative 4, PHMA/IHMA would be avoidance for major ROWs, and areas within 0.5 miles of PHMA/IHMA would also be avoidance. GHMA would be avoidance within breeding/nesting/limited-seasonal habitats, or entirely if not mapped, while designated corridors remain open. These modifications aim to protect water resource conditions and the GRSG habitat while allowing for managed development in specific areas, considering the impacts described under the *Nature and Types of Effects*.

GRSG Management

Alternative 4 would introduce specific provisions that differ from Alternative 1 regarding potential for wildfire, focusing on the impacts on water resource conditions for GRSG. That is, under Alternative 4, there would be a 3% cap within the HAF fine scale habitat selection area in PHMA. These measures under Alternative 4 aim to manage and minimize disturbance, preserve vegetation communities, and mitigate the potential for further degradation, while ensuring the conservation of water resource conditions and considering the impacts described under the *Nature and Types of Effects*.

10.15.6 Alternatives 5 and 6

Livestock Grazing Management

Under Alternatives 5 and 6, same as Alternative 1, livestock grazing would generally remain available in PHMA, IHMA, and GHMA for GRSG, except for certain RNAs in Oregon that may be partially or entirely unavailable for grazing pending final determinations. This precautionary measure aims to maintain critical GRSG habitat and associated water resource conditions in Oregon so that impacts described under the *Nature and Types of Effects* would be minimized.

In contrast to Alternative 1, Alternatives 5 and 6 introduce a targeted approach for the inclusion of thresholds and responses. Priority areas with the greatest potential to impact GRSG if suitable habitat conditions were not met would be identified for the implementation of thresholds and responses. This proactive conservation approach, compared with Alternative 1, would focus efforts on these priority areas, promoting the establishment of suitable habitat and thus minimizing impacts on water resource conditions as described under the *Nature and Type of Effects*.

Wild Horse and Burro Management

Under Alternatives 5 and 6, wild horse and burro impacts to water resources within the decision area would be similar to what is described in Alternative 1.

Management of Surface-disturbing Activities

Alternatives 5 and 6 introduce additional management actions compared with Alternative 1, specifically focusing on fluid mineral leasing and development within GRSG HMAs. The BLM would evaluate parcels identified in Expressions of Interest within GRSG habitat management areas giving preference to lands that would not result in impairing habitat suitability and proper function. Alternatives 5 and 6 would include management of areas already leased for fluid minerals, emphasizing the application of lease stipulations, minimization measures, and compliance with NEPA. Alternatives 5 and 6, compared with Alternative 1, would help minimize impacts on water resource conditions as described under the *Nature and Type of Effects* by promoting project designs that avoid, minimize, reduce, rectify, and mitigate for direct and indirect impacts, while considering site-specific considerations and project specific COAs. Moreover, Alternative 5

would expand upon the management actions in Alternative 1 to strike a balance between resource development and the conservation of GRSG habitat, connectivity, and impacts on water resource conditions.

Regarding wind and solar development, Alternatives 5 and 6 would introduce notable changes compared with Alternative 1. PHMA would be designated as avoidance for utility-scale wind and solar projects, prioritizing the protection of GRSG habitat and, in turn, reducing the impacts on water resource conditions as described under the *Nature and Type of Effects*. In contrast, GHMA would remain open for utility-scale wind and solar development, accompanied by specific minimization measures to mitigate potential impacts on water resource conditions as described under the *Nature and Type of Effects*. The designated corridors would be retained to accommodate transmission infrastructure. These modifications in Alternative 5 aim to conserve the GRSG habitat and strike a balance between renewable energy development and the preservation of water resource conditions.

Regarding major transmission ROWs, Alternatives 5 and 6 would introduce notable changes compared with Alternative 1. PHMA would be designated as avoidance for major ROWs, prioritizing the protection of GRSG habitat and, in turn, reducing the impacts on water resource conditions as described under the *Nature and Type of Effects*. In contrast, GHMA would remain open for major ROW development, accompanied by specific minimization measures to mitigate potential impacts on water resource conditions as described under the *Nature and Type of Effects*. The designated corridors would be retained to accommodate transmission infrastructure. These modifications in Alternative 5 aim to conserve the GRSG habitat and strike a balance between ROW development and the preservation of water resource conditions.

GRSG Management

Alternatives 5 and 6 would introduce provisions that slightly deviate from Alternative 1 concerning the potential for wildfire in relation to impacts on water resource conditions as described under the *Nature and Type of Effects*. That is, Alternatives 5 and 6 would entail different disturbance caps within the project analysis area of PHMA, depending on the state. In Wyoming and Montana, the cap would be set at 5%, while in other states, the cap would be 3%, limited to infrastructure only. Furthermore, a 3% cap on infrastructure would be implemented within the HAF fine scale habitat selection area in PHMA. Moreover, there would be no additional disturbance cap, but there are two scales of analysis. These measures under Alternatives 5 and 6, compared with Alternative 1, would aim to improve disturbance management, preserve vegetation communities, and mitigate potential degradation, while ensuring the conservation of water resource conditions for the GRSG across different states and specific boundaries.

10.16 CULTURAL RESOURCES

10.16.1 Methods and Assumptions

Methodology

This section focuses on qualitatively describing the impacts that would result from implementing the alternatives. Impacts are described across the entire planning area because the nature and type of impacts would not change at various levels, though they may be concentrated in different areas based on how potentially surface-disturbing and setting-altering activities and actions that increase use or access are distributed across the landscape.

Impacts on cultural resources would primarily be the product of management actions described in **Chapter 2** that result in surface disturbance or alterations in setting, and actions that result in increased resource use or access. There is overlap between them, and impacts can only be described qualitatively and generally

without site-specific project details. The types of actions that can result in these impacts are discussed in more detail in **Section 4.15.2**, Nature and Type of Effects.

Indicators

Indicators of impacts on cultural resources are as follows:

- Changes in potential for ground disturbance, including erosion and soil removal.
- Changes in potential for vandalism and collection of cultural resources through changes in access or recreation.
- Changes in potential for impacts to site setting, such as landscape fragmentation, visual disturbance, and noise.

Assumptions

This analysis is based on the assumptions in **Section 4.1.1**. and the following additional assumptions:

- The BLM will follow existing regulatory procedures for the consideration of impacts on cultural resources (for example, Section 106 of the National Historic Preservation Act or relevant program alternatives).
- Nondiscretionary mining notices are not federal undertakings, but 43 CFR 3809 specifically provides for the protection of cultural properties by prohibiting mining operators on claims of any size from knowingly disturbing or damaging these properties.
- Many more sites and resources exist in the planning area than are currently inventoried; this includes traditional cultural properties and other data sets outside existing inventoried cultural data, including but not limited to, knowledge of sites from communities in the planning area.
- Areas of high potential for cultural resource site locations have not been modeled throughout the entire planning area.
- Many sites, inventoried or not, are likely significant for regional and national history, including indigenous sites; however, they have never been evaluated for listing on the National Register of Historic Places.
- This analysis assumes all sites are eligible until evaluated, and they are subject to the impacts discussed.
- Any ground-disturbing activity would be considered a potential threat to cultural resources. Cultural sites are nonrenewable resources, adverse impacts are permanent, and beneficial impacts cannot reverse adverse impacts. Even minor impacts accrue over time, resulting in deteriorating site condition and loss of important scientific data and cultural values.
- Recreation levels and future demand in the planning area are likely to continue increasing (See Section 10.19, Recreation and Visitor Services).
- Implementing the management actions for GRSG would have mostly negligible or beneficial impacts on cultural resources. Impacts from resource use actions would tend to have negligible detrimental effects.
- Degradation of known and undiscovered cultural resources from natural processes (e.g., erosion) would continue regardless of avoidance of human caused impacts.
- Unauthorized or unplanned activities, wildland fire, dispersed recreation, natural processes and unauthorized collection, excavation, and vandalism would lead to impacts that would be difficult to monitor and mitigate. Impacts on traditional cultural properties, sacred sites, historic trails, and

some other cultural resources that are significant for reasons other than data potential would be difficult or impossible to mitigate unless the resources and associated settings were avoided.

- Traditional cultural property locations, importance, and nature of use are defined by the communities associated with them. Maintaining access to and reducing impacts on them are responsibilities of the BLM and are important objectives of cultural resource management.

10.16.2 Impacts Common to All Alternatives

Under all alternatives, the BLM would continue to adhere to the existing laws, such as the National Historic Preservation Act, and cultural resource related policy like that found in the BLM manuals and handbooks, such as Manual 8100 The Foundations for Managing Cultural Resources (BLM 2004b). This would generally act to protect culturally significant resources from impacts related to ground-disturbing activities, alterations to setting, and vandalism or unauthorized collection. It would also contribute to mitigating unavoidable impacts to cultural resources through various strategies. These might involve the collection of scientific data during cultural resource inventories or excavations, as well as in situ preservation to minimize physical disturbance and avoidance measures to guide activities away from sensitive areas. The BLM would continue to identify and manage cultural resources on a programmatic and project specific level. Additionally, continued consultation and cooperation with State Historic Preservation Offices and Native American Tribes would allow information on cultural properties and cultural landscapes to continue to be compiled and concerns regarding sensitive cultural resources such as TCPs to be addressed. This would enable better future management and protection of the integrity of these resources.

10.16.3 Alternative 1

GRSG Management

Under Alternative 1, HMAs and SFAs would be designated in GRSG habitat. In all states, a disturbance cap ranging from 3 to 5% would be implemented within PHMA. In Wyoming, a 5% cap is made at the project area scale and includes disturbance from wildfire and agriculture. In all other states (Colorado, Montana, Idaho, Nevada, California, Oregon, Utah, North Dakota, and South Dakota) a 3% cap would not include wildfire or agriculture and the cap would apply not only at the project area scale but also at the biologically significant unit scale within PHMA. In Idaho the cap could be exceeded in utility corridors if it is a benefit to GRSG.

Management related to HMAs and SFAs under Alternative 1, including disturbance caps, would protect cultural resources in these areas from disturbance related impacts to varying degrees depending on the activity and location. While this would continue to reduce potential for impacts on cultural resources in HMAs, it is likely at least some of the development related impacts would be displaced to locations outside of HMA, exposing cultural resources in other areas to greater potential for impacts.

Minerals Management

Under Alternative 1, leasing of fluid minerals would be permitted within PHMAs (and IHMAs in Idaho), with NSO) stipulations. The NSO stipulations would reduce potential for ground disturbing activities, changes to site setting, and increases in access due to development activities within PHMAs and IHMAs.

Under Alternative 1, closure of PHMA and IHMA to saleable and nonenergy mineral development (with some limited exceptions) would reduce potential within PHMAs and IHMAs for ground disturbing activities, changes to site setting, and increases in access due to development activities.

Under Alternative 1, the BLM previously recommended that all SFAs be withdrawn from location and entry under US mining laws. Recommending areas for withdrawal from location and entry under the Mining Law

of 1872 does not restrict any activities and therefore, such recommendation does not have any impacts. The Secretary proposes and makes withdrawals not through BLM land use planning but according to a separate process pursuant to section 204 of FLPMA.

Under Alternative 1 fluid, saleable, and nonenergy mineral development in GHMAs would be subject to a mixture of management measures intended to minimize impacts on GRSG including designation as open, controlled surface use, closed, or NSO within varying distance of GRSG leks. These measures would reduce potential for ground disturbing activities, changes to site setting, and increases in access to impact cultural resources within GHMAs, though not to the degree that the management described above for PHMAs and IHMAs would.

While restrictions from minerals management under Alternative 1 would reduce potential for impacts on cultural resources within HMAs and SFAs, it would also likely result in a shift of some of these activities to suitable areas outside of them where possible, increasing potential for impacts on cultural resources outside of HMAs and SFAs. Overall, restrictions from minerals management under Alternative 1 could make development more costly and difficult or prevent development that could not be relocated to a suitable area. This would continue to be generally protective of cultural resources across the planning area.

Renewable Energy Management

Under Alternative 1, PHMA would be excluded from wind energy development except in some Oregon counties where PHMA would be designated as avoidance and Wyoming, where all PHMA would be designated as avoidance or open if there would be no impact to GRSG. IHMA in Idaho would be designated as avoidance for wind energy development.

Under Alternative 1, PHMA would be excluded from solar energy development, except in Wyoming where solar energy development would not be addressed and in Oregon, where it would be designated as avoidance. IHMA would be designated as avoidance for solar energy development.

Under Alternative 1, GHMAs would be a mix of open, avoidance, and exclusion for wind and solar that would vary by state. Exclusion or avoidance of wind and solar energy development would reduce potential within these areas for ground disturbing activities, changes to site setting, and increases in access due to development.

Impacts on cultural resources from ground disturbance, alteration of setting, and increased access related to renewable energy development would be the same as those described under Nature and Type of effects. While excluding or avoiding renewable energy development within HMAs under Alternative 1 would reduce potential for impacts on cultural resources within these areas, it would likely result in a shift of these activities to suitable areas outside of HMAs, negatively impacting cultural resources outside of them. Overall, the restrictions on renewable energy development under Alternative 1 could make development more costly and difficult or prevent any uses that could not be relocated to a suitable area. This would continue to be generally protective of cultural resources across the planning area.

Lands and Realty Management

Under Alternative 1, all states would designate PHMA/IHMAs as avoidance for major and minor ROWs, except for Wyoming which would be open to minor ROWs with buffers and mitigation. This would reduce potential within designated PHMAs and IHMAs for ground disturbing activities, changes to site setting, and increases in access due to ROW development.

Under Alternative 1, GHMAs would be designated as avoidance for major ROW development in Colorado, California, Nevada, and Oregon. In Idaho and Utah GHMAs would be open to major ROWs with minimization measures, and Wyoming is open to major ROWs. All states would be open to minor ROW development with mitigation, except for Wyoming which would not require mitigation. This would reduce potential within GHMAs for ground disturbing activities, changes to site setting, and increases in access due to ROW development, though to a much lesser degree than ROW related management for PHMAs and IHMAs.

While excluding or avoiding ROW development within HMAs under Alternative 1 would continue to reduce potential for impacts on cultural resources within these areas, it would likely result in a shift of these activities to suitable areas outside of HMAs, negatively impacting cultural resources outside of them.

Livestock Grazing Management

Under Alternative 1, all PHMAs, IHMAs, and GHMAs would be available for livestock grazing except for in Oregon where some or all of RNAs would be unavailable. Livestock grazing would continue to create potential for impacts on cultural resources within these areas from ground disturbance like trampling and changes to site setting through vegetation changes.

Wild Horse and Burro Management

Under Alternative 1, in all states where wild horses and burros overlap with GRSG habitat, the BLM would continue to manage wild horse and burro populations within established AMLs and incorporate GRSG objectives into wild horse and burro management. Keeping wild horse and burro populations at established AMLs, and prioritized gathers to accommodate GRSG habitat objectives would keep wild horse and burro populations from increasing. Any reduction in AMLs from incorporation of GRSG objectives into wild horse and burro management could decrease wild horse and burro populations. Restrictions on wild horses and burros under Alternative 1 would maintain or decrease the current potential for surface disturbance and changes to site setting from wild horse and burro grazing, extending protection to cultural resources.

10.16.4 Alternative 2

GRSG Management

Under Alternative 2, the impacts on cultural resources from designating SFAs and HMAs within GRSG habitat would be similar to those described under Alternative 1, although SFAs in Utah, Wyoming, Nevada and Idaho would not be designated under Alternative 2. Under Alternative 2, the impacts on cultural resources from instituting a disturbance cap in GRSG habitat would be very similar to those described under Alternative 1, relevant differences being that in Utah the cap can be exceeded if it is a benefit to GRSG, and in Idaho the cap only applies at the BSU-scale, both of which could result in additional impacts from development beyond what would be seen under Alternative 1.

Similar to Alternative 1, management related to HMAs and SFAs under Alternative 2 would protect cultural resources in these areas from disturbance related impacts to varying degrees depending on the activity and location. The differences in GRSG management under Alternative 2 would reduce GRSG related restrictions in these areas that are protective of cultural resources.

Minerals Management

Under Alternative 2, impacts from fluid mineral management in PHMAs and GHMAs would be similar to those described for Alternative 1, except in Colorado PHMAs would not be closed to fluid mineral leasing and GHMAs would have NSO stipulations instead of closure. The increased potential for fluid mineral leasing

and associated activities in Colorado GRSG habitat from these changes would increase the potential for related impacts on cultural resources in these areas.

Under Alternative 2, impacts from saleable and nonenergy mineral management in PHMAs and GHMAs would be similar to those described for Alternative 1, except that in Idaho consideration of new free use permits would be allowed and in Nevada there would be exception criteria added to closure. The increased potential for saleable and nonenergy mineral development in Idaho and Nevada GRSG habitat would increase the potential for related impacts on cultural resources in these areas.

Under Alternative 2, the recommendation that all SFAs be withdrawn from location and entry under US mining laws (except in Montana, North Dakota, and South Dakota) would be removed. This removal would have no impact because withdrawals are initiated and considered not through land use planning but through a separate process outlined in section 204 of FLPMA. Only the Secretary may withdraw lands through a Public Land Order.

Under Alternative 2, restrictions from minerals management would reduce potential for impacts on cultural resources within HMAs and SFAs and would also likely result in a shift of some of these activities to suitable areas outside of them where possible. This would increase potential for impacts on cultural resources outside of HMAs and SFAs. Overall, restrictions from minerals management under Alternative 2 could make development more costly and difficult or prevent uses that could not be relocated to a suitable area. This would be generally protective of cultural resources across the planning area.

Renewable Energy Management

Under Alternative 2, the impacts from solar and wind energy management in PHMAs and GHMAs would be the similar to those described for Alternative 1, with some additional exception criteria added to exclusion and avoidance of HMAs in Nevada and California. These exception criteria would increase potential for ground disturbing activities, changes to site setting, and increases in access related to renewable energy development in these areas.

Lands and Realty Management

Under Alternative 2, the impacts from ROW management would be similar to those described for Alternative 1, with the addition of exception criteria for ROWs in PHMAs in Nevada. These exception criteria would increase potential for ground disturbing activities, changes to site setting, and increases in access related to ROW development in these areas.

Livestock Grazing Management

Under Alternative 2, the impacts from livestock grazing management would be similar to those described for Alternative 1. In Utah, Wyoming, and Nevada, the prioritization for review and processing of grazing permits in SFAs and PHMAs was removed; however, the BLM would still have the authority to prioritize staff time and budget to identify areas that aren't meeting land health standards and implement corrective actions in areas with the greatest GRSG habitat value.

Wild Horse and Burro Management

Under Alternative 2, the impacts from wild horse and burro management would be the same as those described for Alternative 1.

10.16.5 Alternative 3

GRSG Management

Under Alternative 3, all areas managed for GRSG would be designated PHMAs, with some states considering expanding HMA boundaries to include areas of adjacent non-habitat, unoccupied historic GRSG habitat, or areas with potential to become GRSG habitat as PHMAs. Under Alternative 3, The disturbance cap is 3%, applies at the project scale, and in accordance with the HAF (Stiver et al. 2015) Fine Scale boundaries range wide. Of note, under Alternative 3, the disturbance cap would include wildfire and agriculture as well as infrastructure, greatly increasing the amount of potential disturbance included in the disturbance calculation for those states that do not do so under Alternative 1 (all but Montana and Wyoming)

Under Alternative 3, the HMA designation scheme would create the highest acreage of PHMA, and along with the most robust version of the disturbance cap, offers the highest level of protection to cultural resources in HMAs from GRSG related restrictions among the alternatives.

Minerals Management

Under Alternative 3, closure of PHMAs to fluid minerals, saleable minerals, and nonenergy minerals related development offers the highest level of related protections to cultural resources from GRSG related restrictions among the alternatives.

Under Alternative 3, the recommendation that all PHMAs be withdrawn from location and entry under US mining laws would be made. This recommendation would have no impact on ground disturbing activities, changes to site setting, or access due to related locatable mineral development because withdrawals are initiated and considered not through land use planning but through a separate process outlined in section 204 of FLPMA. Only the Secretary may withdraw lands through a Public Land Order.

Renewable Energy Management

Under Alternative 3, impacts on cultural resources from ground disturbance, alteration of setting, and increased access related to renewable energy development would be the same as those described under Nature and Type of effects. Only PHMA would be designated under Alternative 3, and all designated PHMA would be excluded from solar and wind energy development without exceptions. These exclusions would decrease potential in designated HMAs for ground disturbing activities, changes to site setting, and increases in access due to solar and wind energy related development the most among alternatives.

Lands and Realty Management

Under Alternative 3, PHMA would be excluded from ROW development outside of designated corridors. These exclusions would decrease potential for ground disturbing activities, changes to site setting, and increases in access due to ROW related development inside PHMAs, and would designate the most acreage of PHMA among alternatives. However, the exclusion of ROW development in PHMAs could lead to creation of longer ROW routes to get around closed areas. Longer ROW routes would increase potential for ground disturbing activities, changes to site setting, and increases in access outside of PHMAs.

Livestock Grazing Management

The management of PHMA as unavailable for livestock grazing would cause the greatest decrease in potential for related impacts on cultural resources among alternatives. However, removal of all grazing could reduce the removal of fine fuels across the landscape, making the decision area potentially at higher risk of a large-scale wildfire that could damage or destroy cultural resources located at or near the surface.

Wild Horse and Burro Management

The removal of wild horses and burros would decrease the potential for related impacts on cultural resources within PHMAs the most among alternatives.

10.16.6 Alternative 4

GRSG Management

Under Alternative 4, the BLM would consider adjustments to HMA boundaries from the 2015 and 2019 amendments based on new information such as updated science and mapping that could result in expansion of HMAs, removal of current HMA designation, or re-categorization of HMAs. Under Alternative 4, the impacts on cultural resources from designating HMAs within GRSG habitat would likely be similar to those described under Alternative 1, although SFAs would not be designated under Alternative 4.

Under Alternative 4, the disturbance cap in PHMA (and IHMA in Idaho) for all states would be 3% for new and pre-existing authorizations at the project scale and also within HAF fine scale habitat selection area, and would apply only to infrastructure (not to wildfire or agriculture). Impacts from the disturbance cap as instituted under Alternative 4 would be similar to those under Alternative 1.

Minerals Management

Similar to Alternative 1, under Alternative 4 fluid mineral leasing management would seek to minimize impacts on GRSG through reduction of habitat fragmentation and loss, which would be generally protective of cultural resources in GRSG habitat. Under Alternative 4 a greater number of waivers, exceptions, and modifications for fluid minerals leasing applied across a larger portion of the planning area could enable a greater degree of development in HMAs than would be seen under Alternative 1, leading to increased potential for impacts on cultural resources related to mineral development, as described in *Nature and Type of Effects*.

Renewable Energy Management

Under Alternative 4, PHMA would be managed as exclusion for utility scale wind and solar development while IHMA would be managed as exclusion for utility scale wind and solar development within 3.1 miles of active leks, with the rest of IHMA managed as avoidance. Unique to Alternative 4, all areas within 0.5 miles of PHMA or IHMA would be managed as avoidance for utility scale wind and solar development. Under Alternative 4, the overall impacts on cultural resources from managing HMAs as exclusion and avoidance areas for wind and solar energy development would be similar to those described for Alternative 3.

Lands and Realty Management

Under Alternative 4, PHMA and IHMA as well as a 0.5 mile buffer around them would be designated as avoidance for major transmission ROWs. GHMA would also contain at least some areas designated as ROW avoidance, depending on habitat mapping at the state level. Despite the addition of a 0.5-mile ROW avoidance buffer on PHMA and IHMA, the lack of major ROW exclusions under Alternative 4 could result in shorter ROWs, reducing the overall acreage where cultural resources would potentially be impacted across the planning area compared to Alternative 1.

Livestock Grazing Management

Impacts from livestock grazing management would be the same as described under Alternative 1.

Wild Horse and Burro Management

Impacts from wild horse and burro management would be the same as described under Alternative 1.

10.16.7 Alternative 5

GRSG Management

Under Alternative 5, the BLM would consider adjustments to HMA boundaries from the 2015 and 2019 amendments based on new information such as updated science and mapping that could result in expansion of HMAs, removal of current HMA designation, or re-categorization of HMAs. Under Alternative 5, the impacts on cultural resources from designating HMAs within GRSG habitat would likely be similar to those described under Alternative 1, although SFAs would not be designated under Alternative 5.

Under Alternative 5, the disturbance cap in PHMA (and IHMA in Idaho) for all states would be 3% for new and pre-existing authorizations within HAF fine scale habitat selection area, and would apply only to infrastructure (not to wildfire or agriculture). In Wyoming and Montana, a 5% cap is made in PHMA at the project scale and includes disturbance from wildfire and agriculture. In all other states (Colorado, Montana, Idaho, Nevada, California, Oregon, Utah, North Dakota, and South Dakota) a 3% cap at the project scale would not include wildfire or agriculture related disturbance. Impacts on cultural resources from the disturbance cap as instituted under Alternative 4 would be similar to those under Alternative 1.

Minerals Management

Under Alternative 5, impacts on cultural resources from fluid mineral management would be similar to those described under Alternative 4. The management of fewer acres as NSO under Alternative 5 could make some cultural resources more susceptible to impacts from fluid mineral exploration and development as described in the *Nature and Type of Effects*.

Renewable Energy Management

Under Alternative 5, Impacts on cultural resources related to renewable energy development would be the same as those described under Nature and Type of Effects. Under Alternative 5, PHMA and IHMA would be managed as avoidance for utility scale wind and solar development while GHMA would be open to it. Impacts on cultural resources within HMAs would be greater than under Alternative 1 due to the lack of HMA designated as solar and wind energy exclusion areas, however overall likelihood of these impacts within the planning area are likely to be the similar to that under Alternative 1, since impacts on cultural resources due to renewable energy development may only be displaced instead of avoided entirely.

Lands and Realty Management

Under Alternative 5, impacts on cultural resources related to ROW avoidance would be the same as those described under Nature and Type of effects. The designation of GHMA as open to major ROWs and lack of major ROW exclusions under Alternative 5 could result in shorter ROWs compared to management under all the other alternatives, since all other alternatives include greater ROW avoidance or exclusion designations. Shorter ROWS would reduce the overall area where cultural resources could potentially be impacted by ROWs across the planning area compared to all other alternatives.

Livestock Grazing Management

Under Alternative 5, the impacts from livestock grazing management would be the same as those described for Alternative 1.

Wild Horse and Burro Management

Impacts from wild horse and burro management under Alternative 5 would be the same as those described for Alternative 1.

10.16.8 Alternative 6

Impacts on cultural resources under Alternative 6 would be similar to impacts under Alternative 5 except for the designation of ACECs. ACECs designated for the benefit of GRSG under Alternative 6 would have greater restrictions on mineral exploration, including fluid minerals, nonenergy minerals, saleable minerals and mineral materials as well as development of major ROWs, wind and solar within the ACECs, which would be protective of cultural resources inside these areas. The overall likelihood of impacts on cultural resources from various types of development within the planning area would be similar to that under Alternative 5 since impacts on cultural resources may only be displaced outside of ACECs instead of avoided entirely.

10.17 TRIBAL INTERESTS

10.17.1 Methods and Assumptions

Indicators

The use of indicators in NEPA analysis should provide information on determining the extent or degree to which a tribal interest, resource, or setting is damaged, its physical integrity is lost, or its physical integrity is otherwise adversely affected by a proposed action. However, unlike cultural resources, which have legal criteria for determining the impacts, the impacts on areas or resources of tribal interest and the severity of impacts are dependent upon the perspective and context of the tribe or affected group. In other words, significant impacts would be determined by Indian tribes defining what is culturally or spiritually important to them. When assessing whether the action would have significant impact, the following level-of-effect indicators are carefully considered and consulted upon with tribal representatives:

- Magnitude: The amount of physical alteration or destruction that can be expected. The resultant loss of tribal value is not measurable in quantitative terms, but is described in qualitative summary.
- Severity: The irreversibility of an impact. Impacts that result in an irreversible and irretrievable loss of value are of the highest severity.
- Duration: The length of time an impact persists. Impacts may have short-term or temporary effects, or conversely, more persistent, long-term effects on tribal values.
- Range: The spatial distribution, whether widespread or site-specific, of an impact.
- Frequency: The number of times an impact can be expected. For example, an impact of variable magnitude and severity may occur only once. An impact such as that resulting from annual activities, such as road maintenance, may be of recurring or ongoing nature.

Assumptions

In addition to the assumptions in **Section 4.1.1**. this analysis includes the following assumptions:

- Native Americans or other traditional communities may have concerns about federal impacts on cultural resources, religious practices, or natural resource gathering that may occur because of federal actions. In cases where these concerns may be present, consultation would occur with the potentially affected Indian tribes.
- There may be areas of importance to contemporary Native Americans that are not readily identifiable outside of those communities.
- Consultation would continue with Indian tribes to identify any traditional cultural properties or resource uses and address impacts. Through this process, effects would be minimized or eliminated, although residual effects would be possible.

10.17.2 Impacts Common to All Alternatives

Under all alternatives the BLM would continue to manage BLM-administered lands in a manner that accommodates Native American religious traditions, practices, and beliefs as guided by directives contained in the BLM Manual 1780, BLM Handbook 1780-1, American Indian Religious Freedom Act (42 USC 1996), Native American Graves Protection and Repatriation Act (25 USC 3001), Executive Order 13007 (Indian Sacred Sites), and Executive Order 13084 (Tribal Consultation), Secretarial Order 3317, DOI Policy on Consultation with Indian Tribes (December 1, 2011), and Joint Secretarial Order 3403, on Fulfilling the Trust Responsibility to Indian Tribes in the Stewardship of Federal Lands and Waters (November 21, 2022). All alternatives allow for the appropriate tribal governments to consult on a case-by-case basis on undertakings on BLM-administered lands that could affect Native American concerns. The BLM would continue to identify, protect, and preserve tribal assets, treaty rights, sacred/religious sites, or special use areas through site- and project-specific modification or mitigation on a case-by-case or project-by-project consultation basis that could affect Native American concerns.

Under all alternatives, actions that provide protections for GRSG or its habitat by limiting access into areas or excluding surface-disturbing activities, such as NSO and restrictions on surface and vehicle use would protect cultural resources from effects due to surface disturbance, erosion, effects on setting and access leading to vandalism, inadvertent damage, and unauthorized collection of cultural resources. These actions could also increase tribal opportunities to maintain specific traditional practices and values such as traditional plant gathering, hunting animals including GRSG, and the role played by GRSG in oral traditions and cultural practices such as observing lekking behavior as described in the Nevada and Northeastern California Greater Sage-Grouse Proposed Land Use Plan Amendment and Final Environmental Impact Statement (BLM 2015) if the current leasing of nonenergy minerals has led to decreases in GRSG populations.

10.17.3 Alternative 1

GRSG Management

Under Alternative 1, GRSG habitat would be separated into SFAs, PHMAs, IHMAs, and GHMAs. Restrictions to land use and surface-disturbing activities would occur within each HMA and SFA, depending on the classification. Corresponding management actions, including lek buffers, required design features, fluid mineral leasing prioritization, and habitat objectives, would provide a hierarchy of potential conditions to minimize effects in HMAs which could stabilize or increase GRSG populations in the future. These management goals and objectives could lead to increased opportunities for tribes to maintain traditional cultural practices and values, such as observing lekking behavior. However, use of Sagebrush Focal Areas (SFAs) and sagebrush-dominated vegetation areas in HMAs to the restrict development has the potential to push development into other vegetation regimes where cultural resources and areas of tribal interest may also exist. For example, in northwest Colorado, there are known concentrations of archaeological resources in pinyon-juniper vegetation areas that could face increased potential for impacts if ground-disturbing activities are directed into those areas when sagebrush-dominated areas are more restrictive. In Nevada and California, tribes have expressed concern for access to traditional pine nutting areas that could be similarly impacted if development is pushed to other vegetative areas in preference for SFA conservation. However, project-specific Section 106 compliance and tribal consultation should mitigate the effects of development on BLM-administered lands outside of sagebrush-dominated areas.

Lands and Realty Management

Under Alternative 1, the BLM would manage and minimize effects of land use actions on PHMA and GHMA; however, it would allow for corridors and ROWs that result in a net conservation gain for GRSG. Tribes would be able to maintain traditional practices by accessing pine nutting areas and observing lekking behavior.

Restricting new development and land use authorizations near leks would likely maintain traditional tribal cultural practices and values. Cultural resources important to tribes could be impacted by the development of transmission lines within new and existing utility corridors, specifically surface disturbances from construction of poles, roads, and ancillary features, and visual impacts to the setting.

All states would have a 3% disturbance cap applied to land use activities other than wildfire and agriculture, except MT and WY, which would have a 5% cap that would include wildfire and agriculture. The 3% cap would be calculated at both the BSU-scale and at proposed project analysis area within PHMA, though in ID, the cap could be exceeded in utility corridors. Including caps at both project and BSU scales in the 3% states would reduce disturbance on both the local and landscape scales, therefore, provide protection for resources of tribal interest. A higher disturbance cap in MT and WY calculated at only the project-scale could lead to greater levels of disturbance within a project area, and therefore greater potential direct disturbances to tribally-important resources and the potential for greater cumulative disturbances across multiple projects.

Renewable Energy development is excluded in PHMAs in all states except WY where PHMAs are avoidance or open if there is no impact to GRSG. IHMAs and certain areas in OR would use GRSG avoidance rather than exclusion. GHMAs would be a mix of open, avoidance, and exclusion for wind and solar by state. Allowing renewable energy development within certain GRSG core habitat areas could adversely impact cultural resources and access for tribal cultural practices in those areas.

Minerals Management

Leasing of fluid minerals would be allowed in PHMAs and ID IHMAs, subject to NSO stipulations and/or seasonal restrictions. Allowing fluid mineral leasing would create surface disturbance that could impact cultural resources important to tribes in those areas. However, NSO stipulations on new leases would protect PHMAs from surface-disturbing activities, which could protect cultural resources and increase the opportunities for tribes to participate in traditional cultural practices, if the NSO stipulations were to increase or stabilize GRSG populations.

Closing PHMA to saleable and nonenergy minerals would protect cultural resources important to tribes and increase the opportunities for tribes to participate in traditional cultural practices if the closures were to increase or stabilize GRSG populations.

Livestock Grazing

Management of livestock grazing in PHMA and GHMA could decrease tribal opportunities to maintain specific traditional practices and values such as observing lekking behavior if those current management practices have led to decreases in GRSG populations.

Wild Horse and Burro Management

Management of wild horses and burros in PHMA and GHMA could decrease tribal opportunities to maintain specific traditional practices and values such as observing lekking behavior if those current management practices have led to decreases in GRSG populations.

10.17.4 Alternative 2

GRSG Management

Impacts from designating GRSG habitat as SFAs, PHMAs, IHMAs, and GHMAs would be similar as to those described for Alternative 1. However, some SFAs would be removed in UT, WY, NV, and ID. Removing SFAs in UT, WY, NV, and ID would reduce protections to GRSG and habitat, which could lead to decreased

opportunities for tribes to maintain traditional cultural practices and values, such as observing lekking behavior.

Lands and Realty Management

Impacts from ROW management would be the same as described for Alternative 1 (with additional exception criteria in NV/CA). The additional exception criteria for ROW and renewable energy in NV/CA could increase the potential for impacts to cultural resources and traditional uses from surface-disturbing activities, though the criteria would likely avoid impacts to GRSG. Impacts from disturbance caps at 3%, and 5% in MT and WY, would be similar to Alternative, though the caps could be exceeded in both ID and UT under certain conditions which could pose a higher risk of potential impacts to resources of tribal interest in those states.

Minerals Management

Impacts from fluid mineral management in PHMAs and GHMAs would be the same as described for Alternative 1, except in CO PHMAs would have no closed areas and CO GHMAs would have NSO in place of closed areas. The exposure of areas in CO to fluid mineral leasing could increase the risk of potential impacts to cultural resources and decrease opportunities for tribes to maintain traditional cultural practices and values in areas where fluid mineral leasing occurs.

Impacts from saleable and nonenergy mineral management in PHMAs and GHMAs would be the same as described for Alternative 1, except in ID IHMAs where new free use permits for saleable minerals would be considered and NV PHMAs would include exception criteria to closure for both saleable and nonenergy minerals. These actions could expose cultural resources to increased risk of potential impacts from surface-disturbing activities and decrease opportunities for tribes to maintain traditional cultural practices and values.

Removing the recommendation for withdrawal of the SFAs from location and entry under the Mining Law of 1872 in all states (except in MT/DK, which did not have a 2019 amendment) would have no impact on how surface-disturbing activities would impact cultural resources and would not impact GRSG disturbance and habitat alterations/degradation, nor would it impact opportunities for tribes to maintain traditional cultural practices and values. The Secretary proposes and makes withdrawals not through BLM land use planning but according to a separate process pursuant to section 204 of FLPMA.

Livestock Grazing Management

Impacts from domestic livestock grazing management would be the same as described for Alternative 1. In UT, WY, and NV, the prioritization for review and processing of grazing permits was removed; however, the BLM would still have the authority to prioritize staff time and budget to identify areas that aren't meeting land health standards and implement corrective actions in areas with the greatest GRSG habitat value.

Wild Horse and Burro Management

Impacts from wild horse and burro management would be the same as described for Alternative 1.

10.17.5 Alternative 3

GRSG Management

Under Alternative 3, the highest level of conservation for GRSG would be adopted with all areas managed for GRSG as PHMAs and establish management goals and objectives for specific resources in PHMA that could stabilize or increase GRSG populations in the future. If successful, these management goals and objectives could lead to increased opportunities for tribes to maintain traditional cultural practices and values such as observing lekking behavior.

Lands and Realty Management

New development would be substantially limited compared with Alternatives 1 and 2. All PHMAs would be excluded from new ROW authorizations. New linear ROWs would be allowed only in designated corridors. The potential for habitat degradation and fragmentation within the PHMAs would be reduced and this would result in increased opportunities for tribes to maintain traditional practices as well as increase protection of cultural resources important to tribes in those areas from surface-disturbing activities by reducing travel and access, which in, turn could reduce vandalism and collection. However, the inability to site ROWs in PHMAs could lead to longer ROW routes in order to bypass closed areas. Longer routes would increase surface disturbance and other impacts of ROW siting, resulting in more areas that would be exposed to ground disturbance, erosion, and impacts from increased access outside of PHMAs. A 3% disturbance cap would be applied to pre-existing land-use authorization including wildfire and agriculture at multiple scales and with now exceptions, offering a higher level of protection to resources of tribal interest than alternatives 1 and 2.

Under Alternative 3, PHMAs in all states would be ROW exclusion areas for wind and solar energy development. Alternative 3 would offer more protection from renewable energy development than under Alternatives 1 and 2 because more areas would be excluded from renewable energy development with no exceptions. Excluding wind energy development in GRSG priority and general habitat areas would reduce surface disturbance and visual impacts to cultural resources important to tribes in those areas as well as preserving opportunities for tribes to maintain traditional cultural practices.

Minerals Management

Closing PHMAs in all states to fluid mineral leasing, saleable minerals, and nonenergy minerals would reduce potential for impacts to GRSG and habitat to a greater extent than Alternatives 1 and 2. This is because areas closed to leasing could not be developed at any point. Closing PHMAs to mineral leasing and development would protect cultural resources important to tribes from surface-disturbing activities as well as subsurface activities (e.g., directional drilling). GRSG would not be exposed to disruption that is often associated with the noise and human activity that accompanies construction, development, or production activities, preserving opportunities for tribes to maintain traditional cultural practices.

Recommending PHMAs for withdrawal from location and entry under the US mining laws would have no impact on tribal opportunities to practice traditional cultural behavior and values such as observing lekking behavior if this management strategy stabilizes or increases GRSG populations. The Secretary proposes and makes withdrawals not through BLM land use planning but according to a separate process pursuant to section 204 of FLPMA.

Livestock Grazing Management

Under Alternative 3, all PHMA would be unavailable for domestic livestock grazing that would increase opportunities for tribes to maintain traditional practices, such as observing lekking behavior, if this grazing strategy stabilizes or increases future GRSG populations. Prohibiting livestock grazing within GRSG priority habitat could also protect cultural resources important to tribes in these areas from damage by livestock trampling. However, removal of all grazing could reduce the removal of fine fuels across the landscape, making the decision area potentially at higher risk of a large-scale wildfire that could damage or destroy tribal interests. Additionally, this alternative may decrease economic revenue to tribes holding grazing permits if their current AUMs are reduced.

Wild Horse and Burro Management

Removing wild horses and burros in those PHMAs with existing herd management areas in all states would increase habitat quality for wildlife, including GRSG, as described in **Section 4.2**. This increase in GRSG habitat quality would increase opportunities for tribes to maintain traditional practices.

10.17.6 Alternative 4

GRSG Management

Under Alternative 4, the BLM would consider adjustments to HMA boundaries from the 2015 and 2019 amendments based on new information such as updated science and mapping that could result in expansion of HMAs, removal of areas currently in HMA, or re-categorization of HMA prioritization. Impacts to resources of tribal interest from HMA designations under Alternative 4 are expected to be similar to alternatives 1 and 2.

Lands and Realty Management

Under Alternative 4, impacts from managing PHMAs in all states and ID IHMAs as ROW avoidance areas would be similar to those described for Alternative 1.

Impacts from applying a 3% disturbance cap under Alternative 4 would be similar as to those described for Alternative 3, however, the cap would apply to both existing and proposed infrastructure authorizations and wildfire and agriculture would not be included in the disturbance calculation. As a result, the level of possible disturbance to resources of tribal interest from other sources (energy development, roads, RPWs, etc.) would be relatively higher than if wildfire and agriculture were included in the disturbance calculation.

Impacts from managing PHMAs in all states as ROW exclusion areas for utility-scale wind and solar energy development would be similar to those described for Alternative 3. Unique to Alternative 4, all areas within 0.5 miles of PHMA or IHMA would be managed as avoidance for utility scale wind and solar development. However, since PHMAs would apply to a smaller area under this alternative, the extent of protection from disturbance associated with from renewable energy development would be less.

Minerals Management

Under Alternative 4, fluid mineral leasing management would seek to minimize impacts on GRSG through reduction of habitat fragmentation and loss, which would be generally protective of cultural resources and other tribal interests in GRSG habitat. Under Alternative 4 a greater number of waivers, exceptions, and modifications for fluid minerals leasing applied across a larger portion of the planning area could enable a greater degree of development in HMAs than would be seen under Alternative 1.

Livestock Grazing Management

Impacts under Alternative 4 would be the same as those described under Alternative 1.

Wild Horse and Burro Management

Impacts under Alternative 4 would be the same as those described under Alternative 1.

10.17.7 Alternative 5

GRSG Management

Under Alternative 5, impacts to tribal interests would be similar to Alternative 4 with the additional consideration of adjustments to HMAs to balance multi-use opportunities, which has the potential to produce impacts on tribal interests since HMAs would cover a smaller area under Alternative 5.

Lands and Realty Management

Under Alternative 5, impacts from managing PHMAs in all states and ID IHMAs as ROW avoidance areas and applying minimization measures where major ROWs cannot be avoided would be similar to those described for Alternative 4. GHMA would be open to major ROW development with minimization measures of managing the severity of a project impact at a specific location. Potential impacts on areas of tribal interest would be similar to those as described under Alternative 4, but greater in magnitude due to GHMA being managed as open to major ROW development.

Impacts from applying a 3% disturbance cap under Alternative 5 would be the same as described for Alternative 4, except in WY and MT that would have a 5% disturbance cap at the project scale. Impacts from exceeding the 3% disturbance cap under certain conditions would be similar to those described for Alternative 4, but more exceptions would be allowed, which may result in increased development and potential disturbance to resources of tribal interest.

Minerals Management

Under Alternative 5, impacts on areas of tribal interest from fluid mineral management would be identical to those described under Alternative 4.

Livestock Grazing Management

Impacts under Alternative 5 would be the same as those described under Alternative 1.

Wild Horse and Burro Management

Impacts from wild horse and burro management under Alternative 5 would be similar to those described for Alternative 1. Management within established AMLs could increase in GRSG habitat quality, which could increase opportunities for tribes to maintain traditional practices in some areas.

10.17.8 Alternative 6

Impacts on areas of tribal interest under Alternative 6 would be similar to impacts under Alternative 5 except for the designation of ACECs. ACECs designated for the benefit of GRSG under Alternative 6 would have greater restrictions on mineral exploration, including fluid minerals, nonenergy minerals, saleable minerals and mineral materials as well as development of major ROWs, wind and solar within the ACECs, which would lessen the potential for impacts to areas of cultural interests in these areas.

10.18 LANDS WITH WILDERNESS CHARACTERISTICS

10.18.1 Methods and Assumptions

Indicators

Any change in the existing conditions of lands with wilderness characteristics is an indicator of impacts to the inventoried characteristics. Changes in existing conditions could be positive or negative, such as, impacts affecting preservation or degradation of inventoried characteristics. The types of actions that can result in these impacts are discussed in more detail in **Section 4.18.1**, Nature and Type of Effects.

Indicators of inventoried wilderness characteristics are as follows:

- Size—Projects or management actions that bisect a lands with wilderness characteristics unit so that there are no longer 5,000 acres or more of contiguous BLM lands would change the boundary of the unit and cause the unit to not meet the size requirements. Examples include issuing rights of way and/or constructing or improving roads that would create a wilderness inventory boundary and potentially reduce the size of lands with wilderness characteristics inventoried units.

- Naturalness—Impacts would result from new or a lack of human developments, surface disturbances, or vegetation manipulations that make the area appear to the casual visitor as more or less affected primarily by the forces of nature.
- Outstanding opportunities for solitude or a primitive, unconfined type of recreation—Indicators of impacts that may influence a visitor's solitude include distance between areas of frequent visitation, vegetative screening around the proposed action, topography of the area around the proposed action, attraction of significant additional public visitation, and the ability of visitors to avoid the proposed action and find seclusion in other parts of the inventoried unit. Indicators of impacts that may influence a visitor's opportunity for primitive and unconfined recreation include impairment to the qualities of the primitive and unconfined recreation opportunities to the degree that they would no longer be outstanding. Some examples of primitive and unconfined types of recreation include: hiking, backpacking, fishing, hunting, spelunking, horseback riding, climbing, river running, cross-country skiing, snowshoeing, dog sledding, photography, bird watching, canoeing, kayaking, sailing, and sightseeing for botanical, zoological, or geological features.

Assumptions

The analysis includes the following assumptions:

- All units identified as possessing wilderness characteristics were determined by the BLM to meet the inventory criteria outlined in the BLM Manual 6310 (i.e., size, apparent naturalness, and contain outstanding opportunities for solitude or a primitive and unconfined type of recreation).
- All wilderness characteristics inventories will be maintained and will be updated whenever actions are proposed that could impact BLM-administered lands determined to possess wilderness characteristics.
- The BLM can choose to manage lands with wilderness characters for multiple use rather than the preservation of wilderness character. This analysis addresses the impacts on wilderness characteristics.

10.18.2 Alternative 1

Under Alternative 1, fluid minerals would be managed within PHMA and IHMA as open with an NSO stipulation in most states with the exception that PHMA in Colorado would be closed to fluid mineral leasing within 1 mile of leks. Fluid mineral leasing in PHMA within Wyoming and Montana would also be subject to density and disturbance limits. Fluid mineral leasing within GHMA would be managed as closed within one mile of leks in Colorado and Oregon. Fluid minerals would be managed with an NSO stipulation in GHMA with varying distances from leks depending on the state. Fluid minerals would also be managed within GHMA as controlled surface use in California, Idaho, Nevada, Oregon, and Wyoming. Areas open to fluid minerals leasing and development would not provide protection to wilderness characteristics because development and infrastructure related to those actions would impact wilderness characteristics as discussed above under *Nature and Type of Effects*.

PHMA and IHMA would be managed as closed to saleable minerals in most states and closed to new development of nonenergy leasable minerals. These closures would protect the naturalness of the lands with wilderness characteristics. Lands in GHMA would have minimization measures for saleable mineral and nonenergy leasable mineral development, which would minimize impacts, but would not prevent impacts from saleable mineral development on lands with wilderness characteristics.

SFAs were recommended for withdrawal from mineral location and entry within PHMA. Recommending areas for closure to the mining laws for locatable exploration or development does not restrict any activities and therefore, such recommendation does not have any impacts. The Secretary proposes and makes withdrawals not through BLM land use planning but according to a separate process pursuant to section 204 of FLPMA. Where lands with wilderness characteristics intersect with the areas open for mineral development, there is no certainty for protection of these wilderness characteristics.

PHMA and IHMA would be managed as ROW avoidance areas for major and minor ROWs. However, Wyoming would be open to ROWs with buffers and mitigation. Major ROW development within GHMA would vary by state. For minor ROWs, GHMA would remain open to ROW development with mitigation for all states, except for Wyoming, which does not require mitigation. ROW activities and associated development can reduce the size of lands with wilderness characteristics and can impair the apparent naturalness of the area and the experience of solitude, as described above under *Nature and Type of Effects*. Due to screening criteria, conditions for development, and required mitigation, applicants may find it easier to site their development outside of GRSG habitat, thereby leading to some additional protection of lands with wilderness characteristics within GRSG habitat.

Livestock grazing would be available in GRSG HMAs, except in Oregon where all or portions of 13 key RNAs would be unavailable. Impacts to wilderness characteristics would be the same as those described under *Nature and Type of Effects*.

10.18.3 Alternative 2

Under Alternative 2, impacts from management of fluid minerals on lands with wilderness characteristics would be similar as those described under Alternative 1. However, under Alternative 2, PHMA and GHMA within Colorado would not be managed as closed to fluid minerals, rather these areas would be managed as NSO within 1 mile of leks which would effectively provide the same protection to wilderness characteristics due to the lack of surface disturbance with this type of development.

Impacts from saleable minerals on lands with wilderness characteristics within PHMA and IHMA would be similar as those described under Alternative 1. However, under Alternative 2, Idaho would allow for consideration of new free use permits and Nevada would have exception criteria to the closed areas. Compared with Alternative 1, the free use permits, and exception criteria would allow for more impacts on lands with wilderness characteristics within PHMA and IHMA due to more areas allowing this surface disturbing activity. Impacts from saleable minerals and nonenergy minerals on lands with wilderness characteristics within GHMA would be the same as those described under Alternative 1.

The BLM would not recommend lands for withdrawal from locatable mineral entry within GHMA or PHMA. Recommending areas for closure to the mining laws for locatable exploration or development does not restrict any activities and therefore, such recommendation does not have any impacts. The Secretary proposes and makes withdrawals not through BLM land use planning but according to a separate process pursuant to section 204 of FLPMA. Where lands with wilderness characteristics intersect with the areas open for mineral development, impacts in these areas would be greater under this alternative compared with Alternative 1 due to no certainty for protection of wilderness characteristics.

PHMA would be managed similar to Alternative 1 for ROWs, except Nevada would have added exception criteria added which could allow for more impacts to wilderness characteristics under this alternative as described under *Nature and Type of Effects*. Impacts from ROWs on lands with wilderness characteristics would be the same as those described under Alternative 1 for GHMA.

Impacts from livestock grazing on lands with wilderness characteristics would be the same as those described under Alternative 1. In Oregon, livestock grazing would be available in all or portions of 13 key RNAs.

10.18.4 Alternative 3

Under Alternative 3, PHMA would be closed to fluid mineral leasing, saleable minerals, nonenergy leasable minerals, and recommended for withdrawal from locatable mineral entry providing the most protection from impacts described under *Nature and Type of Effects* to lands with wilderness characteristics than under any other alternative. However, a recommendation for withdrawal provides no protection to habitat. Withdrawals are initiated and considered not through land use planning but through a separate process outlined in section 204 of FLPMA.

PHMA would be managed as ROW exclusion areas which would result in the most protection of lands with wilderness characteristics compared to all other alternatives. ROW activities and associated development can reduce the size of lands with wilderness characteristics and can impair the apparent naturalness of the area and the experience of solitude, as described under *Nature and Type of Effects*. Precluding these types of activities would help protect wilderness characteristics.

Livestock grazing would be unavailable in PHMA which would result in the most indirect protection of lands with wilderness characteristics of all the other alternatives because lands with wilderness characteristics would not be subject to the types of impacts from livestock grazing that could reduce naturalness. In Oregon, key RNAs within PHMA would be unavailable for grazing with the same direct and indirect impacts as described under *Nature and Type of Effects*. However, removal of all grazing could reduce the removal of fine fuels across the landscape, making the decision area potentially at higher risk of a large-scale wildfire that could damage wilderness characteristics.

Management actions under Alternative 3 would have the overall greatest potential to maintain wilderness characteristics on lands with wilderness characteristics within PHMA when compared to all other alternatives. However, these management actions could lead to a buildup of fuels and increase the risk of wildfire. Wildfire would make affected areas less desirable for primitive recreation.

10.18.5 Alternative 4

Under Alternative 4, no changes to mineral resource use allocations would be made, but fluid mineral leasing would be managed to minimize potential for conflict and associated impacts from subsequent development in important habitats or connectivity areas. The evaluation of parcels and the consideration of development proximity, habitat significance, and potential would contribute to the preservation of naturalness in lands with wilderness characteristics as described under *Nature and Types of Effects.*

PHMA and IHMA would be managed as avoidance areas for major ROWs under this alternative. All areas within 0.5 miles of PHMA and IHMA would be managed as avoidance areas for ROWs to address indirect impacts to adjacent PHMA and IHMA. GHMA would be managed as avoidance areas within breeding, nesting, and limited-seasonal habitats where mapped. Impacts on lands with wilderness characteristics would be similar to those as described under Alternative 1, but lesser in magnitude due to the additional areas adjacent to HMAs being managed as avoidance areas for ROWs.

All GRSG HMAs would be available for livestock grazing, except in Oregon, where all or portions of 13 key RNAs would be unavailable. Livestock grazing would be managed toward meeting land health standards, which are informed by GRSG habitat objectives for Special Status Species. This alternative does not provide additional protections to lands with wilderness characteristics, as these lands were designated under existing

livestock grazing management. The purpose of livestock grazing is not to provide protection to lands with wilderness characteristics, and land health standards already exist under 43 CFR 4100, independent of such designations. New range improvement projects would be designed to enhance livestock distribution, and new structural range improvements would be placed in a way that minimizes impacts on GRSG and their habitat. This would limit the impacts on lands with wilderness characteristics from new range improvement projects as described under *Nature and Type of Effects*.

10.18.6 Alternative 5

Under Alternative 5, impacts from mineral resource use allocations on lands with wilderness characteristics would be the same as those described under Alternative 4.

PHMA and IHMA would be managed as avoidance areas for major ROWs under this alternative, but GHMA would be open to major ROW development with minimization measures of managing the severity of a project impact at a specific location. Impacts on lands with wilderness characteristics would be similar to those as described under Alternative 4, but greater in magnitude due to GHMA being managed as open to major ROW development.

Impacts from livestock grazing on lands with wilderness characteristics would be the same as those described under Alternative 4.

10.18.7 Alternative 6

Where lands maintained for wilderness characteristics overlap ACECs, management of these other areas could also indirectly protect wilderness characteristics due to the protective measures proposed for the other areas. These protective measures would include complementary management objectives, where lands with wilderness characteristics would be managed to protect them. This could offer some indirect protection of wilderness characteristics for units managed primarily for other resource considerations.

Under Alternative 6, ACECs would be open to fluid mineral leasing subject to NSO stipulations. Where ACECs overlap inventoried areas found to possess wilderness characteristics, impacts to the indicators of lands with wilderness characteristics would occur due to the surface disturbance and facility development associated with locatable and fluid mineral development. Closure of ACECs to new nonenergy minerals and saleable minerals operations would protect overlapping lands with wilderness characteristics from this type of surface disturbing development.

Management of ACECs as ROW exclusion areas would result in the protection of overlapping lands with wilderness characteristics. ROW activities and associated development can reduce the size of lands with wilderness characteristics and can impair the apparent naturalness of the area and the experience of solitude, as described under *Nature and Type of Effects*. Precluding these types of activities would help protect wilderness characteristics.

10.19 Recreation and Visitor Services

10.19.1 Methods and Assumptions

Methodology

This discussion analyzes the impacts that proposed management decisions would have on managing recreation, recreation opportunities, and the SRP program. Visitor use patterns are difficult to estimate and depend on many factors beyond the scope of management (e.g., recreation trends and economy). For this reason, qualitative language—for example, "increase" or "decrease"—is used to describe anticipated

impacts. For information on qualitative socioeconomic impacts on recreation, refer to **Section 4.11**, Social and Economic Conditions (Including Environmental Justice).

Indicators

Indicators of impacts on recreation resources are as follows:

- Change in the types of recreation activities, experiences, and benefits in the decision area
- Restrictions on the number and type of SRPs issued on an annual basis within the decision area

Assumptions

This analysis includes the following assumptions:

- Recreational OHV use will continue to be a recreation activity.
- Recreation activity, particularly recreational OHV use and mountain biking, is expected to increase throughout the life of current RMPs.
- Outside areas where recreation is the management focus, the BLM will manage recreation activities that consist mostly of dispersed activities where users participate in activities individually or in small groups.
- The potential for resource impacts and conflicts between all types of users, but particularly between motorized and nonmotorized users, will increase with increasing use.
- BLM management of areas unsuitable for public utilities (i.e., ROW exclusion areas) preserves recreation opportunities.
- Closure of areas to mineral development decreases the likelihood for conflict with recreation users and maintains desired recreation settings in those areas.
- Outdoor recreation will continue to be an important component of local economies.
- Demand for SRPs will remain steady or gradually increase.
- The BLM will continue to issue SRPs on a discretionary basis.

10.19.2 Impacts Common to All Alternatives

Under all alternatives, the BLM would continue to review and approve SRPs on a case-by-case basis within the planning area, and the overall number of large group and commercial SRPs would remain consistent. There would be no direct impacts on recreation through changes to the number and types of SRPs issued annually within the decision area. Any indirect impacts on SRPs would be related to the impacts on the change in the types of recreation activities, experiences, and benefits in the decision area.

Under all alternatives, disturbance caps which restrict the construction of recreation infrastructure would decrease access for recreation experiences that depend on road and trail development and could inhibit management objectives where developments are part of the desired conditions. If future recreation projects would exceed the disturbance cap in a particular area, the disturbance cap would prohibit construction of new recreation facilities such as campground, day-use areas, and trailheads in PHMA and GHMA. However, these disturbance caps would also limit development in some areas, thereby increasing remoteness and naturalness in areas managed for those objectives and enhancing the recreational user experience of primitive backcountry recreation activities and experiences over the long-term (BLM 2014).

10.19.3 Alternative 1

Under Alternative 1, existing restrictions on other resource uses, such as seasonal restrictions on fluid mineral development and disturbance caps, would indirectly affect recreation by reducing resource conflicts

in PHMA, IHMA, or GHMA (**Table 2-3**) as described in **Chapter 2**. Reducing resource conflicts with recreation enhances and preserves the recreational experiences in those areas. These restrictions would reduce the impacts on recreation from the general trend of resource conflict with increasing energy development on BLM-administered lands in those management areas over the long-term. Additionally, other key drivers of change, such as growing public demand for outdoor recreation and technological advances, would also shape future recreational opportunities.

Management of major ROW avoidance areas including those for power lines, pipelines, access roads, and communication sites in PHMA and IHMA and in GHMA in some states (CO, NV/CA, OR), would continue to improve recreation experiences over the long-term as these diminish the naturalness of the physical setting and the opportunities for recreation activities, experiences, and outcomes that require more remote and natural settings. These avoidance areas would not apply to existing roads and facilities.

10.19.4 Alternative 2

Under Alternative 2, there would be more exceptions to restrictions on other resource uses compared with Alternative 1, such as no closed areas for fluid mineral development in Colorado and additional exceptions to the disturbance cap. These exceptions would indirectly increase recreation conflicts with other resources in PHMA, IHMA, and GHMA compared with Alternative 1. While some forms of recreation, such as motorized recreation, may benefit from the expansion of roads associated with energy and mineral development, other forms of recreation, such as primitive recreation and solitude-seeking activities, could experience diminished user experiences due to increased noise, traffic, and industrial infrastructure. Over the long term, these exceptions could contribute to the broader trend of increased energy development on BLM-administered lands, further intensifying the impacts on recreational experiences, particularly for activities dependent on undisturbed landscapes. However, for OHV users, the increase in roads may provide enhanced access to recreation areas.

Management of ROW avoidance areas under Alternative 2 would be similar to Alternative 1, except in Nevada where additional exception criteria would allow for more ROWs to be constructed. This would diminish the naturalness of the physical setting and opportunities for recreation experiences in those areas over time for recreation activities that require more remote and natural settings; however, this exception criteria would only occur in Nevada. Some ROWs, such as for road maintenance and trail development, would enhance other recreational activities by providing better access to recreational activities.

Under Alternative 2, there would be fewer acres of PHMA and GHMA when compared to Alternative 1 (**Table 2-3**). This would restrict fewer acres of land subject to disturbance caps when compared to Alternative 1. Therefore, if future recreation projects would exceed the disturbance cap in a particular area, the disturbance cap would have the potential to restrict fewer acres than Alternative 1.

10.19.5 Alternative 3

Alternative 3 would impose the greatest restrictions on other resources, including closing fluid mineral leasing in PHMA, and would most greatly reduce the potential for resource conflict with recreation. Reducing resource conflicts with recreation would enhance and preserve recreation which requires specific physical setting characteristics, such as remoteness. This would counter the trend of increased energy development on BLM-administered lands and its impact on recreation resources in PHMA to a greater extent than Alternative 1. These restrictions would also reduce the degradation of physical setting characteristics within the planning area, which would enhance the recreational user experience more than Alternative 1.

By managing more acres of ROW exclusion compared to Alternative 1, Alternative 3 would prohibit such developments over a greater area and would thus maintain the naturalness and remoteness for recreation experiences in these areas (BLM 2014).

Alternative 3 has the greatest acreage of PHMA, which would be subject the greatest acreage to disturbance caps. Therefore, if future recreation would have the potential exceed the disturbance cap in a particular area, the disturbance cap would have the potential to prohibit the construction of new recreation facilities over the largest area when compared with the other alternatives. There would be over double the acres of PHMA when compared to Alternative 1 (**Table 2-3**). Although Alternative 3 offers the greatest protection for primitive recreation and opportunities for solitude, it does so at the expense of motorized recreation users or those unable to participate in primitive activities, compared with Alternative 1.

10.19.6 Alternative 4

Similar to Alternative 1, under Alternative 4, existing restrictions on other resource uses such as fluid mineral leasing, would have an indirect effect on recreation by reducing resource conflicts in PHMA, IHMA, or GHMA. Reducing resource conflicts with recreation enhances and preserves the recreational experiences in those areas.

Under Alternative 4, ROWs would have additional criteria for avoidance of GRSG when compared to Alternative 1, which would limit such developments over a greater area and would thus indirectly affect recreation by maintaining the naturalness and remoteness for recreation experiences in these areas (BLM 2014).

Under Alternative 4, there would be more acres of PHMA and fewer acres of GHMA when compared to Alternative 1 (**Table 2-3**), which would subject fewer acres of land to disturbance caps. Therefore, if future recreation projects would exceed the disturbance cap in a particular area, the disturbance cap would have the potential to restrict fewer acres of land against the construction of new recreation facilities when compared to Alternative 1.

10.19.7 Alternative 5

Similar to Alternative 1, existing restrictions on other resource uses such as fluid mineral leasing, would have an indirect effect on recreation by reducing resource conflicts in PHMA, IHMA, or GHMA. Under Alternative 5, all states would be avoidance for utility scale wind and solar energy development. This would be less restrictive on energy development than Alternative 1, which could indirectly affect recreation by leading to the potential for great resource conflicts with energy development. Increasing resource conflicts with recreation diminishes the recreational experiences in those areas.

Under Alternative 5, ROWs would have less restrictive criteria for avoidance of GRSG when compared to Alternative 1. This would indirectly affect recreation when compared to Alternative 1 by decreasing the naturalness and remoteness for recreation experiences in these areas (BLM 2014).

Under Alternative 5, there would be more acres of PHMA when compared to Alternative 1 (**Table 2-3**). This would restrict more acres of land to disturbance caps when compared to Alternative 1. Therefore, if future recreation projects would exceed the disturbance cap in a particular area, this would have the potential to restrict more acres against the construction of new recreation facilities when compared to Alternative 1.

10.19.8 Alternative 6

Impacts to recreation under Alternative 6 would be similar to impacts under Alternative 5 except in ACECs. Alternative 6 would have greater restrictions on mineral exploration, including fluid minerals, nonenergy minerals, and mineral materials as well as major ROWs, wind and solar. These would indirectly decrease the resource conflicts that also affect recreation resources when compared to Alternative 1.

10.20 TRANSPORTATION AND TRAVEL MANAGEMENT

10.20.1 Methods and Assumptions

Methodology

The analysis of impacts on transportation and travel management is a comparison of the acres that would move from open to limited based on changes to HMA designations under each alternative.

Indicators

The indicator of impacts on transportation and travel management are the acres managed as open, and limited to OHV use because existing OHV allocations under the 2015 RMP Amendment are not proposed for change under this RMP Amendment under any alternatives and the 2015 RMP Amendment management direction limits OHV use to designated routes in GHMA and PHMA and does not close any areas to OHV use.

Assumptions

There are no assumptions specific to transportation and travel management.

10.20.2 Impacts Common to All Alternatives

Through Resource Management Plans (RMPs), the BLM designates lands in one of three Off Highway Vehicle (OHV) designation categories: open to cross country vehicle use, limited to existing routes, or closed to OHV use. None of the action alternatives, including the Proposed RMP Amendment, propose changes to the existing 2015 GRSG travel and transportation allocations or management direction. Therefore, under all alternatives, in PHMA and GHMA, OHV travel is limited to existing routes and no cross-country travel is allowed.

The changing HMA allocations occurring across the alternatives could, however, result in changes to areas moving from open to cross country travel to limited to existing routes due to areas moving from non-habitat to either PHMA or GHMA and, conversely, areas could move from limited to open if previously identified habitat (GHMA or PHMA) is no longer identified as habitat and the areas are not otherwise limited or closed under an existing RMP decision. Per the existing 2015 management direction under Alternative 1, PHMA and GHMA that do not have designated routes in a Travel Management Plan will be managed as limited to existing routes until a Travel Management Plan designates routes (unless they are already designated as limited to designated routes or closed to OHV use). As noted, this decision will not change by alternative, but since HMAs change by alternative, areas that were open and not designated as open under Alternatives 1 and 2 could, under each alternative, move to a limited designation because areas once considered non-habitat could be identified as either GHMA or PHMA and in GHMA and in PHMA these areas are managed as limited. **Table 4-4 – Table 4-7** illustrate the acres that have changed in open and limited categories based on changes in the HMA boundaries.

10.20.3 Comparison of Alternatives

The HMA allocations in Colorado, Idaho, Montana, and Wyoming would not change the OHV allocations currently in place under any of the alternatives, and, therefore, there are no anticipated effects to by alternative and thus no effects are expected in those states (**Table 4-4**).

In Nevada/California there is an increase in open areas when compared with the existing condition under Alternative 1 in all alternatives except Alternative 3, where there is a decrease in open areas (refer to Table 4-5 in Appendix 9). The increase in open areas is greatest under Alternative 4. Alternatives 5 and 6 both increase open areas by approximately two million acres (refer to Table 4-5 in Appendix 9). From a travel and transportation perspective, this increase in open areas could allow for more recreation associated with off-highway vehicle use. These increases could also increase resource impacts associated with off-highway vehicle travel.In Oregon, there is decrease in open areas and corresponding increase in limited areas from the existing acres in Alternative 1 in all of the alternatives except Alternative 2 (refer to Table 4-6). The largest decrease in open areas occurs under Alternatives 5 and 6 with approximately 600,000 fewer acres allocated as open. Under Alternatives 3 and 4, there are approximately 465,000 fewer acres allocated as open. From a travel and transportation perspective, these changes could reduce recreation opportunities associated with off-highway vehicle use. These decreases would also reduce resource impacts associated with off-highway vehicle travel.

In Utah, like Oregon, there is a decrease in the amount of OHV areas that are open and a corresponding increase in areas that are limited as a result of changes in HMA allocations. The decrease in open areas is greatest under Alternative 3 followed by Alternative 4 (refer to Table 4-7 in Appendix 9). Under Alternatives 5 and 6 the decrease is approximately 88,000 acres, under Alternative 4 the decrease is approximately 376,000 acres, and under Alternative 3 the decrease is approximately 464,000 acres. From a travel and transportation perspective, these changes could reduce recreation opportunities associated with off-highway vehicle use. These decreases would also reduce resource impacts associated with off-highway vehicle travel.

Appendix 11

Special Status Species

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Appendix 11. Special Status Species

This appendix presents the Endangered Species Act-listed species, candidate and proposed species for Endangered Species Act listing, and the BLM sensitive species that may potentially occur in the planning area as well as their habitat associations. See **Chapter 3**, **Section 3.6**, Special Status Species for a description of the affected environment related to special status species.

Taxa	Common Name	Scientific Name	Habitat Associations
Amphibians	Boreal toad (western toad)	*Anaxyrus boreas*	Boreal toads use wet habitats in foothill, montane, sagebrush and subalpine areas and are seldom far from water. Causes of population decline are not well understood but include chytrid fungus (*Batrachochytrium dendrobatidis*) infections, wetland habitat alteration due to recreation, grazing, reservoir construction, timber harvest, fire management, environmental pollutants, and non-native species introduction and climate change.
Amphibians	Great Plains toad	*Anaxyrus cognatus*	Great Plains toads inhabit deserts, grasslands, semidesert shrublands, open floodplains, and agricultural areas, typically in stream valleys. When not active on the surface they usually occupy underground burrows. Breeding sites include rain pools, flooded areas, and ponds and reservoirs that fluctuate in size. Eggs and larvae develop in shallow water (usually clear). Calling males sit along the shoreline or brace themselves on submerged plants.
Amphibians	Hot Creek toad	*Anaxyrus monfontanus*	Inhabits marsh habitats fed by hot springs. Extremely restricted and remote habitat surrounded otherwise by sagebrush steppe, restricting toad dispersal. Only found in Hot Creek Canyon in Nye County, Nevada.
Amphibians	Railroad Valley toad	*Anaxyrus nevadensis*	Endemic to the spring-fed wetlands of Lockes Ranch in Railroad Valley, Nye County, Nevada. Restricted and remote habitat surrounded otherwise by sagebrush steppe, restricting toad dispersal.
Amphibians	Dixie Valley toad	*Anaxyrus williamsi ssp.*	Found in springs, seeps, streams, and similar inundated areas. Presently thought to be endemic to Dixie Valley, NV and potentially a distinct species of western toad.

Taxa	Common Name	Scientific Name	Habitat Associations
Amphibians	Woodhouse's toad	*Anaxyrus woodhousii*	Inhabits grasslands, desert and semi-desert shrublands, river valleys and floodplains, and agricultural areas, usually in areas with deep friable soils. When inactive, they burrow underground or hide under rocks, plants, or other cover. These toads live on land except during the brief breeding season. Breeding occurs in marshes, rain pools, ponds, lakes, reservoirs, flooded areas, stream pools or backwaters, and other bodies of water with a shallow margin lacking a strong current, including both permanent and temporary pools, generally in sites with few if any fishes.
Amphibians	Rocky Mountain tailed frog	*Ascaphus montanus*	Rocky Mountain tailed frogs are present year-round in and near perennial streams associated with cold, clear, rocky streams in mature forests.
Amphibians	Boreal toad	*Bufo boreas boreas*	Inhabit wet habitats in foothills, montane and subalpine streams. Uses both aquatic and terrestrial habitats to meet all seasonal habitat requirements.
Amphibians	Yellow-blotched salamander	*Ensatina eschscholtzii croceator*	Inhabits cool, moist places, under the soil, under debris, or near water.
Amphibians	Shasta salamander	*Hydromantes shastae*	Found around cliff faces, vertical cavern walls and level ground in mixed forests of Douglas fir, pines, and oaks. Lives in moist caves and rock cracks. Mostly associated with limestone outcrops, but one population has been found in a volcanic outcrop, and others in forest areas with no rock outcrops.
Amphibians	Northern leopard frog	*Lithobates pipiens*	Northern leopard frogs live in the vicinity of springs, slow streams, marshes, bogs, ponds, canals, flood plains, reservoirs, and lakes; usually they are in or near permanent water with rooted aquatic vegetation. In summer, they commonly inhabit wet meadows and fields. Threats include commercial overexploitation, and, in some areas, probably competition/predation by bullfrogs or other introduced species. Habitat alteration and loss including flood-control measures and diversion of water for irrigation have probably reduced the availability of breeding habitat along floodplains in lowland segments of some streams. Decline in populations in the Rocky Mountains has been documented.
Amphibians	Foothill yellow-legged frog	*Rana boylii*	The foothill yellow-legged frog is found in or near rocky streams in a variety of habitats.
Amphibians	Columbia spotted frog	*Rana luteiventris*	Closely associated with clear or slow-moving or ponded surface waters, with little shade, and relatively constant water temperatures; breeding and egg-laying occurs in waters with floating vegetation and larger ponds, such as oxbows, lakes, stock ponds, and beaver-created ponds.
Amphibians	Southern Mountain yellow-legged frog	*Rana muscosa*	California's Sierra Nevada mountains in lakes, ponds, marshes, meadows and streams at elevations ranging from 4,500 to 12,000 feet (1,370 to 3,660 meters).

Taxa	Common Name	Scientific Name	Habitat Associations
Amphibians	Sierra Nevada yellow-legged frog	*Rana sierrae*	Occur in lakes, ponds, marshes, meadows and streams at elevations ranging from 4,500 to 12,000 feet (1,370 to 3,660 meters).
Amphibians	Oregon spotted frog	*Rana pretiosa*	Rarely found far from water. Breeding habitat is in seasonally flooded margins of wetlands and areas of extensive shallows (approximately 6 to 8 inches deep).
Amphibians	Western spadefoot toad	*Spea hammondii*	Occurs primarily in grasslands, but occasional populations also occur in valley-foothill hardwood woodlands.
Amphibians	Great Basin spadefoot	*Spea intermontana*	Mainly sagebrush flats, semi-desert shrublands, pinyon-juniper woodland. Digs its own burrow in loose soil or uses those of small mammals. Breeds in temporary or permanent water, including rain pools, pools in intermittent streams, and flooded areas along streams. Eggs are attached to vegetation in water or placed on bottom of pool.
Birds	Northern goshawk	*Accipiter gentilis*	Inhabits both deciduous and coniferous forests with various ages, structural conditions and successional stages.
Birds	Tricolored blackbird	*Agelaius tricolor*	Prefers wetlands but will use agricultural fields for nesting. Have also been found nesting in patches of Himalayan blackberry near stock ponds or irrigated pastures in the foothills of the Sierra Nevada, California. Foraging habitats include cultivated fields, feedlots associated with dairy farms, and wetlands.
Birds	Baird's sparrow	*Ammodramus bairdii*	Grassland specialist requiring large landscapes for breeding.
Birds	Grasshopper sparrow	*Ammodramus savannarum*	Breeding habitat includes grasslands of intermediate height and are often associated with clumped vegetation interspersed with patches of bare ground or moderately deep litter and sparse coverage of woody vegetation.
Birds	Sage sparrow	*Amphispiza bella*	Prefers large and undisturbed tracts of tall and dense sagebrush.
Birds	Black-throated sparrow	*Amphispiza bilineata*	Not closely associated with particular plant species or communities, but favors sparsely vegetated desert scrub, including thorn brush, cacti, chaparral, mesquite and juniper. It is most often found on desert uplands, alluvial fans, and hillsides where thorny xeric brush dominates, and sometimes also in dry shrubby washes, but avoids desert valley floors.
Birds	Sprague's pipit	*Anthus spragueii*	Endemic species of the northern Great Plains, breeding in mixed-prairie grasses.
Birds	Golden eagle	*Aquila chrysaetos*	Golden eagles generally inhabit open and semi-open country such as prairies, sagebrush, arctic and alpine tundra, savannah or sparse woodland, and barren areas, especially in hilly or mountainous regions, in areas with sufficient mammalian prey base and near suitable nesting sites.
Birds	Sagebrush sparrow	*Artemisiospiza nevadensis*	This species found in shrubby, open flats and sagebrush plains, with nesting sites usually in or under low shrubs like sagebrush or saltbush.

Taxa	Common Name	Scientific Name	Habitat Associations
Birds	Short-eared owl	*Asio flammeus*	This species is found in large, open areas with low vegetation, including prairie and coastal grasslands, heathlands, meadows, shrubsteppe, savanna, tundra, marshes, dunes, and agricultural areas; winter habitat is similar, but is more likely to include large open areas within woodlots, stubble fields, fresh and saltwater marshes, weedy fields, dumps, gravel pits, rock quarries, and shrub thickets.; if food is plentiful, winter areas often become breeding areas
Birds	Long-eared owl	*Asio otus*	Roosts in dense vegetation and forages in open grasslands or shrublands and open coniferous or deciduous woodlands. They occur at elevations ranging from near sea level to above 6,500 feet.
Birds	Burrowing owl	*Athene cunicularia*	Optimum habitat typified by short vegetation and presence of fresh small mammal burrows. Found in open grasslands, sagebrush, and sagebrush-steppe, sometimes in open areas such as vacant lots near human habitation. Spends much time on the ground or on low perches such as fence posts or dirt mounds.
Birds	Upland sandpiper	*Bartramia longicauda*	Restricted primarily to extensive, open tracts of short grassland habitat. Nest in native prairie, dry meadows, pastures, domestic hayfields, short-grass savanna, plowed fields, along highway rights-of-way and on airfields, and (in the north) peatlands and scattered woodlands near timberline. Nesting is also known to occur in dry patches of wet meadows and in blueberry barrens. A survey of nesting habitats in Wisconsin suggests that upland sandpipers favor a level topography with a minimum of tall vegetation edges and proportionately high acreages of agricultural crops which duplicate prairie grasslands in terms of structure.
Birds	Ferruginous hawk	*Buteo regalis*	Open country, primarily prairies, plains and badlands; sagebrush, saltbush-greasewood shrubland, periphery of pinyon-juniper and other woodland, desert. In the southern Great Plains, common at black-tailed prairie dog colonies in winter. Nests in tall trees or willows along streams or on steep slopes, in junipers (Utah), on cliff ledges, river-cut banks, hillsides, on power line towers, sometimes on sloped ground on the plains or on mounds in open desert. Generally, avoids areas of intensive agriculture or human activity.
Birds	Swainson's hawk	*Buteo swainsoni*	This species favors open habitats for foraging; hay and alfalfa fields, pastures, grain crops, and row crops, or perched atop adjacent fence posts and overhead sprinkler systems; they rely on scattered stands of trees near agricultural fields and grasslands for nesting sites.

Taxa	Common Name	Scientific Name	Habitat Associations
Birds	Cassin's finch	*Carpodacus cassinii*	Open coniferous forest; in migration and winter also in deciduous woodland, second growth, scrub, brushy areas, partly open situations with scattered trees, and sometimes suburbs near mountains. Usually nests in conifer, 3-25 m above ground, on outer end of limb; may sometimes nest in deciduous tree or in shrub. May return to same nesting area in successive years, though this may be unusual.
Birds	Veery	*Catharus fuscescens*	Nesting habitat includes swampy forest, especially in more open areas with shrubby understory, as well as second growth, willow or alder shrubbery near water; large tracts of forest are most suitable. Nests usually are on or near the ground, at the base of a shrub, in a clump of herbaceous vegetation, or in a shrub or low tree. In migration and winter this species occurs also in lowland forest, woodland, and scrub.
Birds	Greater sage-grouse	*Centrocercus urophasianus*	Habitat includes sagebrush steppe; nest in areas with relatively dense cover from big sagebrush; may use areas with rabbitbrush, greasewood, and grassy areas; leks are located in clear areas such as broad ridgetops, grassy swales, dry lakebeds, and sometimes recently burned areas. chick rearing areas include irrigated pastures, wet meadows, and alfalfa fields, in addition to sagebrush.
Birds	Vaux's swift	*Chaetura vauxi*	Mature and old-growth coniferous and mixed forests for nesting, especially those with plenty of hollow trees.
Birds	Western snowy plover	*Charadrius alexandrines nivosus*	Barren to sparsely vegetated sand beaches, dry salt flats in lagoons, dredge spoils deposited on beach or dune habitat, levees and flats at salt-evaporation areas.
Birds	Mountain plover	*Charadrius montanus*	Nesting habitat includes high plains/shortgrass prairie and desert tablelands, commonly prairie dog towns in some areas, such as sagebrush/blue grama habitats in central Montana. In central and southwestern Montana, southeastern Wyoming, and northeastern Colorado, nesting often occurs in shortgrass prairie with a history of heavy grazing or in low shrub semideserts. Nesting areas are characterized by very short vegetation, significant areas of bare ground, and flat or gentle slopes. Commonly, nesting takes place in barren fields that subsequently are planted with millet or sunflowers, resulting in losses of eggs and chicks. Nests are on the ground in shallow depressions that may be lined with plant material and/or adjacent to dried cattle dung. Adults often take chicks to windmill/water tank areas to forage, but site around tank must be dry. This bird generally avoids moist soils.

Taxa	Common Name	Scientific Name	Habitat Associations
Birds	Common nighthawk	*Chordeiles minor*	Nest in both rural and urban habitats including coastal sand dunes and beaches, logged forest, recently burned forest, woodland clearings, prairies, plains, sagebrush, grasslands, open forests, and rock outcrops.
Birds	Yellow-billed cuckoo	*Coccyzus americanus*	Large stands of cottonwood-willow habitat below 7,000 feet. Riparian obligates requiring low, dense shrubby vegetation for nesting.
Birds	Black-billed cuckoo	*Coccyzus erythropthalmus*	Elusive cuckoo that lives in woodlands, including aspen and willows.
Birds	Olive-sided flycatcher	*Contopus cooperi*	Boreal forest and western coniferous forests, from sea level to over 10,000 feet elevation. Here they are found in forests of spruce, fir, Douglas-fir, hemlock, western redcedar, and tamarack or larch. Use openings or edges in the forest and are rarely found in deep, closed forest.
Birds	Trumpeter swan	*Cygnus buccinator*	Nest in clear and quiet water bodies with relative static water levels and shallow margins.
Birds	Black swift	*Cypseloides niger*	Colonial breed on cliff faces near waterfalls or in caves and forage over forests and open areas.
Birds	Bobolink	*Dolichonyx oryzivorus*	This species generally selects habitat with moderate to tall vegetation, moderate to dense vegetation, and moderately deep litter. Breeding habitat includes tall grass areas, flooded meadows, prairie, deep cultivated grains, and hayfields.
Birds	White-headed woodpecker	*Dryobates albolarvatus*	Habitat consists of montane coniferous forests dominated by pines.
Birds	Snowy egret	*Egretta thula*	Nests in riparian, marsh, and tree habitats.
Birds	Willow flycatcher	*Empidonax traillii*	Breeding habitat is strongly tied to brushy areas of willow and similar shrubs. Found in thickets, open second growth with brush, swamps, wetlands, streamsides, and open woodland. Common in mountain meadows and along streams; also in brushy upland pastures (especially hawthorn) and orchards. The presence of water such as running water, pools, or saturated soils and willow, alder, or other deciduous riparian shrubs are essential habitat elements.
Birds	Great Basin willow flycatcher	*Empidonax traillii adastus*	Breeds in moist, shrubby areas with standing or running water, such as deciduous thickets and woodland edges.

Taxa	Common Name	Scientific Name	Habitat Associations
Birds	Gray flycatcher	*Empidonax wrightii*	Arid woodland and brushy areas. Most commonly associated with pinyon-juniper woodland. In Wyoming, strongly associated with the presence of pinyon pine and higher than expected juniper overstory cover. In western Great Basin, nests in tall, big sagebrush shrublands. Less frequently found in open ponderosa pine or pine-oak woodland. In the last three decades has expanded its range northward into Washington and British Columbia, where it uses open stands of small to medium ponderosa pines exclusively; these stands usually have a scattered shrub or young pine understory. Usually builds nest in fork or branch of a shrub or juniper. In migration and winter also in arid scrub, riparian woodland, and mesquite.
Birds	Prairie falcon	*Falco mexicanus*	Primarily open situations, especially in mountainous areas, steppe, plains or prairies. Typically nests in pothole or well-sheltered ledge on rocky cliff or steep earth embankment, 10 to more than 100 meters above base.
Birds	American peregrine falcon	*Falco peregrinus anatum*	Various open situations from tundra, moorlands, steppe, and seacoasts, especially where there are suitable nesting cliffs, to mountains, open forested regions, and human population centers. When not breeding, occurs in areas where prey concentrate, including farmlands, marshes, lakeshores, river mouths, tidal flats, dunes and beaches, broad river valleys, cities, and airports.
Birds	Pinyon jay	*Gymnorhinus cyanocephalus*	Pinyon-juniper woodland, less frequently pine; in nonbreeding season, also occurs in scrub oak and sagebrush. Nests in shrubs or trees (e.g., pine, oak, or juniper), about 1.5-9 m above ground.
Birds	Cassin's finch	*Haemorhous cassinii*	Often live in mature forests of lodgepole pine and ponderosa pine, but are also found in Jeffrey pine, Douglas-fir, limber pine, Engelmann spruce, subalpine fir, grand fir, red fir, pinyon pine, bristlecone pine, and quaking aspen. Some Cassin's Finches breed in open sagebrush shrubland with scattered western junipers.
Birds	Bald eagle	*Haliaeetus leucocephalus*	Breeding habitat most commonly includes areas close to (within 4 km) coastal areas, bays, rivers, lakes, reservoirs, or other bodies of water that reflect the general availability of primary food sources including fish, waterfowl, or seabirds.
Birds	Harlequin duck	*Histrionicus histrionicus*	Most common in fast-flowing sections of rivers early in the breeding season, but move to slower-moving stretches of rivers and lakes once the chicks have hatched. Use streams and rivers with small islands and sandbars for resting. In the winter, they are found almost exclusively on rocky coastal shorelines.

Taxa	Common Name	Scientific Name	Habitat Associations
Birds	Scott's oriole	*Icterus parisorum*	Inhabits arid foothills and mountains down to deserts, preferring higher slopes with abundant yucca, agave, pinyon pine, juniper, and live oak, usually between about 980 and 8,200 feet elevation.
Birds	Least bittern	*Ixobrychus exilis*	Freshwater and brackish marshes with tall, dense emergent vegetation such as cattails, sedges, and rushes that are interspersed with clumps of woody shrubs and open water.
Birds	Loggerhead shrike	*Lanius ludovicianus*	Found in open country with short vegetation and well-spaced shrubs or low trees, particularly those with spines or thorns; frequent agricultural fields, pastures, old orchards, riparian areas, desert scrublands, savannas, prairies, golf courses, and cemeteries; are often seen along mowed roadsides with access to fence lines and utility poles.
Birds	Virginia's warbler	*Leiothylpis virginiae*	Breed in open pinyon-juniper and oak woodlands often on steep slopes with shrubby ravines throughout most of their range. They also use dense thickets of mountain mahogany in southern Idaho.
Birds	Franklin's gull	*Leucophaeus pipixcan*	Franklin's gulls nest in large prairie marshes with lots of emergent vegetation and open water.
Birds	Black rosy-finch	*Leucosticte atrata*	Breed above treeline in areas with cliffs and rock slides. During the nonbreeding season, they often move to lower elevations especially when heavy snow covers foraging areas to forage in open parks and valleys with little snow cover.
Birds	Brown-capped rosy-finch	*Leucosticte australis*	Brown-capped rosy-finch breed almost exclusively in alpine tundra at or above ~11,000 feet elevation. They remain at high elevations throughout the year but outside of the breeding season they will move down in elevation into areas with thinner snowpacks such as high parks, meadows, and open grassland valleys between mountain ranges.
Birds	Gray-crowned rosy-finch	*Leucosticte tephrocotis*	Inhabit alpine areas above treeline nesting near glaciers, talus, rock piles, and cliffs, at very high elevations. Move in response to snow levels, usually descending to lower elevations in late fall and winter as snows accumulate.
Birds	Wallowa rosy finch	*Leucosticte tephrocotis wallowa*	This subspecies has a small breeding range in alpine zone of Wallowa Mountains, northeastern Oregon.
Birds	Lewis's woodpecker	*Melanerpes lewis*	Individuals require snags in advanced stages of decay or trees with softer wood (*e.g.*, *Populus* spp.) for nest sites because they are not a strong excavator compared with other woodpecker species. They most often nest in riparian areas dominated by cottonwoods.
Birds	Ash-throated flycatcher	*Myiarchus cinerascens*	Desert scrub, pinyon-juniper and oak woodland, chaparral, thorn scrub and riparian woodland; in winter also in open deciduous woodland. Usually nests in a tree cavity, a hole in a cactus, in an abandoned woodpecker hole or Cactus Wren nest.

Taxa	Common Name	Scientific Name	Habitat Associations
Birds	Long-billed curlew	*Numenius americanus*	Occurs in a variety of grasslands communities including sagebrush-grasslands.
Birds	Sage thrasher	*Oreoscoptes montanus*	Sagebrush plains, primarily in arid or semi-arid situations, rarely around towns. Usually breeds between 1300 and 2000 meters above sea level.
Birds	Mountain quail	*Oreortyx pictus*	Live in dense brush in wooded foothills and mountains; most common in pine-oak woodland, coniferous forest, and chaparral; sometimes in pinyon-juniper woods or in scrub at lower elevations; may be common in areas of second-growth brush after fires or clearcuts; requires dense low thickets for cover; during hot weather, rarely found more than a mile from water.
Birds	American white pelican	*Pelecanus erythrorhynchos*	Habitat includes rivers, lakes, reservoirs, estuaries, bays, and open marshes, sometimes inshore marine habitats. Pelicans rest/roost on islands and peninsulas. Nests usually are on islands or peninsulas (natural or dredge spoils) in brackish or freshwater lakes, or on ephemeral islands in shallower wetlands as in the northern Great Plains or on the Texas coast. Nest sites usually are in open areas but often near vegetation, driftwood, or large rocks. Habitats used in winter are mainly coastal but also include also inland waters such as the Salton Sea and some rivers with open water. Suitable sand bars and similar sites for roosting or loafing are important components of winter habitat
Birds	White-headed woodpecker	*Picoides albolarvatus*	Associated with old-growth ponderosa pine and sugar pine, ideally with partly open canopies, limited understory, and an abundant pine seed crop. They're also often found in recently burned forests.
Birds	American three-toed woodpecker	*Picoides dorsalis*	Inhabit coniferous forest, both the boreal forest (mostly spruce and fir) and mountain forests. Most numerous in mature and old-growth forests that have been damaged in some way, such as by wind storms, floods, or fire.
Birds	Green-tailed towhee	*Pipilo chlorurus*	Breeds in thickets, chaparral, shrublands, riparian scrub, and especially sagebrush. Habitat varies with elevation. Primarily in mountains. Found on mountain slopes, plateaus, and higher valleys of arid West, associated with dense shrubs 0.5 to 1.5 m in height; most commonly uses dry shrubby hillsides and post-disturbance shrubby second growth. Attracted to dwarf mistletoe as a nest, roost or foraging site in southwestern Ponderosa pine forests. Nests on or near ground in shrubby habitat; nest is usually under cover of brush or plant tufts; built by the female.
Birds	White-faced ibis	*Plegadis chihi*	White-faced Ibises forage in shallow wetlands, usually among short plants such as sedges, spikerush, glasswort, saltgrass, and greasewood. Salt, brackish, and freshwater marshes all provide foraging habitat. They also frequent wet agricultural fields with low plant cover, including alfalfa, barley, wheat, oats, and rice, along with livestock pastures and hayfields.

Taxa	Common Name	Scientific Name	Habitat Associations
Birds	Horned grebe	*Podiceps auratus*	Small, shallow, freshwater ponds with emergent vegetation such as rushes, sedges, and reeds.
Birds	Blue-gray gnatcatcher	*Polioptila caerulea*	Blue-gray Gnatcatchers nest and forage in a broad range of wooded habitats. They use a range of broadleaf and mixed woodlands from chaparral to mature forests, preferring moist areas, often near habitat edges. In the west, oak and pinon-juniper woodlands, chaparral, and willow and cottonwood woodlands near water all provide habitat.
Birds	Purple martin	*Progne subis*	A wide variety of open and partly open situations, frequently near water or around towns. In west and formerly in east nests in tree cavities, abandoned woodpecker holes (including those in saguaro cacti), crevices in rocks.
Birds	Flammulated owl	*Psiloscops flammeolus*	Breeds in dry mature mountain forests of ponderosa pine or other large coniferous trees, often interspersed with aspen or oak. Occurs on middle and upper slopes, avoiding lower elevations and valleys.
Birds	Bank swallow	*Riparia riparia*	Habitat includes open and partly open situations, frequently near flowing water. Nests are in steep sand, dirt, or gravel banks, in burrows dug near the top of the bank, along the edge of inland water, or along the coast, or in gravel pits, road embankments, etc. Both sexes construct the nest burrow. Pairs usually dig a new burrow each year, but sometimes they use old bank swallow burrows or abandoned cavities of the belted kingfisher. Individuals tends to return to same nesting area in successive years, though they may move several kilometers away, especially if nesting was unsuccessful the previous year; yearlings often return to the natal area or nearby.
Birds	Thick-billed longspur	*Rhychophanes mccownii*	This species breeds in the Great Plains of Canada through Montana and Wyoming and barely into Colorado. Ideal nesting habitat consists of blue grama and buffalo grass, with scattered purple three-awn, western wheatgrass, needle-and-thread grass, and taller vegetation such as opuntia cacti, broom snakeweed, rabbitbrush, and prairie sagebrush.
Birds	Broad-tailed hummingbird	*Selasaphorus platycercus*	Habitat includes open woodland, especially pine, pine-oak, pinyon-juniper, and conifer-aspen associations, brushy hillsides, montane scrub, and thickets; in migration and winter, broad-tailed hummingbirds also inhabit open situations in lowlands where flowering shrubs are present.
Birds	Black-throated gray warbler	*Setophaga nigrescens*	Open pine forests, pine-oak woodlands, and pinyon-juniper forests with a brushy understory.
Birds	Brewer's sparrow	*Spizella breweri*	Brewer's Sparrows depend almost exclusively on the sagebrush ecosystem when breeding typically dominated by big sagebrush (*Artemisia tridentata*) and similar species, interspersed with bunchgrasses and bare ground. Some also use large clearings in pinyon-juniper woodlands.

Taxa	Common Name	Scientific Name	Habitat Associations
Birds	California spotted owl	*Strix occidentalis occidentalis*	Lives in mid-elevation forests of the Sierra Nevada, which consist primarily of ponderosa pine (*Pinus ponderosa*), mixed-conifer, and white fir (*Abies concolor).*
Birds	Bendire's thrasher	*Toxostoma bendirei*	Desert habitats including arid grasslands, shrublands, and even some agricultural habitats. In the northern parts of the range they also breed in sage-juniper desert.
Birds	Sharp-tailed grouse	*Tympanuchus phasianellus*	Requires a mosaic of dense grass and shrubs with rich forb and insect foods during nesting and brood-rearing. During winter often relies on riparian areas and other sites that support deciduous trees and shrub for feeding, roosting, and escape cover; also utilizes non-native cultivated grains and hedgerow species. Natural succession of grasslands and shrublands to forests, accelerated or expanded geographically by artificial fire regimes, have influenced habitat quality and populations in several regions. Habitat and distribution is constrained in regions where fire suppression has reduced early and mid-successional vegetation communities.
Birds	Columbian sharp-tailed grouse	*Tympanuchus phasianellus columbianus*	Native bunchgrass and shrub-steppe communities. In western Idaho, preferred big sagebrush habitats with moderate vegetative cover, high plant species diversity, and high structural diversity; in general, selected vegetative communities that were least modified by livestock grazing. Deciduous shrubs are critical for winter food and escape cover. Bunchgrasses and perennial forbs are important components of nesting and brood-rearing habitat.
Birds	Virginia's warbler	*Vermivora virginiae*	Breeding habitat includes arid montane woodlands, oak thickets, pinyon-juniper, coniferous scrub, chaparral. Brushy steep mountain slopes within or near dry coniferous woodlands. In northern part of breeding range, generally use scrubby habitat below pine woodlands; in southern part of range use scrubby habitat islands with coniferous woodlands. Will inhabit ravines or rocky slopes with dense scrub oaks or mountain mahogany. Also found along mountain streams in sagebrush, or cottonwood and willow.
Birds	Gray vireo	*Vireo vicinior*	Breeding habitats include warm/hot, semi-arid, shrubby habitats, especially mesquite and brushy pinyon-juniper woodlands; also chaparral and desert scrub. Thorn scrub, oak-juniper woodland, pinyon-juniper, juniper-cholla, mesquite, dry chaparral.
Conifers and Cycads	Ground cedar	*Diphasiastrum complanatum*	Circum-boreal species that occurs in most coniferous forests.

Taxa	Common Name	Scientific Name	Habitat Associations
Conifers and Cycads	White-bark pine	*Pinus albicaulis*	Populations of whitebark pine in Montana and across most of western North America have been severely impacted by past mountain pine beetle outbreaks and by the introduced pathogen, white pine blister rust. The results of which have been major declines in whitebark pine populations across large areas of its range. Occurs in Subalpine and krummholtz habitats in most mountain ranges.
Conifers and Cycads	Lodgepole pine	*Pinus contorta*	Thrives in mostly well drained soils but may be found in peat bogs, muskegs or on dry sandy sites.
Conifers and Cycads	Limber pine	*Pinus flexilis*	Limber pine dominates on dry rocky sites at many elevations (1500-3600m) within its range. It can occur scattered throughout forested regions on more mesic sites, especially in low density, open areas. At higher elevations, Pinus flexilis can define the boundary of the treeline; occurring in high montane forests, often at the timberline). In these areas (i.e., Utah and the West) it is often very long-lived and slow growing, occurring on dry, harsh sites. In the northern half of its distribution, limber pine is generally found near lower tree line and on dry sites in the montane forests.
Conifers and Cycads	Bristlecone pine	*Pinus longaeva*	Grow in the mountains of Utah, Nevada, and California, in exposed, dry, rocky areas at elevations between 6,500 and 11,000 feet.
Fishes	White sturgeon	*Acipenser transmontanus*	White sturgeon primarily inhabits estuaries of large rivers and move into freshwater to spawn.
Fishes	Bluehead sucker	*Catostomus discobolus*	Occurs in low elevation mainstem rivers and tributaries.
Fishes	Flannelmouth sucker	*Catostomus latipinnis*	Prefers large rivers with deep riffles and runs but will inhabit small tributaries.
Fishes	Modoc sucker	*Catostomus microps*	Inhabit cool (<25°C) pools of headwater streams that usually have high spring flows and low summer flows. Favorable streams have moderate gradients with large mud or rock bottomed pools where the Suckers can seek refuge during summer.
Fishes	Wall Canyon sucker	*Catostomus murivallis*	Known from only one stream in northwestern Nevada.
Fishes	Goose Lake sucker	*Catostomus occidentalis lacusanserinus*	This taxon is endemic to the Goose Lake basin of Northern California and Southern Oregon.
Fishes	Mountain sucker	*Catostomus platyrhynchus*	This species can range in elevation up to 9,000 feet but is generally found in cool, clean water mid elevation mountain streams with cobble, sand, or gravel substrate, and favors pools.
Fishes	Tahoe sucker	*Catostomus tahoensis*	Native to the Lahontan Basin in southeastern Oregon, Nevada, and northeastern California. They are commonly found in large lakes and reservoirs, such as Lake Tahoe and Pyramid Lake, but can also be found in ponds in lower reaches of streams.
Fishes	Cui-ui	*Chasmistes cujus*	Restricted to Pyramid Lake, Nevada.

Taxa	Common Name	Scientific Name	Habitat Associations
Fishes	Northern redbelly X finescale dace	*Chrosomus eos X C. neogaeus*	These hybrid dace are found in clear, cool, slow-flowing creeks, ponds and lakes with aquatic vegetation, including filamentous algae, and sandy or gravelly bottoms interspersed with silt. In Montana, this species is an indicator species of the Northern Glaciated Prairie Stream Ecological System and may occur in the intermittent prairie stream systems.
Fishes	Rough sculpin	*Cottus asperrimus*	Occurs in vegetated runs and riffles of creeks and small to medium rivers, usually over mud in clear, fairly deep water (1-2 m).
Fishes	Shorthead sculpin	*Cottus confusus*	Habitat includes fast riffles of cold headwaters, creeks, and small to large rivers - also sometimes large rivers with slow-moving water.
Fishes	Bear Lake sculpin	*Cottus extensus*	Occur throughout Bear Lake in UT and ID, with adults spawning in littoral areas on rocky substrate, and juveniles found throughout the lake in benthic habitats.
Fishes	Shoshone sculpin	*Cottus greenei*	Generally found in cool, well-oxygenated, low velocity waters with abundant benthic structure and aquatic vegetation.
Fishes	Wood River sculpin	*Cottus leiopomus*	Small to medium-sized streams that are cool and have swift currents. endemic to the Big Wood and Little Wood rivers and their tributaries upstream of Magic Reservoir in Blaine County, Idaho.
Fishes	Preston White River springfish	*Crenichthys baileyi albivallis*	Inhabits warm water springs extending from east central Nevada to the Colorado River system.
Fishes	White River springfish	*Crenichthys baileyi baileyi*	Inhabits warm springs and their effluents in the White River drainage of eastern Nevada.
Fishes	Hiko White River springfish	*Crenichthys baileyi grandis*	Springs and remnants of the White River system in eastern Nevada
Fishes	Moorman WhiteRiver springfish	*Crenichthys baileyi thermophilus*	Endemic to three small springs, the Moorman, Moon River and Hot Creek Spring in Nevada.
Fishes	Railroad Valley springfish	*Crenichthys nevadae*	Live in six thermal springs, including Chimney Spring, North Spring, Hay Corral Spring, Reynolds Springs, Big Spring, Big Warm Spring, and Little Warm Spring.
Fishes	Lost River sucker	*Deltistes luxatus*	Spawn in rivers, streams, or springs associated with lake habitat. After hatching, migrate to lakes. Need shoreline river and lake habitat with vegetative structure during larval and juvenile rearing.
Fishes	Desert dace	*Eremichthys acros*	Lives in thermal springs and outflows in Soldier Meadows in Humboldt County, Nevada. Has the highest temperature tolerance of any minnow in western North America and can live in waters as warm as 104 degrees Fahrenheit.
Fishes	Iowa darter	*Etheostoma exile*	Iowa Darters prefer clear slow-flowing streams with solid bottoms, although they have a wide range of tolerance for changes in water flow rates. They are also found in lakes and reservoirs.

Taxa	Common Name	Scientific Name	Habitat Associations
Fishes	Borax lake chub	*Gila boraxobius*	Small minnow found only in Borax Lake in the Alvord Basin of southeastern Oregon. Borax Lake is fed by geothermal hot springs rich in dissolved mineral and heavy metals that most fish could not tolerate
Fishes	Cow head tui chub	*Gila bicolor vaccaceps*	Found in springs, ponds, lakes, large sluggish streams, and in the shelter of small swiftwater streams.
Fishes	Roundtail chub	*Gila robusta*	Found in large, swift rivers in tributaries to the Green River and several lakes in the upper portion of the basin.
Fishes	Pit roach	*Lavinia symmetricus mitrulus*	Predominately found in small warm streams but are capable of thriving in larger colder streams with diverse conditions. They may actually occupy several different habitat types within a single drainage.
Fishes	White River spinedace	*Leidomeda albivallis*	Lives in the springs and outflows of the upper White River in Nevada. Habitat characterized by shallow, cool and clear water over sand and gravel.
Fishes	Northern leatherside chub	*Lepidomeda copei*	Inhabits streams with a broad range of temperatures and requires habitats with health riparian vegetation and intact streambanks.
Fishes	Big spring spinedace	*Lepidomeda mollispinis pratensis*	Known only from Condor Canyon section of upper Meadow Valley Wash in Lincoln County, Nevada. Uses clear, clean shallow streams.
Fishes	Northern pearl dace	*Margariscus nachtriebi*	The Pearl Dace is a small, native minnow of both the eastern and northern drainages within the Glaciated Plains ecoregion of Montana, and is an indicator species of the complete Coolwater Northern Glaciated Plains Fish Assemblage
Fishes	Hornyhead chub	*Nocomis biguttatus*	Isolated populations occur within the Missouri River drainage. Usually occur in small to medium-sized streams with gravel bottoms.
Fishes	Fine-spotted Snake River cutthroat trout	*Oncorhyncus clarkia behnkei*	Occurs in large rivers with swift current and requires clear, cool, well-oxygenated water.
Fishes	Yellowstone cutthroat trout	*Oncorhynchus clarkia bouvieri*	Yellowstone Cutthroat Trout are native to the Yellowstone and Snake River watersheds. In pre-European settlement, Yellowstone Cutthroat Trout were present in an estimated 17,800 miles of stream. This distribution included large parts of Wyoming, Montana, Idaho, with a few streams supporting Yellowstone Cutthroat Trout extending into small portions of Utah and Nevada.
Fishes	Lahontan cutthroat trout	*Oncorhynchus clarkia henshawi*	Found in cold, high-elevation mountain streams and lower-elevation desert lakes. They are obligate stream spawners, and the distance they travel to spawn depends on the stream size and strain.

Taxa	Common Name	Scientific Name	Habitat Associations
Fishes	Westslope cutthroat trout	*Oncorhynchus clarkia lewisi*	Westslope Cutthroat Trout are common in both headwaters lake and stream environments. They feed primarily on aquatic insect life and zooplankton. Newborn fry frequently migrate back to lakes to rear after 1 to 2 years in their native stream. Spawning and rearing streams tend to be cold and nutrient poor.
Fishes	Colorado River cutthroat trout	*Oncorhynchus clarkii pleuriticus*	Requires cool, clear water and well-vegetated streambanks for cover and bank stability; instream cover in the form of deep pools and boulders and logs also is important; adapted to relatively cold water, thrives at high elevations. Most remaining populations are fluvial or resident. Occurs also in lakes (Trappers Lake in Colorado formerly had the largest pure population; now hybridized with rainbow trout). Adfluvial populations largely have been eliminated, though reestablished lacustrine stocks have been reported in Wyoming and in Rocky Mountain National Park in Colorado
Fishes	Bonneville cutthroat trout	*Oncorhynchus clarkii utah*	Ranges from high-elevation streams with coniferous and deciduous riparian trees to low-elevation streams in sage-steppe grasslands containing herbaceous riparian zones to lakes; in winter, streams may have instream ice that reduces trout habitat; high flows occur in spring from melting snowpack, low flows occur in mid- to late summer, when lethal and sublethal water temperatures may be common. Occurs primarily in small headwater streams; optimum habitat includes areas with a 1:1 pool to riffle ratio and slow, deep water with vegetated streambanks for shade, bank stability, and cover; prefers summer water temperatures of about 55 F but can survive in water up to 70 F; in lakes (e.g., Bear Lake), the littoral and pelagic zones are typically used during most of the year. Beaver ponds likely are important as both summer and winter holding habitat for adults.
Fishes	Steelhead	*Oncorhynchus mykiss*	Gravel-bottomed, fast-flowing, well-oxygenated rivers and streams. They migrate to the ocean then return to freshwater to spawn.
Fishes	Redband trout	*Oncorhynchus mykiss gairdneri*	Clean, cool, relatively small and low gradient streams, but are capable of enduring higher water temperatures (75–80 °F; 24–27 °C) than other trout that may co-habit the same streams.
Fishes	Sockeye salmon	*Oncorhynchus nerka*	Freshwater lakes, streams, estuaries, and associated wetlands provide vital nursery grounds for sockeye salmon
Fishes	Chinook salmon	*Oncorhynchus tshawytscha*	Spend their early life growing and feeding in freshwater streams, estuaries, and associated wetlands. Spend the remainder of their life foraging in the ocean before returning to the streams and tributaries where they were born to spawn.
Fishes	White River desert sucker	*Pantosteus clarkia intermedius*	Inhabits rapids and fast-flowing streams with gravelly bottoms.

Taxa	Common Name	Scientific Name	Habitat Associations
Fishes	Paddlefish	*Polyodon spathula*	The Paddlefish is an ancient, mostly cartilaginous fish with a smooth skin. Habitat includes slow or quiet waters of large rivers or impoundments. They spawn on the gravel bars of large rivers during spring high water. Paddlefish tolerate, or perhaps seek, turbid water. In Montana, paddlefish are found in the Yellowstone and Missouri Rivers.
Fishes	Bear Lake whitefish	*Prosopium abyssicola*	Lives in the cold, deeper waters of Bear Lake in Utah and Idaho.
Fishes	Bonneville cisco	*Prosopium gemmifer*	Endemic to Bear Lake on the Utah-Idaho border. Bonneville cisco generally inhabit deep cool water.
Fishes	Bonneville whitefish	*Prosopium spilonotus*	Found only in Bear Lake on the Utah-Idaho border. Bonneville whitefish prefer cold water and stay in cool deep areas of the lake during the summer months.
Fishes	Mountain whitefish	*Prosopium williamsoni*	Primarily a stream-dwelling species, but populations are also found in reservoirs and lakes. Prefers cold mountain lakes and streams with highly oxygenated water.
Fishes	Relict dace	*Relictus solitarius*	A small fish that lives in a few isolated habitats in eastern Nevada. Habitat includes springs, spring-fed streams, ponds, intermittent lakes and marshes, with mud or stone bottoms.
Fishes	Longnose dace	*Rhinichthys cataractae*	Found in the riffles of small to medium rivers and creeks, and in headwater streams with steep gradients. They prefer moderate currents and areas with overhanging cover.
Fishes	Independence Valley speckled dace	*Rhinichthys osculus lethoporus*	Inhabits a temperate desert stream and marsh in Neveada that is fed by many springs.
Fishes	Clover Valley speckled dace	*Rhinichthys osculus oligoporus*	Found in three springs and outflows in the Clover Valley in Elko County, Nevada.
Fishes	Foskett speckled dace	*Rhinichthys osculus ssp. nov*	Found only in desert springs of Lake County, Oregon including Foskett Spring and Dace Spring
Fishes	Monitor Valley speckled dace	*Rhinichthys osculus ssp. 5*	Inhabits freshwater, riparian, and herbaceous wetland habitats
Fishes	White river speckled dace	*Rhinichthys osculus ssp. 7*	Found in springs in the upper White River drainage, White Pine County, Nevada, US
Fishes	Lahontan redside shiner	*Richardsonius egregius*	Stream populations shoal near the surface of quiet pools, where they catch drifting insects, while in lakes they form groups in the littoral zone, generally preferring to stay over rocky bottoms, and eat a combination of surface insects, insect larvae, and planktonic crustacea.
Fishes	Bull trout	*Salvelinus confluentus*	Bull trout have exacting habitat demands, requiring water temperatures generally below 55 °F (13 °C), gravel beds, deep pools, complex cover such as snags and cut banks, and large systems of interconnected waterways to accommodate spawning migrations.

Taxa	Common Name	Scientific Name	Habitat Associations
Fishes	Sauger	*Sander canadensis*	Sauger inhabit the larger turbid rivers and the muddy shallows of lakes and reservoirs. They spawn in gravelly or rocky areas in shallow water and seem to prefer turbid water.
Fishes	Alvord chub	*Siphateles alvordensis*	Inhabits springs and spring-fed streams, and impoundments in Alvord basin.
Fishes	Fish Creek Springs tui chub	*Siphateles bicolor euchila*	Endemic species restricted to springs and outflows of Fish Creek Springs in southeastern Eureka County, NV. Typically found in slow-moving water with lots of aquatic vegetation.
Fishes	Independence Valley tui chub	*Siphateles bicolor isolata*	A subspecies of tui chub endemic to the drainage of the Independence Valley in Elko County, Nevada. The highest concentration of this species are found in water temperature between 11 and 20 degree Celsius (51.8 and 68 degree Fahrenheit) and water depth between 200 and 400 mm (7.8 and 15.7 in). T
Fishes	Newark Valley tui chub	*Siphateles bicolor newarkensis*	Inhabits freshwater springs and small ponds in Newark Valley, Nevada.
Fishes	Oregon lakes tui chub	*Siphateles bicolor oregonensis*	This subspecies is endemic to the endorheic Abert Lake basin in south-central Oregon.
Fishes	Duckwater Creek tui chub	*Siphateles bicolor ssp. 3*	Most comfortable in slow-moving water with lots of vegetation.
Fishes	Fish Lake Valley tui chub	*Siphateles bicolor ssp. 4*	Subspecies of tui chub found in Fish Lake Valley, Esmeralda County, Nevada. Its current distribution is limited to a single spring and outflow system.
Fishes	Hot Creek Valley tui chub	*Siphateles bicolor ssp. 5*	This subspecies occurs in riparian wetlands..
Fishes	Little Fish Lake Valley tui chub	*Siphateles bicolor ssp. 6*	This subspecies occurs in riparian wetlands.
Fishes	Railroad Valley tui chub	*Siphateles bicolor ssp. 7*	A freshwater fish that lives in shallow water.
Fishes	Dixie Valley tui chub	*Siphateles bicolor ssp. 9*	Known from two sites in Dixie Valley, Nevada. One site is an impoundment supplied from an artesian well.
Fishes	Goose Lake tui chub	*Siphateles bicolor thalassina*	Endemic fish species that lives in the Goose Lake watershed in Oregon and California.
Fishes	Arctic grayling	*Thymallus arcticus montanus*	Arctic Grayling are found primarily small, cold, clear lakes with tributaries suitable for spawning. They do not coexist well with other fishes except cutthroat trout and others with which they evolved. Arctic grayling are common in lakes across the western half of Montana. Historically, river-dwelling Arctic graylings were widespread throughout the Missouri River drainage, but now are reduced to a single, native population in the Big Hole River, in MT.
Flowering Plants	Trans montane abronia	*Abronia turbinata*	This species occurs in sandy soils of desert scrub at elevations ranging from 900 to 2500 m.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Henderson's ricegrass	*Achnatherum hendersonii*	Dry, rocky, shallow soil. Often associated with Artemisia rigida and occasionally with Pinus ponderosa. Also found in *Eriogonum thymoides/Poa secunda* community type.
Flowering Plants	Nevada needlegrass	*Achnatherum nevadense*	This species is found in open woodlands and sagebrush.
Flowering Plants	Richardson's ricegrass	*Achnatherum richardsonii*	Sandy and gravelly sites in grassland, open forest, and sagebrush grassland.
Flowering Plants	Wallowa ricegrass	*Achnatherum wallowaense*	Dry, shallow rocky soil. Restricted to non-forested, rocky, shallow soils, dominated by Poa secunda, other bunchgrasses and forbs. Rigid sagebrush (Artemisia rigida) is often present. These communities, often referred to as "scablands", are commonly found on topographic high ground and are particularly exposed to summer heat and dryness. During winter and early spring, the shallow scabland soils are subject to severe water saturation and frost heaving.
Flowering Plants	Cusick's giant-hyssop	*Agastache cusickii*	Associated with western juniper (*Juniperus occidentalis*), curlleaf mountain-mahogany (*Cercocarpus ledifolius*), quaking aspen (*Populus tremuloides*), or high-elevation sagebrush-grasslands
Flowering Plants	Tall agoseris	*Agoseris elata*	Meadows, prairies, open woods, and exposed rocky ridges with various aspects, from low elevations to timberline.
Flowering Plants	Mill Creek agoseris	*Agoseris lackschewitzii*	Grows in well-draining soils that are rich in organic matter in full sun to partial shade.
Flowering Plants	Rabbit Valley gilia	*Aliciella caespitosa*	On Navajo and Wingate sandstone in crevices, Carmel Limestone formations, detrital slopes, and (infrequently) in sandy wash bottoms. Found within open pinyon-juniper communities, often mixed with mountain brush, sagebrush, or ponderosa pine, at 1554 to 2743 m elevation.
Flowering Plants	Narrow-stem gilia	*Aliciella stenothyrsa*	Found in open places often in hills of pinyon-juniper, salt desert shrub, sagebrush, and mountain-mahogany communities from 5,003 to 9,318 feet (1,525 to 2,840 meters) elevation. Soils are typically silty to gravelly loams and sandy or clay alkaline, sandstone and siltstone shale or clay barrens all of the Green River and Uinta Formation. Presumed extinct.
Flowering Plants	Mussentuchit gilia	*Aliciella tenuis*	A Navajo Basin endemic growing in various mixed-desert shrub communities, commonly associated with Shadscale, ephedra, Wyethia, Indian-ricegrass, pinyon-juniper, and mountain mahogany communities at 1585 to 2170 m.
Flowering Plants	Iodinebush	*Allenrolfea occidentalis*	Grows in sandy, often salty, distinctly alkaline soils, such as desert washes and saline dry lakebeds.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Asse's onion	*Allium aaseae*	Aase's onion is restricted to a narrow range of habitat conditions. It occurs on open, relatively barren, xeric, gentle to very steep, sandy slopes, generally with a southerly aspect, but ranging from east to west. It is usually associated with relatively sparsely vegetated bitterbrush (*Purshia tridentata*) or bitterbrush/sagebrush (*Artemisia tridentata*) communities.
Flowering Plants	Two-headed onion	*Allium anceps*	High elevation plant that thrives under damp and shady conditions or open meadows.
Flowering Plants	Blue mountain onion	*Allium dictuon*	Open, fairly dry, rocky areas at low to middle elevations.
Flowering Plants	Geyer's onion	*Allium geyeri var. geyeri*	Moist, open slopes, meadows, or stream banks in mountains.
Flowering Plants	Nevius' onion	*Allium nevii*	Found in grasslands, sagebrush desert, and ponderosa pine forests in shallow, winter wet soils.
Flowering Plants	Tolmiei's onion	*Allium tolmiei var. persimile*	Occurs on mountains and scrublands at elevations of 1,300–9,200 feet (400–2,800 m).
Flowering Plants	Candystick	*Allotropa virgata*	Grows in deep humus of mature, usually lodgepole pine forests in the montane zone.
Flowering Plants	Malheur valley fiddleneck	*Amsinckia carinata*	Occurs in the Malheur River Valley in eastern Oregon, where it grows on slopes of talus and gravel.
Flowering Plants	Jones' bluestar	*Amsonia jonesii*	This species is growing in dry, gravelly, sandy, loam, or clay soils of washes in pinyon- juniper, desert shrub, mountain brush, blackbrush, semi-desert grasslands, and sandy sagebrush deserts communities at 1,200 to 2,150 m.
Flowering Plants	Long-fruit anemone	*Anemone cylindrica*	Native to sandy and rocky fields, hillsides and woodlands.
Flowering Plants	Bog anemone	*Anemone organa var. felix*	Found in Oregon in sphagnum bogs and marshes in Lincoln and Tillamook counties, and in the Cascade foothills of Linn county.
Flowering Plants	Great Basin angelica	*Angelica kingii*	This species grows in a variety of sites with moist soils including montane or subalpine riparian areas, in wet meadows and seeps within pinyon-juniper woodland and Great Basin scrub.
Flowering Plants	Meadow pussytoes	*Antennaria arcuata*	Moist meadows, often on hummocks of sedges and rushes that stay drier than the surrounding areas, or at the edges of these meadows. 1500-2400 m. The wet meadows are usually surrounded by sagebrush grassland communities.
Flowering Plants	King snapdragon	*Antirrhinum kingii*	This species is found in washes, as well as on rocky slopes and scree at elevations ranging from 500 to 2,300 meters.
Flowering Plants	Laramie columbine	*Aquilegia laramiensis*	Endemic to the Laramie Mountains in Wyoming and occurs in shaded microsites associates with outcrops and boulders at 6,300 feet to 10,100 feet.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Goodrich's columbine	*Aquilegia scopulorum var. goodrichii*	This species is associated with pine, juniper, and mountain brush communities on Green River Shale Formation.
Flowering Plants	Goodrich eared rockcress	*Arabis goodrichii*	Occurs on rocky slopes in sagebrush, pinyon-juniper woodlands, oak thicket.
Flowering Plants	Fremont County Rockcress	*Arabis pusilla*	This species occurs in coarse soil that has accumulated in cracks and crevices of sparsely vegetated granite-pegmatite outcrops at about 2,350 m elevation. The surrounding plant community is sagebrush grassland. The habitat is exposed to high winds and extreme cold conditions with as few as 30 frost free days annually.
Flowering Plants	Park rockcress	*Arabis vivariensis*	Low elevations in the mountains. Granitic soil at upper limit of sagebrush and sandy soils at the bases of cliffs.
Flowering Plants	Prickly-poppy	*Argemone munita ssp. rotundata*	Grows in open slopes and foothills in full sun.
Flowering Plants	Rock tansy	*Artemisia capitata*	This species grows on dry, rocky hills, in shallow, silt loams that are typically limestone-derived overlying rock outcrops. It can be found in exposed sagebrush grassland, desert shrubland, and juniper woodland in the valley and foothill zones.
Flowering Plants	Owyhee sagebrush	*Artemisia papposa*	This species grows in meadows, alkaline flats, and sagebrush-juniper slopes.
Flowering Plants	Porter's sagebrush	*Artemisia porteri*	Very sparsely vegetated badlands of pale, ashy or tufaceous (volcanic) mudstones and clay slopes. 1615-1980 m elevation.
Flowering Plants	Eastwood milkweed	*Asclepias eastwoodiana*	Desert shrub and pinyon-juniper communities on calcareous, tuffaceous, and sedimentary substrates at 3500-7000 feet.
Flowering Plants	Dwarf milkweed	*Asclepias uncialis*	This species is often associated with Juniper Woodland and Savanna ecological systems, but it is always found in the prairie or grassland components of these systems.
Flowering Plants	Green spleenwort	*Asplenium viride*	Cliff crevices, especially on limestone, often near or above timberline.
Flowering Plants	Boise milkvetch	*Astragalus adanus*	Occurs on brushy slopes, terraces and benches along canyons or along dry flats and gently rolling hill country among sagebrush in alluvial clays and gravels.
Flowering Plants	Field milk-vetch	*Astragalus agrestis*	Moist spots in sagebrush plains, and mountain meadows to alpine slopes.
Flowering Plants	Challis milkvetch	*Astragalus amblytropis*	Grows in soft clay, mobile shale, clay detritus, and volcanic ash deposits of sagebrush or shadescale covered slopes at 4600-5600 feet.
Flowering Plants	Rattlepod	*Astragalus americanus*	Open forest, woodlands, thickets, moist meadows, often along streams; valleys to lower subalpine

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Lost River milkvetch	*Astragalus amnis-amissi*	Grows in cracks and ledges on, or near vertical limestone cliffs, and in talus at the base of cliffs
Flowering Plants	Gunnison mikvetch	*Astragalus anisus*	This species is found within Sagebrush Shrubland (dominated by *Artemisia tridentata* ssp. *tridentata, Artemisia tridentata* ssp. *vaseyana, Artemisia tridentata* ssp. *wyomingensis*, or *Artemisia cana*) and Sagebrush Shrub Steppe ecological system types; primarily within the Dry Sagebrush Shrubland type. It is usually found in fairly open sites where sagebrush shrubs do not form a closed canopy, but sometimes shelters under low sagebrush plants. Sites are characterized by the absence of trees, moderate shrub cover, moderate understory cover, and extensive bare ground.
Flowering Plants	Goose Creek milkvetch	*Astragalus anserinus*	Confined to deeply weathered, sandy, white rhyolitic ash of the Salt Lake Formation, sometimes overlain by a thin veneer of black glassy sinter gravel of apparent volcanic origin. It occurs in drainage bottoms, lower to upper slope and crest positions, typically within open Utah juniper, Wyoming big sagebrush, or rabbitbrush communities with Sandberg's bluegrass, and needle and thread grass as well.
Flowering Plants	Ash Valley milkvetch	*Astragalus anxius*	Gravelly volcanic soil among pines, sagebrush; 1550 m altitude.
Flowering Plants	Lemhi milkvetch	*Astragalus aquilonius*	Shale or clay washes of gullied clay bluffs, on steep eroded canyon banks or on sand bars within the shrub-steppe zones at lower elevations.
Flowering Plants	Silverleaf milk-vetch	*Astragalus argophyllus var. argophyllus*	Occurs usually in wetlands, occasionally in non wetlands and in meadows and plays. Found in alkali sink areas.
Flowering Plants	Palouse milkvetch	*Astragalus arrectus*	Grows on grassy hillsides, sagebrush flats, river bluffs, and grassy or shrub-dominated openings of ponderosa pine (*Pinus ponderosa*) and Douglas-fir (*Pseudotsuga menziesii*) forests.
Flowering Plants	Mourning milkvetch	*Astragalus atratus var. inseptus*	Endemic to the Snake River Plain where it grows on sparsely vegetated ridge crests.
Flowering Plants	Barr's milkvetch	*Astragalus barrii*	In southeastern Montana, this species is restricted to heavy clay knobs, buttes, and barren hilltops. Often only a sparse shrub cover of *Artemisia tridentata* and/or *Atriplex confertifolia* is present. Also occurs in silty to sandy, calcareous soils. When an upper overstory is present, usually consists of a sparse cover of *Pinus ponderosa* and *Juniperus scopulorum*. Populations of this plant are associated with the harsh edaphic and environmental conditions of badlands areas. Buttes, bluffs, clay hills or sandstone, open barren ground; 900-1450 m.
Flowering Plants	Two-grooved milkvetch	*Astragalus bisculcatus var. bisulcatus*	Grows in upland meadows, prairies, grasslands, roadsides, dry hillsides, gullied bluffs, and over-grazed pastures.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	California milkvetch	*Astragalus californicus*	Dry hillsides, stony ridges, and canyon benches, among sagebrush, in open oak woods or in openings of coniferous forests.
Flowering Plants	Callaway milkvetch	*Astragalus callithrix*	Deep, sandy soil on the valley floor or on dunes in barren openings with *Atriplex, Grayia, Chrysothamnus*, and *Artemisia* at elevations of 1550 - 1710 m.
Flowering Plants	King's rattleweed	*Astragalus calycosus*	Occurs on dry, open hillsides, knolls and ridges in grassland and sagebrush desert to drier slopes of lower mountains. Sandy or gravelly clay soils.
Flowering Plants	One-leaflet Torrey's milkvetch	*Astragalus calycosus var. monophyllidius*	Occurs in sagebrush or pinyon-juniper communities on lower foothills and valley habitats on dry, stony, or otherwise barren place.
Flowering Plants	Painted milkvetch	*Astragalus ceramicus var. apus*	The species is associated with early successional habitats in sandhills. It is found in sandy, well-drained blowout areas and sandy flats or draws of old sand dunes at elevations of 6650-6700 feet, on moderately steep (20-30%), south- and west-facing slopes. Much of the vegetative cover consists of *Artemisia tripartita*, *Phacelia hastata*, *Agropyron dasystachyum, Stipa comata* and *Tetradymia canescens*.
Flowering Plants	Cima milkvetch	*Astragalus cimae var. cimae*	Mesas and stony hillsides in calcareous soils, commonly among sagebrush. Habitats include Great Basin scrub, Joshua tree woodland, and pinyon and juniper woodland.
Flowering Plants	Inflated cima milkvetch	*Astragalus cimae var. sufflatus*	This variety occurs among sagebrush on gentle slopes and flats, open pinon forest, and in calcareous, clay soil at elevations ranging from 5,000 to 6,000 feet.
Flowering Plants	Four-wing milkvetch	*Astragalus cinerascens*	Found in deserts, forests, sands, and disturbed areas.
Flowering Plants	Stiff milkvetch	*Astragalus conjunctus var. conjunctus*	This variety occurs in grassland and meadows, stony hilltops, canyon benches, brushy hillsides, sagebrush desert, and rarely into the edge of xeric pine forest on basaltic bedrock at elevations ranging from 2,000 feet to 5,100 feet.
Flowering Plants	Margaret Rushy milkvetch	*Astragalus convallarius var. margaretiae*	Grows on rocky slopes and flats beneath sagebrush (Artemisia tridentata) in pinyon-juniper woodland. Associated species include *Pinus monophylla, Purshia tridentata, Artemisia tridentata* ssp. *wyomingensis, Ribes velutinum, Poa secunda, Juniperus osteosperma, Leymus cinereus, Elymus elymoides*, and *Tetradymia canescens.*
Flowering Plants	Cusick's horse-mint	*Astragalus cusickii*	The species is associated with early successional habitats in sandhills and is found in sandy, well-drained blowout areas and sandy flats or draws of old sand dunes at elevations of 6650-6700 feet, on moderately steep (20-30%), south- and west-facing slopes. Much of the vegetative cover consists of *Artemisia tripartite*.
Flowering Plants	Barren milkvetch	*Astragalus cusickii var. sterilis*	Inhabits dry, barren ashy areas on gravelly and sandy clay bluffs and knolls at elevations ranging from 823-1460 m (2700-4800 ft).

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Debeque milkvetch	*Astragalus debequaeus*	Found in varicolored, fine-textured, seleniferous, saline soils of the Atwell Gulch Member of the Wasatch Formation, in areas surrounded by pinyon-juniper woodlands and desert shrub. Plants are mostly clustered on toe slopes and along drainages, but many occur on steep sideslopes. Soils are clayey but littered with sandstone fragments.
Flowering Plants	Rimrock milkvetch	*Astragalus desperatus var. neeseae*	Plants are found growing in desert scrub and salt-desert scrub communities, frequently associated with juniper, blackbrush, and horsebrush as well as shadscale and sagebrush. Known primarily from the Uinta Basin in Utah with the Colorado portion of the distribution considered disjunct.
Flowering Plants	Debris milkvetch	*Astragalus detritalis*	Found in pinyon-juniper and mixed desert shrub communities associated with Artemisia, Stipa, Phlox, Trifolium, and cactus species. Often in rocky soils ranging from sandy clays to sandy loams, and on alluvial terraces with cobbles from 5,400 to 7,200 feet (1,646 to 2,195 meters) elevation.
Flowering Plants	South fork John Day milk-vetch	*Asragalus diaphanous var. diurnus*	Endemic to Oregon. Occurs on barren rocky slopes and in sagebrush-juniper communities.
Flowering Plants	Meadow milkvetch	*Astragalus diversifolius*	Halophyte species restricted to low topographic positions within sagebrush valleys and closed-basin drainages in moist alkaline meadows.
Flowering Plants	Duchesne milkvetch	*Astragalus duchesnensis*	Found in salt desert shrub and pinon-juniper communities on sandy and gravelly pediments such as sandy mesas or around sandstone or shale outcrops (Goodrich, 1986) from 1430 to 1830 m.
Flowering Plants	Horseshoe milkvetch	*Astragalus equisolensis*	Grows on sand and sandy silt soils and is a component of the salt-desert shrub vegetative community. This species occurs on river terrace sand and gravel. Habitat is sagebrush, shadscale, horsebrush, and other mixed desert shrub.
Flowering Plants	Geyer's milkvetch	*Astragalus geyeri var. geyeri*	Habitat includes sandy desert areas, especially dunes, gullies, and washes, depressions in mobile or stabilized dunes, sandy flats, and valley floors.
Flowering Plants	Threeleaf or plans milkvetch	*Astragalus gilviflorus*	Barren knolls, stony hilltops, gullied bluffs and badlands, on limestone, shale or sandstone in sagebrush communities at 5340-6590 feet.
Flowering Plants	Dubois milkvetch	*Astragalus gilviforus var. purpureus*	Endemic to the Dubois Badlands in Wyoming. Found in sparsely vegetated cushion plant/bunchgrass communities on sandy-clay souls with abundant surface gravel.
Flowering Plant	Hamilton's milkvetch	*Astagalus hamiltonii*	This species grows on gullied bluffs and barren hilltops in desert shrub and juniper communities in the Uinta Basin, Utah.
Flowering Plants	Hyattville milkvetch	*Astragalus jejunus var. articulates*	Occurs in sparsely vegetated cushion plant/bunchgrass/low shrub communities. Endemic to the eastern rim of the Bighorn Basin in Wyoming.
Flowering Plants	Starveling milkvetch	*Astragalus jejunus var. jejunus*	Found in the rolling hills of Wyoming big sagebrush and mixed grasslands.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Lemmon's milkvetch	*Astragalus lemmonii*	Grows in meadows and flats along streams in or on the margins of ponderosa pine forest, and the shore of small ephemeral lakes.
Flowering Plants	Lens-pod milkvetch	*Astragalus lentiformis*	Dry sandy soil among sagebrush; sometimes with Jeffrey pines, Great Basin scrub.
Flowering Plants	Broad-pod freckled milkvetch	*Astragalus lentiginosus var. latus*	Occurs on open, gravelly slopes in the timber belt from 7,500 to 9,500 feet, on limestone. It occurs on gravelly or sandy calcareous soils, generally on moderate to steep slopes. Associated plants include pinyon-juniper and sagebrush. It is endemic to Nevada and known from several ranges in White Pine County and the Monitor Range in Eureka County.
Flowering Plants	Pohl's milkvetch	*Astragalus lentiginosus var. pohlii*	This species can be found growing in greasewood, shadescale, horsebrush, big sagebrush communities and vegetated sand dunes at 1330-1650 m.
Flowering Plants	Sodaville milkvetch	*Astragalus lentiginosus var. sesuimetralis*	Occurs on moist, open, alkaline hummocks and drainages near cool springs.
Flowering Plants	Park milkvetch	*Astragalus leptaleus*	Grows in moist or wet, often alkaline meadows in the valley, foothills, and montane zones.
Flowering Plants	Grand Junction milkvetch	*Astragalus linifolius*	Found in rocky soil on dry hillsides. Many populations occur on the Chinle and Morrison Formations with pinyon-juniper and sagebrush. Often found in drainages and along benches of perennial streams.
Flowering Plants	Loa milkvetch	*Astragalus loanus*	Volcanic gravels at 1650-2075 m elevation in sagebrush and pinyon-juniper communities.
Flowering Plants	Stiff milkvetch	*Astragalus microcymbus*	Open sagebrush or juniper-sagebrush communities on moderately steep to steep slopes. Often found in rocky areas with a variety of soil conditions from clay to cobbles, gray to reddish in color.
Flowering Plants	Least bladdery milkvetch	*Astragalus microcystis*	This species is found in alpine and subalpine areas on limestone and dry, gravelly soils and sandy areas, as well as on riverbanks and in open woods.
Flowering Plants	Pauper milkvetch	*Astragalus misellus var. misellus*	Habitat is stony hills and pastures and gravelly clay banks, on basaltic bedrock, with sagebrush and juniper.
Flowering Plants	Mulford's milkvetch	*Astragalus mulfordiae*	Mulford's milkvetch occurs on loose, sandy substrates derived from lacustrine and alluvial sediments, including unconsolidated sands, decomposed sandstone, and oolithic limestone. It occurs predominantly on south to west-facing aspects. The slopes may be prone to high rates of erosion. It occurs at elevations between 670 - 1100 meters (2200 -3600 feet). It is found mainly in shrub-steppe and desert shrub communities.
Flowering Plants	Ferron's milkvetch	*Astragalus musiniensis*	Gullied knolls and stony clay benches among junipers, on shale, sandstone, or gravelly alluvia, 4700-7000 feet. Weber and Wittmann report the Colorado habitat as sagebrush hills.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Naturita milkvetch	*Astragalus naturitensis*	This species grows in the cracks and ledges of sandstone cliffs and rim rocks and flat bedrock areas with shallow soil development within pinyon-juniper woodlands at elevations of 1,650 to 2,050 m.
Flowering Plants	Newberry's milkvetch	*Astragalus newberryi var. castoreus*	Found in sagebrush and pinyon-juniper woodlands in the plains, foothills, bluffs and badlands.
Flowering Plants	Nye milkvetch	*Astragalus nyensis*	Occurs in the foothills of desert mountains, outwash fans, and gravelly flats, sometimes in sandy soil.
Flowering Plants	Picabo milkvetch	*Astragalus oniciformis*	Occurs almost exclusively on the *Artemisia tridentata* var. *wyomingensis*/*Stipa comata* habitat type, an edaphically controlled habitat type restricted to sandy loam soils.
Flowering Plants	Pink egg milkvetch	*Astragalus oophorus var. lonchocalyx*	Pinyon-juniper, sagebrush, and mixed desert shrub communities at 1,770 to 2,300 m. Dry gravelly hillsides and stony flats, associated with sagebrush, on limestone.
Flowering Plants	Payson's milkvetch	*Astragalus paysonii*	Grows in open places in the timber belt, burned-over forests, on decomposed granites, or other open disturbed mountainous sites on silty and ashy soils.
Flowering Plants	Peck's milkvetch	*Astragalus peckii*	Occurs on very dry sites, on loose sandy soil or pumice at ca. 900-1500 m; it is often found in dry water-courses. This species is usually found in barren openings in juniper/sagebrush communities or in openings in lodgepole pine forests. Plants also occur in the forest ecotone and occasionally beneath forest canopy.
Flowering Plants	Broad-keeled milk-vetch	*Astragalus platytropis*	Found in rocky alpine and subalpine plant communities at elevations ranging from 6,000 to 12,000 feet. Often in dry waterways, and on sagebrush flats on dry, sandy soils or pumice.
Flowering Plants	Lahontan milkvetch	*Astragalus porrectus*	Localized and restricted to the bed of Pleistocene Lake Lahontan. It inhabits open, calcareous or alkaline, sandy to gravelly washes, alluvium, or gullies on clay badlands, knolls, or playa edges in the shadscale zone.
Flowering Plants	Precocious milkvetch	*Astragalus proimanthus*	Occurs in cushion plant/bunchgrass communities on dry, thin, rocky clay soils of benches and bluffs at 6,400-7,200 feet. Restricted to a small are in the southern Green River Basin in Wyoming.
Flowering Plants	Tonopah milkvetch	*Astragalus pseudiodanthus*	Occurs on deep, loose, sandy soils of stabilized and active dune margins, old beaches, valley floors, or drainages, with black greasewood and other salt desert shrub taxa.
Flowering Plants	Rams Horn Spring milkvetch	*Astragalus pulsiferae var. coronensis*	Occurs in Great Basin scrub, lower montane coniferous forest, pinyon and juniper woodland.
Flowering Plants	Ames milkvetch	*Astragalus pulsiferae var. pulsiferae*	Sandy or rocky soils (frequently granitic), often occurring with pines or sagebrush. Elevation: 1300-1900 m.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Suksdorf's milkvetch	*Astragalus pulsiferae var. suksdorfii*	Rocky ledges and arid gravelly hillsides in the Creosote Bush Scrub community, Joshua tree woodland, carbonate soil. Great Basin scrub, lower montane coniferous forests, pinyon and juniper woodlands, dry flats in open pine forest and on stony plains, in loose volcanic soils, 1290 m.
Flowering Plants	Hare's-foot milkvetch	*Astragalus purshii var. lagopinus*	This variety occurs on dry slopes and plains usually with sagebrush on basalt or pumice.
Flowering Plants	Snake River milkvetch	*Astragalus purshii var. ophiogenes*	This variety is found in loosely aggregated sand and gravelly sand deposits on bluffs, talus, dunes and volcanic ash beds with big sagebrush, Indian ricegrass, needle-and-thread grass, and four-wing satlbush, at elevations ranging from 700 to 1,075 meters.
Flowering Plants	Racemose milkvetch	*Astragalus racemosus var. treleasei*	Occurs on shale derived substrates on outwash flats and slopes along river valleys. Elevation 6500-7500 (8300) ft. Frequently occurs with thickspike wheatgrass, rubber rabbitbrush, green rabbitbrush and shadscale.
Flowering Plants	Bitterroot milkvetch	*Astragalus scaphoides*	Sagebrush-grassland communities on dry slopes at mid- elevations (5000-6000 feet).
Flowering Plants	Weak milkvetch	*Astragalus solitarius*	Stiff clays of valley floors and mesas, usually in close association with Artemesia arbuscula (Nevada, Oregon) & Sacrobatus (in Oregon).
Flowering Plants	Bastard kentrophyta	*Astragalus tegetarioides*	Dry sandy soil, in Ponderosa pine forests at elevations of 1300–1700 m.
Flowering Plants	Railhead milkvetch	*Astragalus terminalis*	Sagebrush steppe and sparsely vegetated grasslands in the valley, foothills, montane, and alpine zones; 1524-2914 m.
Flowering Plants	Tiehm's milkvetch	*Astragalus tiehmii*	Grows in desert habitats, specifically in basalt mesa country with white ash deposits at elevations of 1,600–1,700 meters.
Flowering Plants	Currant milkvetch	*Astragalus uncialis*	Dry alkaline soils derived from limestone. With sagebrush in gullied foothills at 1,600-1,825 m in Nevada and in shadscale at 1,400-1,600 m on Sevier Desert in Utah.
Flowering Plants	Webber's milk-vetch	*Astragalus webberi*	Grows at forest edges in openings on well-drained soils.
Flowering Plants	Welsh's milkvetch	*Astragalus welshii*	This species occurs exclusively on igneous gravels, in sagebrush, pinyon-juniper, and sagebrush-aspen communities at elevations of 2,000-2,810 m.
Flowering Plants	Mudflat milkvetch	*Astragalus yoder-williamsii*	Grows in shrubland/chaparral habitats on dry, cold ridge crests, stony flats, and disturbed roadbeds.
Flowering Plants	Dunes four-wing saltbush	*Atriplex canescens var. gigantea*	Grows in habitats of interdune valleys with scurfpea, anomalous sunflower, and other sand-loving plants. Found at elevations between 1450 to 1600 meters.
Flowering Plants	King's desert grass	*Blepharidachne kingii*	Grows in pinyon-juniper woodlands.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Sickle-pod rockcress	*Boechera atrorubens*	This species occurs on rocky summits, and sagebrush slopes on sandy loam.
Flowering Plants	Bodie Hills rockcress	*Boechera bodiensi*	Occurs at high elevations on rolling to steep topography; found on dry, open, rocky, high or north-facing slopes (often in rock crevices) and exposed rocky ridges and summits. Occurs on granitic, rhyolitic, or andesitic substrates. Occurs in high elevation Great Basin scrub, pinyon and juniper woodland, and subalpine lodgepole pine and whitebark pine forests. Preferred microsites include moisture-accumulating microsites in sagebrush associations, under shrubs, and on disturbed soils of prospector's diggings.
Flowering Plants	Davidson's rockcress	*Boechera davidsonii*	Ledges and rock outcrops in lodgepole forests, subalpine forests, and alpine fell-fields.
Flowering Plants	Elko rockcress	*Boechera falcifructa*	Endemic to Nevada, predominantly in Elko County with one disjunct population in the Shoshone Mountains in Lander County. Occurs on gently north-sloping, sagebrush-dominated slopes with a high moss/cryptogamic cover over silty substrates.
Flowering Plants	Sapphire rockcress	*Boechera fecunda*	This species occurs in the ecotone between lower treeline (associated species include *Pseudotsuga menziesii*, *Juniperus scopulorum* and/or *Pinus ponderosa*) and shrub/grasslands (associated species include Artemisia tridentata and/or *Cercocarpus ledifolius* and *Agropyron* spicatum. Soils are highly calcareous, sandy to coarsely gravelly, derived from metamorphosed calcium silicate parent materials. Sites are usually sparsely vegetated and on south to west-facing steep, eroding slopes (erosion and a dry, warm microclimate probably help maintain the open habitat).
Flowering Plants	Hells canyon rockcress	*Boechera hastatula*	Endemic to Oregon where it is found in subalpine or subarctic areas on shallow gravel of igneous rock outcrops.
Flowering Plants	Mt. Adams rockcress	*Boechera paddoensis*	Known only from the mountains of central Washington and northeastern Oregon where it grows on alpine slopes and talus.
Flowering Plants	Small rock cress	*Boechera pusilla*	Endemic to the southern Wind River Range in Wyoming. Occurs in creices and sparsely vegetated, occurs granite soil in outcrops surrounded by sagebrush grasslands.
Flowering Plants	Upward-lobed moonwort	*Botrychium ascendens*	Occurs in open habitats and microsites with evidence of slight to moderate disturbances, such as lower montane mesic coniferous forest, open subalpine slopes, and mountain and riparian meadows.
Flowering Plants	Prairie moonwort	*Botrychium campestre*	Rangewide, this species is reported from sandy grasslands and limestone prairies.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Dainty moonwort	*Botrychium crenulatum*	Occurs in very moist sites with saturated soil and dense, herbaceous vegetation. Usually found at higher elevations in southern areas (most of Nevada). Probably has some affinity for limestone or other calcareous substrates.
Flowering Plants	Western moonwort	*Botrychium hesperium*	Found in upper montane to subalpine elevations in open, mesic meadows with low, herbaceous cover including sagebrush shrublands, moist and dry meadows and forest edges on dry, gravelly, or sandy loam soils.
Flowering Plants	Slender moonwort	*Botrychium lineare*	Early- to mid-succession species in a wide variety of habitats including mid-height grasslands, grazed rangelands, a limestone shelves, woodlands, roadside gravels and in grass under conifers.
Flowering Plants	Moonwort	*Botrychium lunaria*	Generally occurs on calcareous soils in the sunlight of open fields, wood edges, and occasionally forests in the southern parts of its range.
Flowering Plants	Mountain grap-fern	*Botrychium montanum*	Moist duff around seeps or streams under mature *Thuja plicata* or, rarely, *Picea engelmannii,* at mid-montane elevations. Occasional in fen-like seeps or in moist to wet meadows with moss or lush herbaceous cover at subalpine elevations.
Flowering Plants	Peculiar moonwort	*Botrychium paradoxum*	A small perennial fern with a single above ground frond. Found in mesic meadows associated with spruce and lodgepole pine forests in the montane and subalpine zones; also found in springy western red cedar forests.
Flowering Plants	Stalked moonwort	*Botrychium pedunculosum*	Mesic meadows with low, herbaceous or grassy cover, gravelly soil, brushy areas, and in duff under mature *Thuja plicata*, at upper montane to subalpine elevations.
Flowering Plants	Blue gramma	*Bouteloua gracilis*	Grows pure stands in mixed prairie associations and disturbed habitats, usually on rocky or clay soils and mainly at elevations of 300-3000 m.
Flowering Plants	American thorowax	*Bupleurum americanum*	Found in stony soil of grasslands, meadows, turf, fellfields, montane to alpine elevations.
Flowering Plants	Brewer's reedgrass	*Calamagrostis breweri*	Occurs n moist subalpine and alpine meadows, lake margins, and stream banks. 1400–2800m.
Flowering Plants	Cascade reedgrass	*Calamagrostis tweedyi*	Grows in seral stages of Douglas-fir and subalpine fir forests in the montane zone.
Flowering Plants	Winged water-starwort	*Callitriche marginata*	Aquatic plant that grows in wet areas and vernal pools.
Flowering Plants	Wheel fruited water-starwort	*Callitriche trochlearis*	Found in western central to northern California (below about 500 meters) and western Oregon, occurring in shallow water or mud, near the margin or free-floating in ponds and marshes.
Flowering Plants	Howell's mariposa-lily	*Calochortus howellii*	Found in the Illinois River Valley of southern Oregon in dry, rocky, serpentine outcrops in open woodlands and brush-covered slopes at elevations of 300–800 meters.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Long-haired star-tulip	*Calochortus longebarbatus var. longebartatus*	Found in grassy margins of wet meadows and under pines at elevations of 1600--1800 m.
Flowering Plants	Peck's mariposa-lily	*Calochortus longebarbatus var. peckii*	Found in meadow margins, intermittent streambeds, and semi-moist areas in ponderosa pine forests.
Flowering Plants	Green-brand mariposa-lily	*Calochortus macrocarpus var. maculosus*	Dry plains, rocky slopes, sagebrush scrub, and in pine forests. Usually occurring in volcanic soils.
Flowering Plants	Booth's evening primrose	*Camissonia boothii ssp. boothii*	Most abundant in arid areas such as deserts.
Flowering Plants	Cusick's camas	*Camassia cusickii*	Occurs at low to mid elevations on steep, rocky hillsides and ridgetops in moist soils, usually along or near creeks. Often found in sagebrush scrub and among scattered ponderosa pine.
Flowering Plants	Grand Junction Chylismia	*Camissonia eastwoodiae*	Plants are annuals and generally found in low densities on barren clay soils of the Mancos Formation often alongside Gardner's saltbush (*Atriplex gardneri*).
Flowering Plants	Lewis' River suncup	*Camissonia parvula*	This species is found in areas with sagebrush scrub and sandy soils at elevations ranging from 100 to 2,700 meters.
Flowering Plants	Pygmy suncup	*Camissonia pterosperma*	This species occurs on well-drained slopes, often of volcanic origin, with sagebrush and pinyon-juniper, at elevations of 700 to 2600 m, but at 1400 to 2400 m elevation in California.
Flowering Plants	Washoe suncup	*Camissonia pusilla*	Dry, open to branchy slopes, flats, and roadsides on sandy soil with Artemisia to pinyon-juniper. Commonly found growing sympatrically with *Camissonia parvula* and *Camissonia pubens* (Kartesz 1988). Mixed desert shrub, sagebrush, and mountain brush communities at ca. 1220 to 1830 m.
Flowering Plants	Indian Valley sedge	*Carex aboriginum*	Grows primarily in sagebrush steppe, dominated by *Artemisia tridentata*, *Purshia tridentata,* and *Pseudoroegneria spicata*.
Flowering Plants	Blackened sedge	*Carex atrosquama*	Moist to dry subalpine and alpine meadows, fellfields, rocky slopes, swales, and shores.
Flowering Plants	Hairlike sedge	*Carex capillaris*	Moss mats in moist areas; bogs, marshes, stream banks, wet meadows, moist woods, usually on limestone substrates at elevations of 1600–2800 m.
Flowering Plants	Capitate sedge	*Carex capitata*	Found in wet to seasonally wet alpine or subalpine meadows on calcareous substrates, or at lower elevations in cold air drainages. Also found along shores, boreal forest heaths and mires.
Flowering Plants	Cordilleran sedge	*Carex cordillerana*	Found in mesic forests, disturbed open grassy slopes, and disturbed rocky soils with organic layers, often near streams.
Flowering Plants	Idaho sedge	*Carex idahoa*	Idaho sedge is a regional endemic known from several dozen sites in Montana. It inhabits moist alkaline meadows, often along streams. It most often occupies ecotonal areas between wet meadow and sagebrush steppe.
Flowering Plants	Slender sedge	*Carex lasiocarpa var. americana*	Fens, bogs, lake shores, and wet meadows, sometimes forming floating mats, in deep, organic, acidic soils with low to moderate nutrient levels.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Intermediat sedge	*Carex media*	Grows in drier habitats above timberline
Flowering Plants	Pyrenaean sedge	*Carex micropoda*	In dry or moist, rocky meadows and slopes, ledges, talus, and scree; also in washes, arid or very dry desert areas and disturbed habitats along roads, railroads, burned areas, vacant lots, and similar places.
Flowering Plants	Spikenard sedge	*Carex nardina*	Grows on dry alpine ridges and slopes, abrasion plateaus, heaths and fellfields at elevations of 2300–3000 m.
Flowering Plants	Western sedge	*Carex occidentalis*	Frequently found in dry grasslands and forests, generally at mid-elevations, but extending upward to sulalpine or alpine areas from 1,200 to 3,500 meters in elevation.
Flowering Plants	New sedge	*Carex pelocarpa*	Grows in alpine areas, often above the timberline in dry sites and barren slopes.
Flowering Plants	Retrorse sedge	*Carex retrorsa*	Grows along stream shores, lake shores, marshes, graminoid meadows, openings in swamps.
Flowering Plants	Russet sedge	*Carex saxatilis*	Grows in fens, bogs, and lake shores at high elevations (1800–2400 m).
Flowering Plants	Alaskan single-spiked sedge	*Carex scirpoidea ssp. stenochlaena*	Moist meadows, stream banks, and rocky slopes, the more southerly populations on waterfalls and seepy cliffs on somewhat acidic substrates.
Flowering Plants	Dark alpine sedge	*Carex subnigricans*	Moist, rocky, alpine to subalpine slopes and meadows at elevations of 2300–2800 m.
Flowering Plants	Many-headed sedge	*Carex sychnocephala*	Moist or wet ground adjacent to marshes or lakes, on a wide variety of substrates: rocky, sandy, silty, and at least moderately alkaline soils.
Flowering Plants	Tahoe sedge	*Carex tahoensis*	This species occurs in grasslands, sagebrush as well as open, rocky and sandy slopes, subalpine and alpine meadows, at elevations ranging from 600 to 3,700 meters.
Flowering Plants	Tioga Pass sedge	*Carex tiogana*	Found in meadows and on terraces next to lakes.
Flowering Plants	Foothill sedge	*Carex tumulicola*	Occurs in upland prairies, dry to moist meadows, and in openings in Garry Oak woodlands.
Flowering Plants	Native sedge	*Carex vernacula*	Alpine and subalpine wet meadows, rocky slopes that receive snowmelt, edges of headwater streams, and lake shores at elevations of 2300–2800 m.
Flowering Plants	Rural paintbrush	*Castilleja flava var. rustica*	This variety is mostly found in montane sagebrush habitats with dry soils at elevations ranging from 1,100 to 2,300 meters.
Flowering Plants	Fraternal paintbrush	*Castilleja fraterna*	Narrow endemic found only in the Wallowa Mountains of Oregon. Occurs on moist or dry rocky slopes and flats, ridges and talus, and in dwarf willow mats.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Peck's Indian paintbrush	*Castilleja peckiana*	Open conifer forests, sagebrush slopes, riparian meadows, shores, dry areas, sandy or gravelly soil, pine forests, deserts, grasslands, and rocky areas
Flowering Plants	Purple alpine paintbrush	*Castilleja rubida*	Rocky, open ground on alpine summits at elevations of 2240-3000 m. Found in the Wallowa Mountains, Oregon.
Flowering Plants	Monte Neva paintbrush	*Castilleja salsuginosa*	Endemic to Nevada; it is limited to alkaline soils of travertine hot springs in two areas: one in White Pine County (Monte Neva Hot Springs in the Steptoe Valley) and one in Eureka County (Hot Spring Hill). It occurs in damp, open, alkaline to saline, clay soils of hummocks and drainages on travertine hot spring mounds.
Flowering Plants	Thompson's painbrush	*Castilleja thompsonii*	Dry soil, frequently associated with sagebrush. Local on open slopes and bald summits of the surrounding mountains to about 7000 ft.
Flowering Plants	Sticky paintbrush	*Castilleja viscidula*	Found in dry to mesic sagebrush steppes, rocky slopes, ledges, and open woodlands.
Flowering Plants	Smooth wild cabbage	*Caulanthus crassicaulis var. glaber*	This variety is found in pinyon-juniper woodland and sagebrush scrub at elevations ranging from 1,200 to 2,900 meters.
Flowering Plants	Alexander wild cabbage	*Caulanthus major*	Grows in dry mountain slopes and similar habitats in the Great Basin.
Flowering Plants	Hairy wild cabbage	*Caulanthus pilosus*	Open, dry habitat in the Great Basin of Nevada, the Eastern slope of the Sierra Nevada to 9,000 ft (2,700 m) and surrounding regions of the United States northward to the SE corner of Oregon.
Flowering Plants	Prostrate ceanothus	*Ceanothus prostratus*	Occurs on well-drained soils and thrives in the acidic, granitic soils of the Sierra Nevada Mountains. It is commonly found as an understory beneath Douglas-fir, Jeffery pine, and ponderosa pine.
Flowering Plants	Birchleaf Mountain mahogany	*Cercocarpus montanus*	This species is found on sandstone, granite, limestone ridges, rocky slopes, and valley floors, as well as grasslands, savannahs, juniper-oak, pinyon-juniper, yellow pine woodlands, aspen, and pine-fir forests, at elevations ranging from 800 to 3,000 meters.
Flowering Plants	Cusick's pincushion	*Chaenactis cusickii*	A regional endemic that is locally abundant on ash-clay soils in southwestern Idaho and southeastern Oregon.
Flowering Plants	Desert or broadflower pincushion	*Chaenactis stevioides*	This species is found in arid or semiarid, gravelly, or sandy, open slopes, flats, and shrublands at elevations ranging from -30 to 2,300 meters.
Flowering Plants	Desert Chaenactis	*Chaenactis xantiana*	Arid and semiarid shrublands and chaparral, and prefers sandy soils.
Flowering Plants	Wheeler's skeleton-weed	*Chaetadelpha wheeleri*	This species is found in dunes, sandy soils and alkali flats in sagebrush scrub and creosote bush scrub, at elevations ranging from 800 to 1,800 meters.
Flowering Plants	Fee's lip fern	*Cheilanthes feei*	In arid climates, on limestone or sandstone cliff crevices, outcrops, rocky areas, and steep slopes.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Spearhed	*Chlorocrambe hastata*	Mountain slopes and canyons, thickets, shady damp areas, stony and brushy hillsides.
Flowering Plants	Naked-stemmed evening-primrose	*Chylismia scapoidea ssp. scapoidea*	This subspecies occurs in shrublands and rocky, gravelly, or sandy slopes.
Flowering Plants	Bulbous water hemlock	*Cicuta bulbifera*	Lives in sunny areas in swamps, fens, along shores, and in slow moving water.
Flowering Plants	Cedar Rim thistle	*Cirsium aridum*	Endemic to the Green River Basin, Beaver Rim, Sweetwater River Valley and Flaming Gorge area in Wyoming. Occurs in sparsely vegetated openings within Wyoming sagebrush grasslands at 5,80-7,500 feet.
Flowering Plants	Palouse thistle	*Cirsium brevifolium*	Lives in Palouse grassland remnants, dry rocky slopes, and roadsides.
Flowering Plants	Mojave thistle	*Cirsium mohavense*	Occurs in damp soils around desert springs, streams, and ditches from 1,500 to 9,000 feet.
Flowering Plants	Ownbey's thistle	*Cirsium ownbeyi*	Juniper, sagebrush, and riparian communities. Usually on limestone, talus, or sandy slopes. Weber and Morgan formations.
Flowering Plants	Slender-lobed clematis	*Clematis columbiana var. tenuiloba*	Rock faces and peaks, typically in exposed areas or thin pine woodlands
Flowering Plants	Many-stemmed spider flower	*Cleome multicaulis*	Found on alkaline soils at the margins of spring-fed playa lakes and dried lakebeds.
Flowering Plants	Hillman's stickweed	*Cleomellas hillmanii var. goodrichii*	Grows in dry, open, often alkaline meadows and flats.
Flowering Plants	Alkali cleomella	*Cleomella plocasperma*	Grows mainly in wet, alkaline soils such as those around hot springs.
Flowering Plants	Barren Valley collomia	*Collomia renacta*	This species occurs on rocky soils (rocks average less than 5-10 cm wide) on south-facing slopes.
Flowering Plants	Slender gentian	*Comostoma tenellum*	Grows in alpine areas, typically where moist.
Flowering Plants	Solieri's pygmyweed	*Crassula solieri*	Grows in vernal pools, along the shores of lakes and streams, and at elevations below 2,100 meters.
Flowering Plants	Barneby's cryptanth	*Cryptantha barnebyi*	Locally abundant on the domed or gently sloping white shale knolls of the Green River Formation, mostly in shadscale and pinyon-juniper communities at 1850-2400 m elevation.
Flowering Plants	Tufted cryptantha	*Cryptantha caespitosa*	Populations are usually restricted to rocky or chalky ridgetops in cushion plant communities. Forb-grass, pinyon-juniper, mountain brush, limber pine, and spruce-fir forests at 1950 to 3120 meters.
Flowering Plants	Silver-mounded candleflower	*Cryptantha cana*	This species occurs on open slopes in juniper woodlands and valleys, in sandy, calcareous soil, and on sandstone outcroppings and bluffs, at 1219 - 2300 m elevation.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Cocks-comb cat's-eye	*Cryptantha celosioides*	Stony or sandy, often sparsely vegetated soil of grasslands, sagebrush steppe; plains, valleys, montane.
Flowering Plants	Mound catseye	*Cryptantha compacta*	Occurs in salt desert shrub and mixed desert shrub communities, mostly on Devonian Sevy dolomite; on shallow, stony loam; rocky slopes; and summits of desert ranges.
Flowering Plants	Creutzfeldt-flower	*Cryptantha creutzfeldtii*	Known only from Carbon County and Emery County, Utah where it is a Navajo Basin endemic found in the San Rafael Swell. Grows in barren clay knolls and shaley slopes, in shadscale and mat-atriplex communities.
Flowering Plants	Fendler cat's-eye	*Cryptantha fendleri*	Widespread in the western U.S. Grows in open areas of sand dunes, and occupies a range of sparsely vegetated sites and successional stages.
Flowering Plants	Narrow-stem cryptantha	*Cryptantha gracilis*	This species is found in joshua tree and pinyon-juniper woodlands, as well as dry slopes, mesas, creosote bush scrub, all in sandy to rocky soils.
Flowering Plants	Clearwater cryptantha	*Cryptantha grandiflora*	Grows in grasslands, open conifer forest, scree slopes, and volcanic-based substrates.
Flowering Plants	Gray cryptantha	*Cryptantha leucophaea*	Sandy substrates, especially sand dunes that have not been completely stabilized.
Flowering Plants	Malheur cryptantha	*Cryptantha propria*	Native Habitat includes clay hillsides, sandy bluffs, rocky outcrops.
Flowering Plants	Schoolcraft catseye	*Cryptantha schoolcraftii*	In sagebrush scrub, on white-colored volcanic ash deposits at 837 - 1750 m, most locations are in a basalt mesa area along the west side of Black Rock Desert.
Flowering Plants	Silky cryptantha	*Cryptantha sericea*	This species occurs in open pine-juniper woodlands and fir-mountain brush communities, in sandy to gravelly soils, shaley slopes and sandstone outcrops.
Flowering Plants	Pine Woods cryptantha	*Cryptantha simulans*	This species found in open conifer forests and shrublands, as well as dry, gravelly sites, slopes, and disturbed areas.
Flowering Plants	Snake River cryptanthea	*Cryptantha spiculifera*	This species occurs in dry, open slopes and flats in plains and grasslands, sandy or stony ridges, foothills, valleys, and sagebrush steppe.
Flowering Plants	Owl Creek miner's candle	*Cryptantha subcapitata*	Endemic to Owl Creek and Bridger Mountains and northern Wind River Basin in Wyoming. Occurs on sandy-gravelly slopes and desert ridges in sparsely vegetation cushion plan communities.
Flowering Plants	Torrey's cryptantha	*Cryptantha torreyana*	An annual that grows in sparsely-vegetated soil, talus of woodlands, open forest, grasslands, sagebrush steppe, often in partial shade around the base of trees.
Flowering Plants	Steller's rockbrake	*Cryptogramma stelleri*	Moist, shaded cliffs sand ledges, often on calcareous rocks, middle elevations to the subalpine.
Flowering Plants	Greeley's wavewing	*Cymopterus aculis var. greeleyorum*	Occurs in desert communities, including desert scrub, sagebrush, blackbrush, pinyon-juniper, dry plains, and prairies.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Intermountain wavewing	*Cymopterus basalticus*	Reported to occur on bare basaltic, but more often dolomite rocks, barren clays, dolomite outcrops, gravelly hills and alluvial fans, at elevations of 1705 - 2134 meters (5600 - 7000 feet) in desert shrub, pinyon-juniper and sagebrush communities.
Flowering Plants	Pinnate spring-parsley	*Cymopterus beckii*	Sandy or stony crevices, ledges, and cliff bases on Navajo Sandstone in pinyon-juniper, mountain brush, and ponderosa pine-manzanita conifer-oak, and Douglas fir communities between 1700-2635 m elevation.
Flowering Plants	Uintah Basin springparsley	*Cymopterus duchesnensis*	Found in cold desert shrub, sagebrush, and juniper communities on sandy clay and clay semi-barrens of the Mancos and Morrison shales (Morrison, Uintah, Wasatch and Green River formations) from 4,700 to 6,800 feet (1,433 to 2,073 meters) elevation.
Flowering Plants	Evert's wafer-parsnip	*Cymopterus evertii*	Montane populations in Wyoming are on dry, rocky, often disturbed ridges and in meadows with volcanic substrates at 2200-3300 m elevation. Other Wyoming populations are along sandstone ridges with scattered Limber pine (Pinus flexilis) and Utah juniper (Juniperus osteosperma) at elevations of 1770-1800 m. The Utah plants are growing in gravelly soils on limestone outcrops at 2620 m.
Flowering Plants	Goodrich biscuitroot	*Cymopterus goodrichii*	Endemic to the Toiyabe and Humboldt ranges of Nevada on steep scree and talus slopes of slate or limestone.
Flowering Plants	Henderson's wavewing	*Cymopterus hendersonii*	Occurs in dry talus or skeletal soil of upper slopes and ridge crests at 2620-3000 m (8,600- 9600 ft.) in elevation. Associated vegetation is sparse and dominated by cushion plants.
Flowering Plants	Ibapah wavewing	*Cymopterus ibapensis*	This species occurs in alkaline, clay soil in valleys, rocky hillsides and flats.
Flowering Plants	Snowline spring-parsley	*Cymopterus nivalis*	Dry alpine meadows, high rocky ridges, under alpine conifers, and dry meadows. Typically found at elevations between 2,700–3,300 meters.
Flowering Plants	Purple cymopterus	*Cymopterus purpurascens*	This species occurs on shrubby slopes.
Flowering Plants	Wiliams' wafer-parsnip	*Cymopterus williamsii*	Endemic to the Bighorn Mountains in Wyoming. Occurs on open ridgetops and upper slopes with exposed limestone outcrops or talus.
Flowering Plants	Clustered lady's-slipper	*Cypripedium fasciculatum*	Predominantly occurs within the Klamath mountain region in coniferous forests with steep slopes and dense canopy cover.
Flowering Plants	Hole-in-the-rock prairie-clover	*Dalea flavescens var. epica*	Endemic to Utah. It grows on sandstone bedrock and sand among blackbrush and mixed desert shrub communities at 4,700 to 5,000 feet elevation.
Flowering Plants	Ordate dalea	*Dalea ornata*	Dry sand, shaley barrens, rocky ridges, gullied bluffs, knolls, and canyon washes with Artemisia to yellow pine.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Fringed waterplantain	*Damasonium californicum*	Damp ground, in and near water of shallow ponds, vernal pools, intermittent streams, sloughs, and mud flats at low elevations.
Flowering Plants	Poverty oatgrass	*Danthonia spicata*	Open woods, dry prairies, limestone and sandstone glades, balds, thinly wooded bluffs, rocky slopes, and roadsides.
Flowering Plants	Wyoming tansymustard	*Descurainia torulosa*	Endemic to the southern Absaroka Range in Wyoming. Gound at the base of steep cliffs at 7,700-10,500 feet.
Flowering Plants	Dimeresia	*Dimeresia howellii*	Grows in dry volcanic sand, scree or barren ridges, at high elevations.
Flowering Plants	Cusick's monkeyflower	*Diplacus cusickii*	This species occurs in canyons, ditches, washes, black volcanic gravel, volcanic ash and sand, sagebrush areas, as well as on sand talus, diatomaceous slopes, and basalt outcrops, at elevations ranging from 800 to 1,000 meters.
Flowering Plants	Steamboat monkeyflower	*Diplacus ovatus*	Dry to somewhat moist, often barren, loose, sandy to gravelly slopes derived from siliceous sinter deposited by hot springs in the sagebrush zone, or from highly acidic hydrothermally altered andesite or rhyolite deposits supporting sparse yellow pine woodlands within the pinyon-juniper zone, or possibly on sandy alkaline valley floor deposits in the sagebrush zone, sometimes on adjacent roadsides or washes.
Flowering Plants	Darkthroat shootingstar	*Dodecatheon pulchellum var. shoshonense*	Found in widely scattered, nearly always alkaline meadows mainly in the valley bottoms. Can be locally abundant at the bases of limestone cliffs.
Flowering Plants	Bacigalupi's downingia	*Downingia bacigalupii*	Found in moist meadows and vernal pools.
Flowering Plants	Harlequin calicoflower	*Downingia insignis*	Found in vernal pools, roadside ditches, playas, lakeside margins and stream margins.
Flowering Plants	Pointed draba	*Draba globosa*	Found above treeline in remote alpine meadows, snow flushes and talus slopes.
Flowering Plants	Lost River whitlow-grass	*Draba hitchcockii*	Endemic to Idaho, found in gravelly soil and limestone outcrops.
Flowering Plants	Yellowstone whitlow-grass	*Draba incerta*	Found in stony soil of fellfields, turf, cliffs, exposed slopes; alpine, occasionally lower on exposed calcareous sites.
Flowering Plants	Subalpine whitlow-grass	*Draba oreibata var. oreibata*	Found on rock outcrops, gravelly soil, and talus in mixed conifer and subalpine meadow communities.
Flowering Plants	Pennell draba	*Draba pennellii*	Restricted to White Pine County, Nevada and Juab County, Utah. Occurs in remote and inaccessible crevices and ledges of carbonate or quartzite cliffs and rock faces.
Flowering Plants	American dragonhead	*Dracocephalum parviflorum*	Found in open, moist areas in Oregon at low to middle elevations east of the Cascades crest in open, rocky, moist riparian and woodland areas.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	False tickhead	*Eatonella nivea*	This small annual is native to the western United States, particularly the Great Basin, where it grows in sandy soils or gravelly soils in barrens or shrubland/chaparral or often sagebrush scrub.
Flowering Plants	Short seeded waterwort	*Elatine brachysperma*	Found in open, rocky, moist riparian and woodland areas in Oregon at low to middle elevations east of the Cascades crest.
Flowering Plants	Bolander's spikerush	*Eleocharis bolanderi*	Found in a variety of wet habitats in Oregon, including: mountain meadows, springs, seeps, and stream margins.
Flowering Plants	Dune wildrye	*Elymus simplex var. luxurians*	Sparsely vegetation slopes and flats, most common in swales of choppy dune landscapes. Only known from a few locations in Wyoming.
Flowering Plants	Nevada willowherb	*Epilobium nevadense*	Grows in Pinyon-juniper and oak-mountain mahogany communities, at 1560-2685 m elevation.
Flowering Plants	Swamp willow-herb	*Epilobium palustre*	Mesic to wet meadows, stream banks, and talus, from middle to high elevations in the mountains.
Flowering Plants	Chatterbox	*Epipactis gigantea*	This orchid favors the shoreline of streams, lakes, seeps, and the sandy soil of marshes and riparian areas.
Flowering Plants	Yellow lovegrass	*Eragrostis lutescens*	Found on sandy banks of lakes and streams, moist alkaline flats, in canyons and disturbed grounds.
Flowering Plants	Nevada suncup	*Eremothera nevadensis*	Endemic to central-western Nevada, from 3,900 to 5,400 feet in elevation. It grows in various soils in dry, open places in valleys and foothills. It occurs on open, sandy, gravelly, or clay slopes and flats in the salt desert, shadscale, and lower sagebrush zones.
Flowering Plants	Dwarf evening-primrose	*Eremothera pygmaea*	Endemic to Oregon. Found on dry plains and slopes with unstable soils or on gravel in steep talus, dry washes, banks and roadcuts.
Flowering Plants	Bloomers goldenweed	*Ericameria bloomeri*	Grows on dry, rocky slopes, and in open woods, coniferous forests, open gravelly or rocky places, mixed forests, pine woods, shrublands, open slopes, ridges, and roadsides
Flowering Plants	Greenwood's goldenbush	*Ericameria lingnumviridis*	A Utah Great Basin endemic, where it is found in riparian areas of the Utah Great Basin region.
Flowering Plants	Dwarf gray rabbitbrush	*Ericameria nauseosa var. nana*	Found in shrublands, grassy meadows, and conifer woods.
Flowering Plants	Winward's narrow leaf goldenweed	*Ericameria winwardii*	Rare species only know in Wyoming and Idaho. Occurs on unstable substrates susceptible to erosion from disturbances.
Flowering Plants	White cushion erigeron	*Erigeron disparipilus*	This species occurs on rocky and gravelly substrates of ridges and slopes, in grassland and sagebrush, at elevations ranging from 600 to 2,200 meters.
Flowering Plants	Fan-leaved fleabane	*Erigeron flabellifolius*	Grows on scree and talus.
Flowering Plants	Broad fleabane	*Erigeron latus*	Thin, volcanic soils on gravelly or rocky hillsides and outcrops in the sagebrush zone, near juniper woodlands. 1600-2000 meters elevation.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Cliff daisy	*Erigeron petrophilus*	Grows in forest and woodland, often, as its name suggests, in rocky habitat, sometimes on serpentine soils.
Flowering Plants	Tender fleabane	*Erigeron tener*	Grows in rocky or gravelly areas, such as talus, cliff ledges, and crevices at elevations of 1700–3200m. Is often associated with *Atriplex*, sagebrush, pinyon-juniper, yellow pine, bristlecone pine, limber pine, or spruce.
Flowering Plants	Limestone daisy	*Erigeron uncialis var. uncialis*	This taxon grows in crevices and cracks of limestone outcrops or at the base of cliffs within Great Basin sagebrush scrub, subalpine coniferous forest, or pinyon and juniper woodland at altitudes of 1,900 to 2,900 meters.
Flowering Plants	Untermann's daisy	*Erigeron untermannii*	Calcareous shales and sandstones, mainly of the Uinta and Green River formations, in various plant communities at elevations ranging from 2073 to 2890 meters. Pinyon-juniper, mountain mahogany, limber and bristlecone pine, and sagebrush communities on calcareous shales and sandstones of the Uinta and Green River Formations between 7,000 and 9,400 feet elevation
Flowering Plants	Single-stem buckwheat	*Eriogonum acaule*	Endemic to the Wyoming Basin. Plants exhibit a low mat-forming habit in barren areas of fine soils often with sagebrush and saltbrush.
Flowering Plants	Alexander's buckwheat	*Eriogonum alexanderae*	Occurs on light-colored clay outcrops, hillsides, and badlands in the shadscale, sagebrush, and pinyon-juniper zones.
Flowering Plants	Ibex buckwheat	*Eriogonum ammophilum*	This taxon occurs in sandy washes, flats, and dunes and stabilized sand in shadscale, horsebrush, winterfat, rabbitbrush, ephedra, and pinyon-juniper communities at 1460 to 1890 meters elevation.
Flowering Plants	Windloving buckwheat	*Eriogonum anemophilum*	Wind-loving Buckwheat occurs on bleak, exposed, windswept summits, ridges, and exposed rocky slopes on loose, gravelly to rocky limestone and on volcanic tuff outcrops, and at low elevations on barren clay hills. It occurs in saltbush and sagebrush communities, pinyon-juniper woodlands, and in barren areas, at elevations of 1400-2600 meters.
Flowering Plants	Kaye H. Throne's buckwheat	*Eriogonum artificis*	This species occurs in sandy to gravelly soil, on volcanic slows, mixed grassland, sagebrush and juniper woodland communities.
Flowering Plants	Beatley buckwheat	*Eriogonum beatleyae*	Dry volcanic outcrops (Reveal 1989). Volcanic tuffaceous soils, sagebrush communities, pinyon-juniper woodlands at 1,700-2,800 meters elevation.
Flowering Plants	Short-flowered eriogonium	*Eriogonum brachyanthum*	Creosote bush, other warm desert shrub & shad-scale communities
Flowering Plants	Lost Creek wild buckwheat	*Eriogonum brevicaule var. mitophyllum*	Grows in clay flats and slopes, saltbush communities and juniper woodlands at 1700-1800 m.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Golden buckwheat	*Eriogonum chrysops*	This species is found within the cold desert environment of the Owyhee uplands, typically within the Artemisia arbuscula-Poa sandbergii lithosolic association in rocky scabland areas. It occurs in relatively open sites, on flats, gently sloping ridges, and outcrops. The substrate is dry, barren, shallow, gravelly to rocky soil overlying basalt or rhyolite flows.
Flowering Plants	Grand buckwheat	*Eriogonum contortum*	Plants are found growing on badlands composed of Mancos Formation shales with vegetative components of the salt desert scrub community.
Flowering Plants	Crosbys buckwheat	*Eriogonum crosbyae var. crosbyae*	Light colored, tuffaceous sandstones and (in Nevada) clay outcrops. Typically, on rolling hills dominated by big sagebrush (Artemisia tridentata). 1650-1700 meters elevation.
Flowering Plants	Pueblo Mountains buckwheat	*Eriogonum crosbyae var. mystrium*	Alpine plant that grows on thin gravelly soils on ridgelines and high convex slopes.
Flowering Plants	Cusick's buckwheat	*Eriogonum cusickii*	Occurs on barren flats and hills with dry soil over weathered basalt and welded tuff. Plants in surrounding areas include dwarf sagebrush (*Artemesia arbuscula*) and western juniper (Juniperus occidentalis). It occurs from 1200 to 1600 m (3940 to 5250 feet) elevation.
Flowering Plants	Churchill Narrows buckwheat	*Eriogonum diatomaceum*	Dry, relatively barren and undisturbed, white to yellowish tan, often gysiferous, clay to silty diatomaceous deposits of the Coal Valley Formation, with a variable volcanic cobble overburden, on rounded knolls, low ridges, slopes, and especially small drainages on all aspects at elevations of 1300-1410 m, with *Atriplex confertifolia, Stanleya pinnata, Sarcobatus baileyi, Artemisia spinescens*, *Kochia americana, Tetradymia glabrata*, and other shadscale zone associates.
Flowering Plants	Tall buckwheat	*Eriogonum elatum var. elatum*	Sand and gravel slopes and flats, grasslands, sagebrush desert, ponderosa pine forest openings, and montane ridges.
Flowering Plants	Ephedra buckwheat	*Eriogonum ephedroides*	Found in juniper and sagebrush-grass communities on white shale of the Green River Shale Formation at 5,700 feet (1,737 meters) elevation.
Flowering Plants	Hooker's buckwheat	*Eriogonum hookeri*	Grows in plateau and desert habitat often associated with pinyon-junipers.
Flowering Plants	Lewis buckwheat	*Eriogonum lewisii*	Dry, exposed, rocky, convex ridge-line knolls and crests underlain by siliceous carbonate, siliceous limestone, or dolomite on all aspects at 1970-2960m elevation. At lower elevations, occasionally found on clay hills derived from silty carbonate or calcium-rich siliceous rock. Co-dominating with Artemisia arbuscula, Chrysothamnus viscidiflorus, Elymus elymoides, and Achnatherum hymenoides.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Lobb's buckwheat	*Eriogonum lobbii*	Habitat is gravelly to rocky or talus slopes, mixed grassland, buckbrush, manzanita, and sagebrush communities, and montane, subalpine, or alpine conifer woodlands. In the high mountains of northwestern California and southwestern Oregon and the southern portion of the North Coast Range of California, plants are frequently associated with serpentine soils. In the Sierra Nevada of eastern California and west-central Nevada, the species is found almost exclusively on granitic soils and infrequently on volcanic ones.
Flowering Plants	Schoolcraft buckwheat	*Eriogonum microthecum var. schoolcraftii*	Sandy to rocky soil, sagebrush communities, pinyon-juniper woodlands; 1400-2200 meters.
Flowering Plants	False naked buckwheat	*Eriogonum novonudum*	Grows in light-colored volcanic ash-clay slopes, sandy clay slopes, and washes in saltbush and sagebrush communities and juniper woodlands.
Flowering Plants	Deeth buckwheat	*Eriogonum nutans var. glabratum*	This taxon occurs in sand on flats and slopes within saltbush and sagebrush communities at elevations 1,500 to 1,900 meters.
Flowering Plants	Calcereous buckwheat	*Eriogonum ochrocephalum var. calcareum*	Barren white volcanic ash-clay; associates include Artemisia arbuscula, Chrysothammus nauseosus, Sitanion.
Flowering Plants	Craters-of-the-Moon wild buckwheat	*Eriogonum ovalifolium var. focarium*	Occurs on black volcanic gravel on gentle slopes and flats in sagebrush communities, conifer woodlands; 1600-1900 meters.
Flowering Plants	Steamboat buckwheat	*Eriogonum ovalifolium var. williamsiae*	This species is endemic to Steamboat Hot Springs in southern Washoe County Nevada. It prefers young, shallow, poorly developed, dry soils derived from siliceous opaline sinter precipitated by past thermal spring flows, but not currently near surface water.
Flowering Plants	Palmer's buckwheat	*Eriogonum palmerianum*	Grows in many types of desert and sagebrush plateau habitat.
Flowering Plants	Prostrate buckwheat	*Eriogonum procidium*	Grows in sagebrush scrub, red fir forest, lodgepole forest, and northern juniper woodland communities.
Flowering Plants	Altered andesite buckwheat	*Eriogonum robustum*	Known only from the Virginia and Carson Ranges and on Peavine Mountain in a small area of southern Washoe and western Storey Counties. Occurs in strongly acidic (pH 3.5–4.5), hydrothermally altered andesite soils forming barren slopes with scattered yellow pines.
Flowering Plants	Playa buckwheat	*Eriogonum salicorniodes*	Grows on sparsely vegetated, open, ash deposits and clayey substrates, sometimes in disturbed areas.
Flowering Plants	Packard's buckwheat	*Eriogonum shockleyi var. packardiae*	Oolitic limestone outcrops, sandy loess over basalt, and cobbly desert pavement over deep sandy-loam; in shadscale, mixed desert shrub and sagebrush communities; elevations from 760-1300 m; this species is endemic to southwest Idaho along the Snake River and a few tributaries in Ada and Owyhee cos.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Shockey's or matted cowpie buckwheat	*Eriogonum shockleyi var. shockleyi*	Occurs on sparsely vegetated sandy-loams, cobbly desert pavement, and gravelly calcrete on lacustrine sediments; in shadscale, mixed desert shrub and sagebrush communities; elevations from 760-1300 meters.
Flowering Plants	Railroad Canyon buckwheat	*Eriogonum soliceps*	This species is found in sagebrush communities with gravelly soil, at elevations ranging from 2,500 to 2,600 meters.
Flowering Plants	Thyme-leaved buckwheat	*Eriogonum thymoides*	Sagebrush deserts, dry ponderosa pine forest openings, and open ridges in lower mountains.
Flowering Plants	Woodside buckwheat	*Eriogonum tumulosum*	This species occurs on gravel and/or clay flats and slopes, sagebrush and saltbush communities, as well as pinyon and/or juniper woodlands at elevations ranging from 1,500 to 2,300 meters.
Flowering Plants	Green buckwheat	*Eriogonum umbellatum var. glaberrimum*	Sandy to gravelly slopes, sagebrush communities, aspen and montane conifer woodlands; 1600-2300 meters.
Flowering Plants	Visher's buckwheat	*Eriogonum visheri*	The entire range of the species lies within the unglaciated Missouri Plateau where it occurs on barren, sedimentary rock outcrops, the alluvium from those outcrops, and small exposures of soil substrates in badlands topography. It is most often found on the unvegetated clay outwash at the base of slopes, on the unvegetated eroding edge of tables, benches, terraces and buttes, and on more level patches of soil exposed by wind or water erosion.
Flowering Plants	Carson Valley monkeyflower	*Erythranthe carsonensis*	This species occurs in open areas of Great Basin sagebrush/bitterbrush scrub in coarse granite soils on gentle to moderate slopes (0-15 percent), usually on north aspects but also occasionally on south to southwest aspects. Elevation 1400-1580 m (4600-5200 ft).
Flowering Plants	Membrane-leaved monkeyflower	*Erythranthe hymenophylla*	Grows on wet spots in cracks in basalt and limestone cliffs alongside ferns and bryophytes usually above flowing water in streams and rivers.
Flowering Plants	Ehemeral monkeyflower	*Erythranthe inflatula*	Observed in rocky sagebrush habitat, especially in areas still moist from early spring soaking.
Flowering Plants	Broad-toothed monkeyflower	*Erythranthe latidens*	Found in moist gravelly, rocky areas, and low, wet fields, in sagebrush-juniper zones.
Flowering Plants	Gorman's aster	*Eucephalus gormanii*	Endemic to the Cascade Mountains of Oregon on open, dry rocky slopes and cliffs.
Flowering Plants	Arctic aster	*Eurybia merita*	Open rocky places, rock crevices, alpine lithosols, and unstable talus slopes, mostly at high elevations in the mountains, from 700 to 2300 m (2400-7400 ft).
Flowering Plants	Ackerman's green gentian	*Frasera ackermaniae*	Locally endemic to foothills of the Uintas, in the Uinta Basin. It occurs on yellowish clay soil with paleosol inclusions and selenite gypsum fragments. It occurs mixed with Utah juniper, mountain brush and desert scrub.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Modoc bedstraw	*Galium glabrescens ssp. modocense*	Occurs on gravelly slopes and under edges of rocks, at elevations of 5500-8500 feet in Oregon and California.
Flowering Plants	Warner Mountains bedstraw	*Galium serpenticum ssp. warnerense*	Grows on steep slopes in rocky areas, meadows, and juniper woodlands. Found on north-facing slopes above dry creeks and in black dirt between lava rocks.
Flowering Plants	Moss gentian	*Gentiana prostrata*	Occurs in moist meadows and bogs in subalpine and alpine areas.
Flowering Plants	Cathedral Bluff dward gentian	*Gentianella tortuosa*	Found in sagebrush through spruce-fir forests on shale outcrops of the Green River Formation at 8,500 to 10,800 feet (2,591 to 3,292 meters) elevation.
Flowering Plants	White-margined wax plant	*Glyptopleura marginata*	Grows in arid grasslands, rocky or sandy deserts, alkali flats, and at elevations of 1,000 to 2,000 meters.
Flowering Plants	Boggs Lake hedge-hyssop	*Gratiola heterosepala*	Restricted to clay soils in or near shallow water such as at the margins of lakes and vernal pools.
Flowering Plants	Cronquist's forget-me-not	*Hackelia cronquistii*	North-facing gentle to moderate slopes, with the majority of plants occurring on mid or lower slope areas. Soils are sandy. Usually found with a plant association that includes big sagebrush and indian ricegrass.
Flowering Plants	Owhyee forget-me-not	*Hackelia ophiobia*	Most mesic talus and rock crevices along the Owyhee River and its tributaries near waterline and *Artemista packardiae*.
Flowering Plants	Dune sunflower	*Helianthus deserticola*	Occurs in dry, open, deep, loose, sandy soils of aeolian deposits, vegetated dunes, and dune skirt areas. Grows on flats and gentle slopes of all aspects, generally in alkaline areas; often thriving on road berms and other stabilized disturbances within such soils.
Flowering Plants	Salt heliotrope	*Heliotropium curassavicum*	Saline places at low evelevations, often in the beds of dried ponds.
Flowering Plants	Unbellate hawkweed	*Hieracium umbellatum*	Grows in moist places in thickets and open woods.
Flowering Plants	Vanilla grass	*Hierochloe odorata*	Occupies a wide range of habitats including riparian and scrub-shrub wetlands, bare rock, talus and scree, shrubland and chaparral, mesic talus and rock crevices.
Flowering Plants	Cooper's rubber-plant	*Hymenoxys cooperi var. canescens*	This variety is found in open areas, edges of juniper/pine forest, and on roadsides at elevations ranging
Flowering Plants	Cooper's rubber-plant	*Hymenoxys cooperi var. canescens*	Found in open areas, forest edges, and roadsides.
Flowering Plants	Rock hymenoxys	*Hymenoxys lapidicola*	Known from rock crevices in pinyon-juniper and ponderosa pine-manzanita communities from 1830 to 2476m elevation.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Large Canadian St. John's wort	*Hypericum majus*	Found along ponds, lakes ides, riparian habitats, or other low, wet places, from 15-710 m (50-2340 ft).
Flowering Plants	Compact gilia	*Ipomopsis congesta ssp. crebrifolia*	Occurs on limestone, sand over lava flows, on clay, or sandy soils in sagebrush steppe and pinyon-juniper woodlands.
Flowering Plants	Spreading gilia	*Ipomopsis polycladon*	This species is found in gravelly or sandy soils in pinyon-juniper woodlands, plains, washes, mesas, and desert shrublands.
Flowering Plants	Rydberg's gilia	*Ipomopsis tenuituba*	Found on gravelly to rocky slopes and dry ground in forests, meadows and disturbed areas.
Flowering Plants	Columbia quillwort	*Isoetes minima*	Seasonally moist swales and vernal pools at middle elevations among open conifer forest or sagebrush-steppe.
Flowering Plants	Sierra Valley mousetails	*Ivesia aperta var. aperta*	Occurs on shallow, vernally saturated, slowly draining, sandy to rocky clay soils derived from mostly andesitic volcanic rock or alluvium.
Flowering Plants	Rock purpusia	*Ivesia arizonica var. saxosa*	Rock Purpusia occurs in crevices of cliffs and on boulders on volcanic (granitic or ash-flow tuff) and possibly carbonate rocks in the upper mixed-shrub, sagebrush, and pinyon-juniper zones, at elevations of 1500 - 2100 meters.
Flowering Plants	Ash Creek ivesia	*Ivesia paniculata*	Shallow, rocky soils on open volcanic ridges, gravelly flats, and openings within Sagebrush Scrub, Northern Juniper Woodland, Yellow Pine Forest, Lodgepole Forest, and Red Fir Forest communities.
Flowering Plants	Pine Nut Mountains mousetails	*Ivesia pityocharis*	This species occurs in seasonally saturated soils of sagebrush flats at 2100 to 2700 meters elevation.
Flowering Plants	Grimy ivesia	*Ivesia rhypara var. rhypara*	Populations of Grimy Ivesia are found on either light-colored ash-tuff or on outcrops of volcanic ash deposited with riverbed gravels. Habitat is low sagebrush or barren without canopy cover and is very dry.
Flowering Plants	Shelly's ivesia	*Ivesia rhypara var. shellyi*	Grows in rock crevices and depressions on large boulders made of pumice and volcanic tuff.
Flowering Plants	Plumas ivesia	*Ivesia sericoleuca*	Meadows and alkaline flats/gentle slopes, usually on volcanic substrates, sometimes on mixed-alluvium Eocene lake deposits. Habitat is generally vernally moist, drying later in the season; species sometimes also found around vernal pools or seeps. These open habitats are found within Sagebrush Scrub and Yellow Pine Forest communities. 1300 - 2200 meters.
Flowering Plants	Shockley's ivesia	*Ivesia shockleyi*	Grows on open, exposed rocky ridges and outcrops at elevations ranging from 8100-13200 feet
Flowering Plants	Tweedy's ivesia	*Ivesia tweedyi*	Dry, gravelly to rocky flats, slopes, alpine ridges, often on serpentine, in subalpine conifer woodlands.
Flowering Plants	Webber's ivesia	*Ivesia webberi*	Occurs on shallow shrink-swell clay soils with a gravelly surface layer over volcanic, generally andesitic bedrock, on mid-elevation benches and flats.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Moss rush	*Juncus bryoides*	An annual that grows in many types of wet, sandy habitat.
Flowering Plants	Least rush	*Juncus hemiendytus var. abjectus*	This variety occurs in damp open habitats such as vernal depressions, swales in sagebrush flats, streambeds, forest clearing and alpine meadows at elevations ranging from 1,400 to 3,400 meters.
Flowering Plants	Kellogg's rush	*Juncus kelloggii*	Found in damp soils of sand and clay, near vernal pools, as well as low spots in fields and meadows, and seepage areas.
Flowering Plants	Santa Lucia dwarf rush	*Juncus luciensis*	Occurs in vernal pools, depressions in meadows, wet sandy soil of seepage areas on sandstone, and stream banks
Flowering Plants	Tiehm's rush	*Juncus tiehmii*	Found along stream banks and in floodplains, moist depressions, springs, washes, moist or drying meadows, and ditches.
Flowering Plants	Three-flowered rush	*Juncus triglumis var. albescens*	Found in wet meadows, seeps, gravel shores, peatlands, wet pastures, and ditches.
Flowering Plants	Inch-high rush	*Juncus unicialis*	Found on vernal pool margins and other drying places from the southern coastal ranges of California north to Washington and west to Nevada.
Flowering Plants	Bellard's kobresia	*Kobresia myosuroides*	Found in alpine grasslands on dry to wet ground at elevations of 2400–2900 m as well as talus, dry or somewhat moist fellfields, subalpine to alpine, barrens, and tundra.
Flowering Plants	Simple bog sedge	*Kobresia simpliciuscula*	Found in the Wallowa Mountains of Oregon in fens and marshes, mesic to wet tundra, gravels and rocky slopes.
Flowering Plants	Great Plains stickseed	*Lappula cenchrusoides*	Grows in dry soils in open areas
Flowering Plants	Grime's vetchling	*Lathyrus grimesii*	Endemic to Nevada, known only from a small portion of the northern Independence Range and southern Bull Run Mountains of north-central Elko County, Nevada. Grows in gravel scree derived from siliceous members of the Schoonover Formation.
Flowering Plants	Huber's pepperplant	*Lepidium huberi*	In sand or silty sands derived from the Navajo formation, Shinarump member of the Chinle and Moenkopi formations, and Park City and Weber sandstone formations. Found within a variety of shrub-dominated and coniferous forest/woodland communities, including ponderosa pine, lodgepole pine, Douglas fir, spruce-fir, sagebrush, black sagebrush, snowberry, and mountain mahogany communities at 2225 - 2960 meters.
Flowering Plants	Entire-leaved peppergrass	*Lepidium integrifolium var. integrifolium*	Endemic to northeastern Utah and southwestern Wyoming. Occurs in sparsely vegetation, seasonally saturated flats of silts and silt loams.
Flowering Plants	Davis' peppergrass	*Lepidium montanum ssp. davisii*	Inhabits the drying clay hardpan soils of its playa habitat.
Flowering Plants	Pueblo Valley peppercress	*Lepidium montanum var. nevadense*	Known only from the Pueblo Valley that straddles the Nevada/Oregon state line. Found in interdune areas on the valley floor.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Slickspot peppergrass	*Lepidium montanum var. papilliferum*	Grows in microsites called slick spots, which are soil inclusions high in clay and sodium. Found in the Great Basin sagebrush steppe habitats of the Snake River Plain and Foothills geographic areas.
Flowering Plants	Bruneau River prickly phlox	*Leptodactylon glabrum*	Known only from a few river canyons in southwestern Idaho and northern Nevada and restricted to rhyolitic cliffs.
Flowering Plants	Fremont's bladderpod	*Lesquerella fremontii*	Rocky limestone slopes and ridges in cushion plant-bunchgrass (Festuca idahoensis) communities and in montane meadows with scattered limber pine (Pinus flexilis). Often associated with three-tip sagebrush (Artemisia tripartita).
Flowering Plants	Large-fruited bladderpod	*Lesquerella macrocarpa*	Wyoming endemic found in the Great Divide and Green River Basins. Occupies upland slopes withing sparsely vegetation habitat of saltbush communities.
Flowering Plants	Mountain bladderpod	*Lesquerella montana*	This species is found on banks, rock outcrops, from plains into benchland into stony slopes and mountains, in sagebrush, open scrub oak, ponderosa pine, pinyon-juniper woodlands, and Douglas fir on granitic, often gravelly, non-calcareous soils.
Flowering Plants	Payson's bladderpod	*Lesquerella paysonii*	Endemic to the carbonate mountain ranges of west-central Wyoming. Grows on rocky summits, talus, steep slopes, rocky ridges, fine soils, red sandstone, and gravelly and gypseous substrates.
Flowering Plants	Prostrate bladderpod	*Lesquerella prostrata*	Rangewide habitats include plains, hills, and slopes in sagebrush, grass, and juniper communities, mainly on calcareous substrates, but it can also occur on igneous substrates, it occurs at 1800-2500 m (5900-8200 feet) elevation.
Flowering Plants	Common starlily	*Leucocrinum montanum*	This species is found in sandy to rocky places, short-grass prairie, scrub flats, sagebrush deserts to open montane forests, at elevations ranging from 800 to 2,400 meters.
Flowering Plants	Lee's Lewisia	*Lewisia leeana*	Found on open, north- or northwest-facing slopes and cliffs made of granite or serpentine and in conifer forests. Native to California and Oregon.
Flowering Plants	Flowering quillwort	*Lilaea scilloides*	Found in shallow water and mud flats, and in wetland and riparian systems.
Flowering Plants	Bellinger's meadowfoam	*Limnanthes floccose ssp. bellingeriana*	Found in shallow, rocky soil of meadows near vernal pools.
Flowering Plants	Granite prickly phlox	*Linanthus pungens*	This species is found in open, dry, rocky, or sandy areas, from plains to sagebrush desert, to moderate elevations in the drier mountains.
Flowering Plants	Aristulate lipocarpha	*Lipocarpha aristulata*	Wet soil and mud, often comprised of fine sand and silt, in bottomlands, sandbars, beaches, shorelines, stream banks, ponds, and ditches.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Northern twayblade	*Listera borealis*	Found in a variety of habitats including along cold streams, coniferous and mixed hardwood forests, tundra slopes, floodplains, high acidic soils, moist, rich humus of mossy coniferous or mixed seepy, marshy places along cold-air drainages.
Flowering Plants	Sagebrush pygmyleaf	*Loeflingia squarrosa ssp. artemisiarum*	Occurs in dry soils and loose sands of washes, areas bordering clay slicks, and stabilized, low sand dunes. Found in Great Basin scrub and Sonoran Desert scrub most often under Gilia and Linanthus.
Flowering Plants	Taper-tip desert-parsley	*Lomatium attenuatum*	Volcanic or limestone-derived scree and thin soil in sagebrush-grassland, grassland, open Douglas-fir (*Pseudotsuga menziesii*), and creek bottom communities.
Flowering Plants	Bentonite biscuitroot	*Lomatium bentonitum*	This species occurs in pinon-juniper woodlands and clay badlands.
Flowering Plants	Red-fruited lomatium	*Lomatium erythrocarpum*	Occurs on dry, gravely or talus-covered south-facing slopes at elevations of 2300 m (7600 ft) and above.
Flowering Plants	Basalt desert parsley	*Lomatium filicinum*	Known from open, gravelly, dry meadows and gently sloping, rocky, xeric sites in ponderosa pine and mixed conifer forest openings.
Flowering Plants	Fringed desert-parsley	*Lomatium foeniculaceum ssp. fimbriatum*	This subspecies occurs in pine woodlands and sagebrush scrub.
Flowering Plants	Greeman's desert-parsley	*Lomatium greenmanii*	Found on moist subalpine ridges and rock summits at elevations of 2370-2700 m (7760-8870 ft) in the Wallowa Mountains, Oregon.
Flowering Plants	Nuttall desert-parsley	*Lomatium nuttallii*	Nuttall's desert-parsley grows on open, rocky mid- and lower-slopes on sandstone, siltstone or clayey shale, in open pine woodlands from about 3400 to 7200 feet elevation. The vegetation is generally sparse, and commonly includes ponderosa pine, Rocky Mountain juniper, bluebunch wheatgrass, western wheatgrass, big sagebrush, and rubber-rabbitbrush.
Flowering Plants	Ochoco lomatium	*Lomatium ochocense*	Open, barren scabland with *Artemisia rigida/Poa secunda* plant association.
Flowering Plants	Packard's desert parsley	*Lomatium packardiae*	This species is found within sagebrush communities, on dry, open, rocky clay soils derived from rhyolite or volcanic ash, at elevations of 730 - 2300 meters.
Flowering Plants	Meadow lomatium	*Lomatium pastorale*	Found in scrublands, scablands, woodlands, and conifer forests.
Flowering Plants	Paiute lomatium	*Lomatium ravenii var. paiutense*	Grows on flats, slopes, ridges, generally alkaline soils, sagebrush, and pinyon/juniper woodlands.
Flowering Plants	Raven's lomatium	*Lomatium ravenii var. ravenii*	This taxon typically grows on alkaline soils of flats in sagebrush of Great Basin Scrub at elevations of 1,615 to 1,775 meters.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Adobe lomatium	*Lomatium roseanum*	Open, dry, basalt talus and scree overlying clay soils on gentle slopes; also occurs directly on black adobe soil. Usually found within low sagebrush vegetation.
Flowering Plants	Salmon River biscuitroot	*Lomatium salmoniflorum*	Grows on dry, open, rocky slopes.
Flowering Plants	Spider biscuitroot	*Lomatium tarantuloides*	Grows on wet or moist scablands, flat or gentle slopes, and serpentine-derived gravel.
Flowering Plants	Marsh felwort	*Lomatogonium rotatum*	Grows in marshes, wet meadows, tundra, and shorelines and gaps in meadow and shallow marsh vegetation in alpine areas.
Flowering Plants	Colonial luina	*Luina serpentina*	Open, rocky sites with poor soil development, such as barrens, talus, scree, forest, woodland, and grassland.
Flowering Plants	Culter's spurred lupine	*Lupinus caudatus var. cutleri*	Occurs sagebrush plains and in pinyon-juniper woodlands, at elevations of 1800 - 2560 meters.
Flowering Plants	Cusick's lupine	*Lupinus lepidus var. cusickii*	Occurs on eroding hillsides of volcanic ash on moderate to extreme slopes at elevations ranging from 1170-1280 m (2850-4200 ft).
Flowering Plants	Soft lupine	*Lupinus malacophyllus*	Grows on rocky slopes in the foothills and sandy or gravelly flats, from 4,600 to 5,660 feet elevation.
Flowering Plants	Nevada lupine	*Lupinus nevadensis*	Hillsides and valley floors, on dry, sandy, and stony soil with pinyon-juniper and sagebrush; 4400-7000 feet.
Flowering Plants	Inchhigh lupine	*Lupinus uncialis*	This species is found on limestone, rhyolite, volcanic gravels in open areas, barrens, and talus in sagebrush and pinyon/juniper woodland, at elevations ranging from 1,300 to 1,600 meters.
Flowering Plants	Sierra woodrush	*Luzula orestera*	Grows in fellfields, talus, and other habitat in regions of subalpine and alpine climates.
Flowering Plants	Dolores River skeletonplant	*Lyodesmia grandiflora var. doloresensis*	Occurs in dry open places on sandy soils, reddish purple, sandy alluvium and colluvium of the Cutler Formation between the canyon walls and the river in juniper, shadscale, and sagebrush communities, at 1364 - 2032 meters elevation. Some occurrences are along roads, and there are fewer plants away from disturbed roadsides.
Flowering Plants	Lyrate malacothrix	*Malacothrix sonchoides*	Native to much of the western United States, where it grows in sandy substrates in habitat such as Joshua tree woodland, grassland, creosote bush scrub, and ephedra-blackbrush communities.
Flowering Plants	Smith's melicgrass	*Melica smithii*	Moist woods from the lowlands to middle elevations in the mountains.
Flowering Plants	Rock melic	*Melica stricta*	Grows in mountain and plateau habitats, including areas with an alpine climate.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Pioche blazingstar	*Mentzelia argillicola*	Endemic to Lincoln County Nevada. it occurs on sparsely vegetated sites of cliffs, slopes, and knolls with xeric, soft, gypsum-rich, silty, clay soils.
Flowering Plants	Arapien blazingstar	*Mentzelia argillosa*	Long lived perennial found on the gypserious Juarassic Arapien Shale formation. Locally endemic to the Utah Great Basin, grows in the salt desert shrub and pinyon-juniper communities.
Flowering Plants	Candelaria blazingstar	*Mentzelia candelariae*	Grows in barren, often calcareous, low-competition gravelly or clay soils on weathered volcanic ash deposits, scree slopes, hot spring mounds, washes, road banks, or other recovering disturbances in the shadscale, mixed-shrub, and sagebrush zones.
Flowering Plants	Ventana stickleaf blazingstar	*Mentzelia congesta*	This species occurs in sagebrush scrub, disturbed slopes, pine forests, and pinyon/juniper woodlands, at elevations ranging from 1,200 to 2,700 meters.
Flowering Plants	Inyo blazingstar	*Mentzelia inyoensis*	Documented on a variety of substrates including carbonate rocks/gravel, calcareous pumice sand, whitish ash deposits, and clay soils of hillsides, occurs in habitats that include sagebrush scrub, shadscale scrub, and pinyon-juniper woodlands.
Flowering Plants	Smooth stickleaf	*Mentzelia mollis*	Grows in dry, open, and nearly barren habitats that are made up of clay and volcanic ash deposits.
Flowering Plants	Horse Canyon stickleaf	*Mentzelia multicaulis var. librina*	Occurs on barren gray clay soils, on steep shale slopes at elevations 1700 - 2100 meters, in sagebrush, rabbitbrush and pinyon-juniper communities on Manicos Shale and Price River formations.
Flowering Plants	Packard's mentzelia	*Mentzelia packardiae*	Occurs at the base of talus slopes along canyon walls in rocky, volcanic ash substrates.
Flowering Plants	Roan Cliffs blazingstar	*Mentzelia rhizomata*	This species is known only from steep, shaley talus slopes derived from the Parachute Creek Member of the Green River Formation. The plants are commonly associated with Gambel oak, western chokecherry, mountain mahogany and Utah juniper
Flowering Plants	Streamside bluebells	*Mertensia ciliata*	Found in wet meadows, thickets, moist open forest, talus, often along streams in montane, lower alpine areas.
Flowering Plants	Nodding silver-puffs	*Microseris nutans*	This species is found in various soils in brushlands, grasslands, woodlands, and coniferous forests at elevations ranging from 100 to 3,000 meters.
Flowering Plants	Hill monkeyflower	*Mimulus clivicola*	Typically found in pockets of moist, exposed mineral soil or fine gravel in moist to moderately dry slopes and rocky, talus outcrops in the foothills and valleys.
Flowering Plants	Disappearing monkeyflower	*Mimulus evanescens*	Grows in sagebrush-juniper plant associations, among rocky rubble and boulders in vernally moist, heavy gravel. It is generally restricted to a narrow ecotone on fluctuating banks of intermittent streams or pools, between sagebrush on the upper bank and emergent, wetland species on the lower bank.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Narrow-leaved mondardella	*Monardella angustifolia*	Rhyolitic ash tuff outcrops between 850- and 1400-meters elevation. These relatively barren areas consist of azonal soils. Surrounding vegetation includes sagebrush steppe and big sagebrush shrubland.
Flowering Plants	Annual dropseed	*Muhlenbergia minutissima*	This species is found on rocky slopes and flats, in sandy, gravelly drainages, road cuts, and open sites, as well as pinyon-juniper woodlands, yellow pine and oak-pine forests, pinyon-juniper woodlands, thorn-scrub forests, and oak-gramma savannahs, at elevations ranging from 1,200 to 3,000 meters.
Flowering Plants	Green needlegrass	*Nassella viridula*	Most commonly found in open woods and grasslands, especially on sandy soils.
Flowering Plants	Rigid threadbush	*Nemacladus rigidus*	Desert scrub, juniper or pinyon-juniper woodland, sandy and gravelly wash bottoms, volcanic ash, mostly below 2200 meters.
Flowering Plants	Holmgren smewlowskia	*Nevada holmgrenii*	This species occurs in cracks, cervices, ledges, rubble, talus, or small soil pockets on rock outcrops and cliffs, from high-elevation ridges to north facing walls at lower elevations, on various rock types (e.g. calcareous rock, schist, metamorphic rock, igneous rock). Sites are found in the lower alpine, subalpine conifer, mountain sagebrush, and upper pinyon-juniper zones.
Flowering Plants	Flaming Gorge evening primrose	*Oenothera acutissima*	Plants are restricted to sandy, gravelly, and rocky soils in seasonally wet areas and along the margin of arroyos, in meadows, shallow "rock reefs", and mixed conifer forest and sagebrush scrub from 5,300 to over 9,000 ft.
Flowering Plants	Yellow evening primrose	*Oenothera flava*	Found in moist meadows, gravelly soil of roadsides.
Flowering Plants	Saint Anthony's evening primrose	*Oenothera psammophila*	Barren areas of drifting sand, sand dunes, lake margins, edges of scrub, and areas where sand dunes meet lava outcrops.
Flowering Plants	Adder's tongue	*Ophioglossum pusillum*	Seasonally wet areas in pastures, old fields, roadside ditches, bogs, fens, wet meadows, flood plains, moist woods, grassy swales, dry or damp sand, dry hillsides, and in seasonally wet, acidic soil.
Flowering Plants	Sagebrush cholla	*Opuntia pulchella*	Occurs on the sand of dunes, dry-lake borders, river bottoms, washes, valleys, and plains in the desert.
Flowering Plants	Slender orcutt grass	*Orcuttia tenuis*	Restricted to vernal pool habitats.
Flowering Plants	Tufted cryptanth	*Oreocarya caespitosa*	Populations are usually restricted to rocky or chalky ridgetops in cushion plant communities. Forb-grass, pinyon-juniper, mountain brush, limber pine, and spruce-fir forests at 1950 to 3120 meters.
Flowering Plants	Rollins' crypthantha	*Oreocarya rollinsii*	Known from white shale slopes of the Green River Formation; in pinyon-juniper woodlands and cold desert shrubland communities at 5,300 to 5,800 feet (1,615 to 1,768 meters) elevation.
Flowering Plants	Schoolcraft's cryptantha	*Oreocarya schoolcraftii*	Generally grows in xerophytic habitats at middle elevations, but some can tolerate shade, sandy deserts, and alpine slopes.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Tall alpine aster	*Oreostemma elatum*	Grows in peatlands, marshy areas, wet meadows, montane forest.
Flowering Plants	Trotter's oreoxis	*Oreoxis trotteri*	This species grows in crevices or in sandy pockets on the Moab Tongue and (occasionally) the Slick Rock members of the Entrada Sandstone. It is found in the open, although usually on sites with a northern aspect, and, less frequently, in alcoves and along shaded cliff bases. It grows in mixed juniper and warm desert shrub community at 1,359 to 1,573 m elevation.
Flowering Plants	Shasta orthocarpus	*Orthocarpus pachystachyus*	Ultramafic alluvium with sagebrush and native bunchgrasses. 775 - 975 meters.
Flowering Plants	Spjut bristlemoss	*Orthotrichum spjutii*	Occurs on granitic rock in lower montane coniferous forest, pinyon-juniper woodland, subalpine coniferous forest, and upper montane coniferous forest.
Flowering Plants	Nevada oryctes	*Oryctes nevadensis*	Occurs on deep, loose sand of stabilized dunes, washes, and valley flats on various slopes and aspects.
Flowering Plants	Watson's spinecup	*Oxytheca watsonii*	Occurs on dry, open, loose, and/or lightly disturbed, often calcareous, sandy soils of washes, roadsides, alluvial fans, and valley bottoms in salt desert shrub communities
Flowering Plants	Bessey locoweed	*Oxytropis besseyi var. obnapiformis*	This taxon grows on barrens, sand dunes, bluffs, hilltops, or knolls in fine-textured or sandy soils or shaley talus in pinyon-juniper and sagebrush communities.
Flowering Plants	Challis crazyweed	*Oxytropis besseyi var. salmonensis*	Occurs within the shrub-steppe in sandy wash or open lower slopes on fine talus and ash.
Flowering Plants	Creeping nailwort	*Paronychia sessiliflora*	Sparsely vegetated areas, often stony soil of exposed slopes, ridge crests; plains, valleys to montane.
Flowering Plants	Colorado feverfew	*Parthenium ligulatum*	Barren or semibarren calciferous or gypsiferous outcrops of the Green River, Uinta, Ferron, Summerville, and Carmel formations in salt desert shrub, serviceberry, rabbitbrush, Indian rice-grass, greasebush, galleta, black sagebrush, pygmy sagebrush, and pinyon-juniper communities at 1705-2135 meters.
Flowering Plants	Dwarf lousewort	*Pedicularis centranthera*	Sagebrush scrub, alluvial fans; 1300 - 1500 meters.
Flowering Plants	Meadow lousewort	*Pedicularis crenulata*	This species occurs in moist grassy, alpine meadows, and sagebrush basins at elevations ranging from 1,500 to 3,200 meters.
Flowering Plants	Snowball cactus	*Pediocactus nigrispinus*	Sagebrush, grasslands, and coniferous forests; usually below 1500 meters elevation.
Flowering Plants	Simpson's hedgehog cactus	*Pediocactus simpsonii*	Pinyon-juniper woodlands, sagebrush, montane and prairie grasslands, and coniferous forests; usually above 1500 meters elevation.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Absaroka beardtongue	*Penstemon absarokensis*	Endemic to the Absaroka Range in northwest Wyoming. Occurs on sparsely vegetation steep slopes, rocky ridges and creek bottoms in montane and subalpine zones.
Flowering Plants	Stemless beardtongue	*Penstemon acaulis*	This species occurs on semi-barren substrates in pinyon-juniper and sagebrush-grass communities elevations of 1,676 to 2,504 meters.
Flowering Plants	Stemless penstemon	*Penstemon acaulis var. acaulis*	This species occurs on semi-barren substrates in pinyon-juniper and sagebrush-grass communities elevations of 1,676 to 2,504 meters.
Flowering Plants	Yampa beardtongue	*Penstemon acaulis var. yampaensis*	This species grows in sandy or gravelly or rocky soils of barren or semi-barren shale ridges or slopes, dry, sparsely vegetated limestone outcrops, gypsum hills, and shale ridges, or deposition fans from eroded slopes and alluvial fans in sparsely vegetated areas of pinyon-juniper and sagebrush-grass communities at elevations of 1,780 to 2,200 meters.
Flowering Plants	Nevada Dune beardtongue	*Penstemon arenarius*	This species is endemic to the Great Basin in central Nevada. It occurs on deep, volcanic, sandy soils at elevations of 3,940 to 4,430 feet.
Flowering Plants	Cary penstemon	*Penstemon caryi*	Regional endemic in MT and WY, Stony, calcareous soils in Douglas-fir forests, juniper woodlands, sagebrush steppe from the montane to lower subalpine zone
Flowering Plants	Bear River Range beardtongue	*Penstemon compactus*	Open, rocky, calcareous (limestone or dolomite) slopes and outcrops in the subalpine zone.
Flowering Plants	Tunnel Springs beardtongue	*Penstemon concinnus*	Endemic to the Great Basin occurring in pinyon-juniper, blue grama, mountain mahogany, cliff rose, and sagebrush communities. Found on calcareous or igneous gravels, usually on pale, limestone-derived substrates.
Flowering Plants	Variable hot-rock penstemon	*Penstemon deustus var. variabilis*	Dry foothills and lowlands, on open, dry, thin soils over basalt.
Flowering Plants	Franklin's penstemon	*Penstemon franklinii*	Occurs in grass-forb-sagebrush and in three-awn, needlegrass, matchweed, and black sagebrush communities on sandy-gravelly and sandy soils across a gently sloping landscape.at 1,650 to 1,800 meters elevation.
Flowering Plants	Gibben's beardtongue	*Penstemon gibbensii*	Endemic to the Washakie Basin and upper North Platte River valley in Wyoming and Brown's Park area near the Colorado-Utah border. Occurs on steep, bare slopes with poor soil development.
Flowering Plants	Blue-leaved penstemon	*Penstemon glaucinus*	At mid-elevations in open understory of pine forests, usually lodgepole or white-bark, occasionally ponderosa. Also, in open areas dominated by shrub-grasses on exposed slopes, rims and ridges at higher elevations.
Flowering Plants	Goodrich's penstemon	*Penstemon goodrichii*	Grows on the Badlands of the Uinta Basin and has been found on the blue-gray to red clay soils of the Duchesne River Formation. Is often associated with shadscale and juniper-mountain mahogany plant communities.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Graham's beardtongue	*Penstemon grahamii*	Graham's beardtongue is an oil shale obligate endemic to the Uinta Basin in Colorado and Utah. Plants occur in low densities on exposed and sparsely vegetated slopes of Green River oil shale among pinyon-juniper.
Flowering Plants	Harrington's beardtongue	*Penstemon harringtonii*	Open sagebrush or, less commonly, pinyon-juniper habitats, on gentle slopes. Soils are typically rocky loams and rocky clay loams derived from coarse calcareous parent materials.
Flowering Plants	Idaho penstemon	*Penstemon idahoensis*	Grows on the silica-rich tuffaceous outcrops of the Salt Lake formation, usually among sagebrush and juniper between 5,000 and 5,200 feet elevation.
Flowering Plants	Janish's beardtongue	*Penstemon janishiae*	Hillsides and slopes on clay soil derived volcanic rock with Artemisia to pinyon-juniper.
Flowering Plants	Loose beardtongue	*Penstemon laxus*	Endemic to south-central Idaho, grows in dry meadows and sagebrush shrublands.
Flowering Plants	Lemhi beardtongue	*Penstemon lemhiensis*	A regional endemic that occurs only in southwest Montana and adjacent Idaho. Occurs on moderate to steep, east- to southwest-facing slopes, often on open soils. It generally grows below or near the lower extent of Douglas-fir and/or lodgepole pine forest, in habitat dominated by big sagebrush and bunchgrasses, including western wheatgrass and Idaho fescue.
Flowering Plants	Bright penstemon	*Penstemon luculentus*	This plant is found on partly barren, arid benches and slopes in sandy clay loams of the Uinta Formation and Green River shale in sagebrush communities with Amelanchier, Chrysothamnus, and Holodiscus.
Flowering Plants	Golden-tongue penstemon	*Penstemon miser*	Grows in clayey soils, sagebrush shrublands, pine-juniper woodlands, and sandy or gravelly slopes.
Flowering Plants	Shining penstemon	*Penstemon nitidus*	Found in plains, hills and slopes.
Flowering Plants	Lahontan beardtongue	*Penstemon palmeri var. macranthus*	Found in blackbrush, sagebrush, Joshua tree, pinyon-juniper and ponderosa pine communities where subsurface moisture is available for most of the growing season.
Flowering Plants	Dad's penstemon	*Penstemon patricus*	Endemic to the Nevada Great Basin and can be found in Utah and Nevada in granite and limestone rocky outcrops with a variety of shrub, grassland, and conifer communities between 2100 and 2700 meters (6900-8860 ft) elevations.
Flowering Plants	Beautiful penstemon	*Penstemon perpulcher*	Sandy or loamy soils on the lower and middle Snake River Plains and surrounding, rolling, sagebrush-dominated foothills. 630-2000 meters elevation.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Closed-throated beardtongue	*Penstemon personatus*	Conifer forests, often moist and with a substantial Shasta red fir component. In semi-shade or open places, such as dry hillsides, forest openings and edges, and disturbed places such as clearcuts and roadsides; sometimes within Montane Chaparral areas. Often on metavolcanic substrates. 1065 - 2120 meters.
Flowering Plants	Pinyon penstemon	*Penstemon pinorum*	Pinyon-juniper, mountain-mahogany, ephedra, oak, sagebrush, and less commonly greasewood communities on Tertiary Claron Formation, i.e., quartzite cobble conglomerate and sandstone to calcareous sandstone and sandy limestone (soils are reddish and gravelly to cobble-like), across slopes of varying degree and aspect (predominately northerly) between 1713 meters and 2072 meters.
Flowering Plants	Wassuk beardtongue	*Penstemon rubicundus*	Occurs in desert scrub, sagebrush, pinyon-juniper ecosystems on rocky to gravelly soils on perched tufa shores, steep decomposed granite slopes, rocky slopes, rocky drainage bottoms, disturbed but recovering areas with enhanced runoff, including slopes that were recently burned, where it can be abundant.
Flowering Plants	Salmon River Mountains penstemon	*Penstemon salmonensis*	New species of penstemon, is native to the Salmon River Mountains in central Idaho on rocky places, such as cliff crevices and on rocky slopes and talus.
Flowering Plants	White River beardtongue	*Penstemon scariosus var. albifluvis*	Habitat is desert shrub communities or pinyon-juniper woodlands on substrates composed of fine textured soils and shale fragments, weathered from the Green River Formation.
Flowering Plants	Neese's Blue Mountain beardtongue	*Penstemon scariosus var. cyanomontanus*	Occurs in pinyon-juniper or sagebrush-grassland communities, on sandy soil or in sandstone crevices.
Flowering Plants	Short-lobed penstemon	*Penstemon seorsus*	This species is found in juniper woodlands and sagebrush shrublands at elevations ranging from 1,000 to 2,100 meters.
Flowering Plants	Susanville beardtongue	*Penstemon sudans*	This species grows in open, sagebrush or woodland dominated, rocky slopes on volcanic or other igneous substrates at elevations of 1,200 to 1,700 meters elevation.
Flowering Plants	Ward's penstemon	*Penstemon wardii*	This species grows on semi-barren, light-colored clays (often calcareous or gypsiferous) in desert shrub and pinyon-juniper communities at 1,645 to 2,075 meters elevation.
Flowering Plants	Yampa penstemon	*Penstemon yampaensis*	This species grows in sandy or gravelly or rocky soils of barren or semi-barren shale ridges or slopes, dry, sparsely vegetated limestone outcrops, gypsum hills, and shale ridges, or deposition fans from eroded slopes and alluvial fans in sparsely vegetated areas of pinyon-juniper and sagebrush-grass communities at elevations of 1,780 to 2,200 meters.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Wild crabapple	*Peraphyllum ramosissimum*	Oak-sagebrush, pinyon-juniper, mountain brush, and ponderosa pine communities at 1500 to 2500 meters.
Flowering Plants	Spine-noded milkvetch	*Peteria nevadensis*	Grows in salt desert shrublands and alluvial fans, in soils made from volcanic ash.
Flowering Plants	Argyle Canyon phacelia	*Phacelia argylensis*	Endemic to Argyle Canyon in Duchesne County, Utah. Grows in sandy-silty soil of washes in Green River Shale formation among pinyon-juniper, serviceberry, and Douglas Fir community at 7,595 feet elevation.
Flowering Plants	Cooke's phacelia	*Phacelia cookei*	Open areas, including disturbed roadsides, seedling conifer plantations, and recently burned sites, on loose volcanic sand. Found within Great Basin (Sagebrush) Scrub and Yellow Pine Forest communities, often with a scattered ponderosa pine-juniper overstory.
Flowering Plants	North Park phacelia	*Phacelia formosula*	Endemic to Colorado with the majority of occurrences found on gravelly, sparsely vegetated exposures of Coalmont Formation in North Park
Flowering Plants	Gina's phacelia	*Phacelia gina-glenneae*	Plants tend to occur in small patches on relatively steep, sparsely vegetated exposures of Troublesome Creek Formation shales. The entire known distribution of this species occurs in the Troublesome Creek ACEC in Colorado.
Flowering Plants	Reese River phacelia	*Phacelia glaberrima*	Endemic to northwestern and north-central Nevada. It occurs on open, dry to moist, alkaline, nearly barren, sometimes scree-covered, whitish to brownish shrink-swell clay soils derived from fluviolacustrine volcanic ash and tuff deposits. It is generally on the steeper slopes of low hills, bluffs, and badlands in the shadscale-greasewood, sagebrush, and lower pinyon-juniper zones.
Flowering Plants	Idaho phacelia	*Phacelia idahoensis*	Endemic to Idaho. Found in moist meadows and stream bottoms.
Flowering Plants	Obscure phacelia	*Phacelia inconspicua*	Grows in small gaps in vegetation dominated by deciduous mountain shrubs or mountain big sagebrush and on disturbed soils associated with trails and gopher diggings.
Flowering Plants	Playa phacelia	*Phacelia inundata*	Grows in the alkaline soils of playas and dry lakebeds in areas seasonally inundated.
Flowering Plants	Yellow scorpionweed	*Phacelia lutea var. calva*	Grows on barren volcanic ash clays, alkaline soils, deserts, and foothills.
Flowering Plants	Least phacelia	*Phacelia minutissima*	Occurs at moderate elevations in mountains; on damp ground, such as in meadows and along stream banks; on loam, sand, gravel, and rocky areas; and under shrubs and trees from about 4,600 to 8,200 feet in elevation.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Mono County phacelia	*Phacelia monoensis*	Grows in alkaline, barren or sparsely vegetated, grayish, brownish, or reddish shrink-swell clays of mostly andesitic origin. It grows mostly on stabilized or low-intensity artificial or natural disturbances; it is most abundant on road berms that cross such soils in the pinyon-juniper and mountain sagebrush zones.
Flowering Plants	Atwood's pretty phacelia	*Phacelia pulchella var. atwoodii*	Occurs on thin gypsiferous strata or alluvium contaminated by gypsum in pinyon-juniper, oak, sagebrush, single-leaf ash, and serviceberry communities at 1550 to 1680 meters elevation.
Flowering Plants	Dwarf phacelia	*Phacelia tetramera*	This species is found in sagebrush steppe communities, meadows, vernal pools, alkaline flats, and washes.
Flowering Plants	Hot springs phacelia	*Phacelia thermalis*	Open clay flats, slopes, and open woodlands in the western United States.
Flowering Plants	Utah phacelia	*Phacelia utahensis*	Biennial herb grows in salt desert shrub communities on the Arapien Shale Formation at 5,500 to 6,200 feet.
Flowering Plants	Sunbright	*Phemeranthus parviflorus*	This species occurs in a wide variety of habits including woodlands, grasslands, chaparral, scrub, canyon washes, mountain slopes and ledges, on sandy, rocky soils, or on outcrops. It can grow at elevations of 0 to 2,700 meters above sea level.
Flowering Plants	Spinescent fameflower	*Phemeranthus spinescens*	Basaltic outcrops and scablands in sagebrush deserts.
Flowering Plants	Thompson's talinum	*Phemeranthus thompsonii*	Occurs in shallow, gravelly soils comprised mainly of rounded, silicious pebbles of the Buckhorn Conglomerate of the Cedar Mountain Formation in pinyon-juniper, sagebrush, and ponderosa pine communities.
Flowering Plants	Many-flowered phlox	*Phlox multiflora*	Found in open meadows, including sagebrush meadows, rocky hillsides, along streambanks and in open conifer woodlands.
Flowering Plants	Beaver Rim phlox	*Phlox pungens*	Endemic to the Wind River and Green River Basins in Wyoming. Found on sparsely-vegetated cushion plant/bunchgrasses communities and openings in sagebrush grasslands.
Flowering Plants	Payson's bladderpod	*Physaria carinata*	Restricted to areas of calcareous limestone substrates on low elevation, south-facing grasslands.
Flowering Plants	Chambers' twinpod	*Physaria chambersii*	This species is found in reddish clay, limestone gravel, on dolomite ridges and roadsides, as well as in sagebrush and pinyon-juniper habitats at elevations ranging from 1,500 to 3,200 meters.
Flowering Plants	Tufted twinpod	*Physaria condensate*	Endemic to southwest Wyoming. Occurs in sparsely vegetated cushion plan bunchgrass communities.
Flowering Plants	Idaho twinpod	*Physaria didymocarpa var. lyrata*	occurs on rocky, sparsely vegetated, southerly slopes near the Salmon River and tributaries.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Dorn's twinpod	*Physaria dornii*	Dry, sparsely vegetated, calcareous-shaley slopes and ridges dominated by mountain mahogany and rabbitbrush at 1980-2200 meters elevation.
Flowering Plants	Cobre bladderpod	*Physaria kingii ssp. cobrensis*	This variety occurs in limestone gravel, silt, rocky places with low sagebrush at elevations ranging from 500 to 1,000 meters.
Flowering Plants	Pryor Mountain bladderpod	*Physaria lesicii*	Occurs only in Montana, where it is restricted to a few areas of limestone outcrops in the eastern Pryor Mountains in two distinct vegetation types - woodlands with a sparse overstory of Rocky Mountain juniper and/or mountain mahogany, and widely scattered Douglas-fir. The shrub layer may have scattered *Symphoricarpos oreophilus*, *Artemisia nova* or *A. tridentata*.
Flowering Plants	Middle Butte bladderpod	*Physaria obdeltata*	This species grows on clay, silt, or gravel over basal lava flows on barren areas, playas, or in sagebrush at elevations of 1,300 to 1,700 meters.
Flowering Plants	Thick-leaf bladderpod	*Physaria pachyphylla*	A regional endemic species, occurring only in the Pryor Mountain Desert of south-central Montana and in the Big Horn Basin of north-central Wyoming. Grows in dry, barren, and stony, yet edaphically diverse soils in the Pryor Mountain Desert which occur on exposed slopes, ridges, and valleys.
Flowering Plants	Piceance bladderpod	*Physaria parviflora*	This species is endemic to outcrops of the Green River Shale Formation in the Piceance Basin. It grows on ledges and slopes of canyons in open areas of pinon juniper communities.
Flowering Plants	Beautiful bladderpod	*Physaria pulchella*	Found on gravelly, calcareous soils of sparsely vegetated foothill slopes at elevations ranging from 6200 to 7600 feet as well as poorly developed, stony soils of subalpine slopes and ridges. At lower elevations it inhabits openings in mountain mahogany or limber pine woodlands. It also is found in sparse grassland or cushion plant communities at all elevations.
Flowering Plants	Rocky Mountain twinpod	*Physaria saximontana var. saximontana*	Endemic to Wyoming's southern Bighorn and Wind River Basins, and foothills of the Wind River and Absaroka Ranges occurs in sparsely vegetated slopes on sandy, gravelly soils.
Flowering Plants	Small-flowered ricegrass	*Piptatherum micrathum*	Grows in a variety of habitats including rocky slopes, gravel benches, creek banks, open woodlands, and moist meadows.
Flowering Plants	Altered Andesite popcornflower	*Plagiobothrys glomeratus*	Dry, shallow, mostly acidic gravelly clay soils, ridges, knolls and steep slopes in sagebrush and montane conifer zones.
Flowering Plants	Saline plantain	*Plantago eriopoda*	Found in a variety of moist and wet habitats including moist meadows and prairies, wetlands, marshes, fens, ditches, and stream banks and openings in foothills and montane areas.
Flowering Plants	Spiny skeletonweed	*Pleiacanthus spinosus*	Occupies arid grasslands on stony loam at lower elevations (5000-6400 feet).
Flowering Plants	Long tongue muttongrass	*Poa fendleriana ssp. longiligula*	Found in sagebrush-scrub, interior chaparral, and southern high plains grasslands.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Timberline bluegrass	*Poa glauca ssp. rupicola*	Dry alpine areas of western North America.
Flowering Plants	Elusive Jacob's-ladder	*Polemonium elusum*	Occurs where vegetation transitions from sagebrush and mountain mahogany to Douglas-fir woodland.
Flowering Plants	Williams combleaf	*Polyctenium williamsiae*	Occurs on relatively barren, sandy to sandy-clay or mud margins and bottoms of nonalkaline seasonal lakes perched over volcanic bedrock in the sagebrush, pinyon-juniper, and mountain sagebrush zones.
Flowering Plants	Modoc County knotweed	*Polygonium polygaloides ssp. esotericum*	Pinyon and juniper woodlands, desert scrub, vernal pools, and seasonally wet places
Flowering Plants	Fremont's combleaf	*Polyctenium fremontii*	This species is found in shallow soil on basalt, sagebrush areas, dry meadows, edge of vernal pools, gravel bars, rocky wash, mud flats, dry streambeds and swales, at elevations ranging from 1,000 to 2,700 meters.
Flowering Plants	Waterthread pondweed	*Potamogeton diversifolius*	Found in shallow, still or slow-moving water, in shallow water of small lakes and large ponds.
Flowering Plants	Black Rock potentilla	*Potentilla basaltica*	Occurs in or near alkali meadows, seeps, and marsh habitats bordering perennial thermal springs, outflows, and meadow depressions.
Flowering Plants	Tansy cinquefoil	*Potentilla bipinnatifida*	Open shortgrass prairie, alkaline bottoms, streamsides in sagebrush, and disturbed sites.
Flowering Plants	Cottam's cinquefoil	*Potentilla cottamii*	Mat forming plant that grows in cracks and crevices on quartzite cliffs at elevations 7,500 to 10,400 feet.
Flowering Plants	Bushy cinquefoil	*Potentilla paradoxa*	Moist or wet sandy soils such as in prairies, river banks, sand bars, and lake shores, sandy dunes and areas subject to seasonal water fluctuations.
Flowering Plants	Alkali primrose	*Primula alcalina*	A regional endemic, occuring only in east-central Idaho and adjacent Montana. Found in moist to wet alkaline meadows near headwaters streams at 6,300 to 7,200 feet elevation. The soil surface often displays hummock-hollow topography.
Flowering Plants	Desert prenanthella	*Prenanthella exigua*	This species occurs in gravelly, sandy, or clay soils, in desert washes and open slopes to steppes of sagebrush-juniper, at elevations ranging from 20 to 1,900 meters.
Flowering Plants	Jone's primrose	*Primula incana*	Found in river flood plains, open meadows, montane meadows, riparian areas, cold quaking bogs, saline meadows, wetlands and salt marshes.
Flowering Plants	Annual brittlebrush	*Psathyrotes annua*	Grows in desert and scrub habitat, often in areas with alkali soils among plants such as shadscale.
Flowering Plants	Slender woollyheads	*Psilocarphus tenellus*	Grows in seasonally wet habitat, such as vernal pools, as well as coastline and disturbed areas.
Flowering Plants	Lahontan indigobush	*Psorothamnus kingi*	Found occurring on streambanks and in hollows of sandy, hammocked dunes with *Artemisia*.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Beartooth large-flowered goldenweed	*Pyrrocoma carthamoides var. subsquarrosa*	Grassland or sagebrush grassland, often on calcareous soils.
Flowering Plants	Sticky golden weed	*Pyrrocoma hirta var. sonchifolia*	Meadows, rocky vernally wet places, and open or sparsely wooded slopes in foothills at moderate elevations.
Flowering Plants	Bugleg goldenweed	*Pyrrocoma insecticruris*	Mountain meadows, sagebrush/grass; 5000-6000 feet elevation.
Flowering Plants	Entireleaf goldenweed	*Pyrrocoma integrifolia*	Moist, often calcareous soil of meadows, grasslands, valleys and montane areas.
Flowering Plants	Thin-leaf goldenweed	*Pyrrocoma linearis*	Found in marshy grassy areas, swales, meadows, and vernal stream banks.
Flowering Plants	Sticky pyrrocoma	*Pyrrocoma lucida*	Grows in mountain forests and clay flats with alkali soils.
Flowering Plants	Panicled gondenweed	*Pyrrocoma racemose var. paniculata*	Found in open fields, meadows with alkaline soil, and areas near boggy places and hot springs.
Flowering Plants	Snake River goldenweed	*Pyrrocoma radiata*	A grazing-modified sagebrush/grassland community. Usually, a specific soil type that is slightly to very calcareous and often overlays a shale formation.
Flowering Plants	Rough pyrrocoma	*Pyrrocoma scaberula*	Occurs in grasslands of the Snake River Canyons/Camas Prairie region.
Flowering Plants	California chicory	*Rafinesquia californica*	This species is found in open areas in chaparral, coastal sage scrub, and oak woodlands at elevations ranging from 100 to 1,500 meters.
Flowering Plants	Alpine sedum	*Rhodiola integrifolia ssp. integifolia*	Found in in alpine and subalpine meadows, cliffs, and talus in western North America.
Flowering Plants	Wolf's currant	*Ribes wolfii*	Grows in moist forests and meadows in montane and subalpine regions.
Flowering Plants	Persistent sepal yellowcress	*Rorippa calycina*	Occurs along moist sandy to muddy banks of streams, stock ponds and man-made reservoirs
Flowering Plants	Columbia yellow cress	*Rorippa columbiae*	Associated with moist habitats that experience periodic inundation, including shorelines of lakes and playas, banks of rivers, gravel bars, streams, creeks, marshes, mudflats and swales.
Flowering Plants	Lowland toothcup	*Rotala ramosior*	Grows on exposed shorelines, stream margins, streambed outcrops, and other damp, open places.
Flowering Plants	Bartonberry	*Rubus bartonianus*	At least partially shaded in shrub communities on higher riparian terraces along streams and in shrub-dominated ephemeral stream beds, so water is available in abundance at least seasonally. Also, occasionally on lower slopes in mixed shrub communities, but never far from the riparian zone. Soils derived from basalt parent materials.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	King's snapdragon	*Sairocarpus kingii*	Found in washes, as well as on rocky slopes and scree at elevations ranging from 500 to 2,300 meters.
Flowering Plants	Red glasswort	*Salicornia rubra*	Occurs in salt flats, alkaline depressions, exposed shores of alkaline lakes, and saline swales in prairies.
Flowering Plants	Hoary willow	*Salix candida*	Cold, open fens, swamps & bogs of high pH.
Flowering Plants	Farr's willow	*Salix farriae*	Wet meadows, often near small streams, lakes; subalpine.
Flowering Plants	Snow willow	*Salix nivalis*	Subalpine and alpine (10500 to 13500 ft.); tundra, cirques, lake basins, rocky slopes.
Flowering Plants	False mountain willow	*Salix pseudomonticola*	Found in treed bogs, moist fens in white spruce forests, balsam poplar forests, and floodplains at elevations ranging from 0 to 2,500 meters.
Flowering Plants	Wolf's willow	*Salix wolfii*	Found along subalpine streambanks, wet meadows, and around ponds.
Flowering Plants	Wedge-leaf saxifrage	*Saxifraga adscendens ssp. oregonensis*	Grows in glacial moraines and alpine gravelly meadows.
Flowering Plants	Swaying bulrush	*Schoenoplectus subterminalis*	Grows in wet, moist, and shallow water habitats including lakes, ponds, rivers, streams, and bog pools.
Flowering Plants	Blaine pincushion	*Sclerocactus blainei*	Greasewood, galleta grass, shadscale, and sagebrush communities on limestone and igneous gravels with a clay matrix. 1460-1830 meters elevation.
Flowering Plants	Dawson's hookless cactus	*Sclerocactus dawsonii*	Populations occur primarily on alluvial benches along the Colorado and Gunnison Rivers and their tributaries.
Flowering Plants	Colorado hookless cactus	*Sclerocactus glaucus*	Populations occur primarily on alluvial benches along the Colorado and Gunnison Rivers and their tributaries.
Flowering Plants	Great Basin fishhook cactus	*Sclerocactus pubispinus*	Rocky hillsides of woodland and upper desert mountains. Shadscale, sagebrush, winterfat, rabbitbrush, and pinyon-juniper communities on calcareous and dolomitic gravels and outcrops at 1800 to 1955 meters.
Flowering Plants	Salmon River sedum	*Sedum valens*	Found on the steep granite canyon walls of central Idaho.
Flowering Plants	Ertter's senecio	*Senecio ertterae*	Dry clay ash deposits, sand, gravel, and talus.
Flowering Plants	Bog groundsel	*Senecio triangularis var. angustifolius*	Moist places and streambanks from the lowlands to the subalpine on sandy or gravelly soils.
Flowering Plants	Verruose sea-purslane	*Sesuvium verrucosum*	Found in alkali flats, desert playa lakes, and drying desert washes.
Flowering Plants	Shoshonea	*Shoshonea pulvinata*	Occurs on open, exposed limestone outcrops, ridgetops, and canyon rims, in thin rocky soils.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Bristly-stemmed sidalcea	*Sidalcea hirtipes*	Moist remnant prairies, fencerows, open meadows, and roadside ditches; sometimes associated with creeks and streams.
Flowering Plants	Bolander's catchfly	*Silene hookeri ssp. bolanderi*	Usually occurs in grassy openings, sometimes dry rocky slopes, canyons, or roadsides on serpentine and non-serpentine soils.
Flowering Plants	Nachlinger's catchfly	*Silene nachlingerae*	Grows on carbonate (rarely quartzite) crevices in ridgeline outcrops, talus, or very rocky soils on or at the bases of steep slopes or cliffs, mainly in the subalpine conifer zone from 7,160 to 11,250 feet.
Flowering Plants	Lost River silene	*Silene scaposa var. lobata*	Subalpine grassy, gravelly, or rocky slopes, ponderosa pine forests, juniper scrub, sagebrush.
Flowering Plants	Spalding's catchfly	*Silene spaldingii*	Deep loamy soils from wind deposits, volcanic ash, and glacial deposits. Found in bunchgrass or sagebrush communities, with Idaho fescue, Idaho fescue with rough fescue, or Idaho fescue and bluebunch wheatgrass.
Flowering Plants	Pale blue-eyed grass	*Sisyrinchium pallidum*	A regional endemic of southeastern Wyoming and northcentral Colorado. It is found in moist meadows, fens, and along streams in plant communities dominated by graminoids and forbs.
Flowering Plants	Basin goldenrod	*Solidago spectabilis*	Grows in moist habitat, including bogs, meadows, seeps, streambanks, hot springs, and wet areas on alkali flats.
Flowering Plants	Psorlea globemallow	*Sphaeralcea psoraloides*	Salt and mixed desert shrub communities and pinyon-juniper communities; can occur in areas where vegetation is sparse. Occurs on clayey, silty, sandy, and gravelly semibarrens, often under alkaline conditions.
Flowering Plants	Laramie false sagebrush	*Sphaeromeria simplex*	Endemic to the Laramie Range, Shirley Basin and Shirley Mountains in Wyoming. Occurs in cushion plant communities on rocky limestone ridges and gentle slopes.
Flowering Plants	Ute ladie's-tresses	*Spiranthes diluvialis*	Grows in moist wetland habitat, including bogs and riparian areas such as riverbanks, floodplains, lakeshores, riverside woodlands and forest, desert springs, and meadows.
Flowering Plants	Tall dropseed	*Sporobolus compositus var. compositus*	This variety occurs in meadows, prairie, plains, and pastures, as well as open woodlands and savannas.
Flowering Plants	Malheur princes-plume	*Stanleya confertiflora*	Alkaline meadows, heavy clay flats, barren clay slopes in sagebrush communities, dry sandy grounds
Flowering Plants	Hairy prince's-plume	*Stanleya tomentosa var. runcinata*	This variety is found in sagebrush communities, knolls, as well as on rocky limestone hillsides, steep grassy banks, and stony clay slopes at elevations ranging from 1,300 to 2,300 meters.
Flowering Plants	Woolly stenotus	*Stenotus lanuginosus var. lanuginosus*	This variety occurs on basaltic or granitic soils, in open pine forests, alpine meadows, and on sagebrush steppe, at elevations ranging from 300 to 2,900 meters.
Flowering Plants	Disguised wirelettuce	*Stephanomeria occultata*	Disguised wirelettuce can be found in gravel or talus slopes at 590-1650 meters (1935 - 5413 ft) elevations in mountain brush and forb communities.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Howell's streptanthus	*Streptanthus howellii*	Occurs on dry, serpentine slopes, mixed evergreen forests, open pine woods or brushy areas.
Flowering Plants	Kruhsea	*Streptopus streptopoides*	Occurs on damp, dense coniferous forests at elevations ranging from 0 to 1,600 meters.
Flowering Plants	Little ricegrass	*Stipa exigua*	Occurs in Great Basin scrub habitats.
Flowering Plants	Talapoosa Peak pearpod	*Stroganowia tiehmii*	Occupies dry, open, very rocky, clay soils or soil pockets in or near scree, talus, or boulder fields derived from basalt, other volcanic rocks, and/or fluviolacustrine sediments.
Flowering Plants	Northern slender-leaved pondweed	*Stuckenia filiformis ssp. alpina*	Occurs in freshwater and marsh wetlands and wetlands associated with riparian areas.
Flowering Plants	Nevada pondweed	*Stuckenia striata*	An aquatic plant that grows in shallow waterways, such as rivers, canals, and ponds.
Flowering Plants	Violet suksdorfia	*Suksdorfia violacea*	Grows in moist, sandy, shaded areas, mossy banks, cliffs, and rock crevices.
Flowering Plants	Swertia	*Swertia perennis*	Native to wetlands, particularly calcareous fens, in meadows and moist places at high mountain elevations.
Flowering Plants	Long-flowered snowberry	*Symphoricarpos longiflorus*	This species is found in sagebrush, pinyon-juniper communities, and rocky mountain slopes.
Flowering Plants	Rush aster	*Symphyotrichum boreale*	Lakesides, marshes, bogs, and fens, including calcareous bogs and fens, open peatland, and sedge-dominated open sphagnum bogs.
Flowering Plants	Slender-flowered evening-primrose	*Tetrapteron graciliflorum*	This species occurs in clay soil, grasslands, brushy or open slopes, as well as Yucca, juniper and oak shrublands at elevations ranging from 0 to 800 meters.
Flowering Plants	American woodsage	*Teucrium canadense var. occidentale*	Found along streambanks, lake shores and moist bottomlands.
Flowering Plants	Alpine meadowrue	*Thalictrum alpinum*	Occurs in cold, wet, boggy habitats in high mountains.
Flowering Plants	Sun-loving meadow rue	*Thalictrum heliophilum*	Endemic to northwestern Colorado found growing in open sunny sites on sparsely vegetated, barren, dry shale talus slopes, usually on the Parachute Creek Member of the Green River Shale Formation.
Flowering Plants	Green River greenthread	*Thelesperma caespitosum*	Endemic to Sweetwater County in Wyoming and Duchesne County, Utah. Found in sparsely vegetated cushion plant communities.
Flowering Plants	Uinta greenthread	*Thelesperma pubescens*	Endemic to Utah and southwest Wyoming. Found on mesa-like mountains in sparsely vegetation cushion plant communities and sagebrush grasslands.
Flowering Plants	Alpine greenthread	*Thelesperma subnudum var. alpinum*	Pinyon-juniper, mountain brush, and western bristlecone pine communities at 2100 to 2745 meters (6890 to 9006 ft).

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Arrow-leaf thelypody	*Thelypodium eucosmum*	Under or around western juniper in canyons, seasonal creek drainages, and springs.
Flowering Plants	Perennial thelypody	*Thelypodium flexuosum*	Scrubby habitat within sagebrush.
Flowering Plants	Howell's thelypodium	*Thelypodium howellii var. howellii*	This species is known from desert shrub communities, alkaline ground.
Flowering Plants	Purple thick-leaved thelypody	*Thelypodium laciniatum var. streptanthoides*	Found in sagebrush scrub communities.
Flowering Plants	Wavy-leaf thelypody	*Thelypodium repandum*	Endemic to east-central Idaho. can be found on moderate to steep, unstable slopes that face generally south. on rocky, usually on gravelly, or cindery substrates and decomposing shale banks.
Flowering Plants	California screw-moss	*Tortula californica*	Found in arid soils and on rocks at low elevations.
Flowering Plants	Hooker's townsend-daisy	*Townsendia hookeri*	This species is found in grasslands, sagebrush steppe, coniferous woodlands; plains, valleys, and montane habitats.
Flowering Plants	Sevier townsendia	*Townsendia jonesii var. lutea*	Found in salt desert and mixed desert shrub and juniper-sagebrush communities.
Flowering Plants	Cedar Mountain Easter daisy	*Townsendia microcephala*	Endemic to southwestern Wyoming. Occurs on exposed, west-facing upper slopes and ridges at high elevations.
Flowering Plants	Mountain townsendia	*Townsendia montana*	Grows on sandy calcareous soil of grasslands, sagebrush steppe, and woodlands at lower elevations.
Flowering Plants	Parry's townsendia	*Townsendia parryi*	Occurs on sparsely vegetated soil of grasslands, sagebrush steppe, dry forest, woodlands; valleys to rarely alpine.
Flowering Plants	Scapose daisy	*Townsendia scapigera*	This species is found in openings in sagebrush at elevations ranging from 1,400 to 3,400 meters.
Flowering Plants	Hairy townsend daisy	*Townsendia strigosa*	This species occurs in junipers, pinyons, desert scrub, and open places, with shales, sands, and clays at elevations ranging from 1,500 to 2,000 meters.
Flowering Plants	Barneby's clover	*Trifolium barnebyi*	Endemic to the foothills of the Wind River Range and southern Beaver Rim in Wyoming. Found in ledges, crevices, and seams at 5500-6780 feet.
Flowering Plants	Douglas clover	*Trifolium douglasii*	Open meadows, forested wetlands, stream banks, creek bottoms, and openings in pine forests.
Flowering Plants	Woolly clover	*Trifolium eriochphalum var. villiferum*	Known from a small distribution in eastern Nevada, in White Pine County, and into neighboring west-central Utah. It grows in marshes and alkaline meadows.
Flowering Plants	Leiberg's clover	*Trifolium leibergii*	Grows in soils of decomposing tuff, a volcanic ash substrate.

Taxa	Common Name	Scientific Name	Habitat Associations
Flowering Plants	Owyhee clover	*Trifolium owyheense*	Owyhee Clover occurs on barren slopes, ridges and mounds composed of talus and loose, coarse-grained, crumbly soils derived from rhyolitic ash or diatomaceous tuff at 830- 1650 m elevation within sagebrush-steppe or desert shrub vegetation.
Flowering Plants	Slender bog arrowgrass	*Triglochin palustrus*	Found in damp grassland usually on calcareous soils, fens and meadows.
Flowering Plants	Sand puffs	*Tripterocalyx micranthus*	Creosote bush, blackbrush, sandy desert shrub, and mixed desert shrub, usually in sand.
Flowering Plants	American globeflower	*Trollius albiflorus*	Found at high elevations in moist meadows and open forests.
Flowering Plants	Dotted water-meal	*Wolffia borealis*	Found in quiet, calm bodies of water, such as ponds, lakes, rivers, and streams.
Flowering Plants	Spanish bayonet	*Yucca sterilis*	Found in sandy and loamy soils within mixed dessert shrub communities with salt dessert shrub, junipers, and sagebrush between 1460 and 1770 meters (4800 - 5800 ft) elevations.
Invertebrates	Idaho point-headed grasshopper	*Acrolophitus pulchellus*	This grasshopper has limited range, mostly in Clark and Custer Counties in Idaho. It lives in dry, sparsely vegetated shrubland habitat on foothills and in floodplains. An important host plant for the insect is stemless mock goldenweed (*Stenotus acaulis*).
Invertebrates	Crescent Dunes Aegialian scarab	*Aegialia crescenta*	Found in the Crescent Dunes complex near Tonapah, NV.
Invertebrates	Hardy's Aegialian scarab	*Aegialian hardyi*	Occurs in sand dunes in Churchill County, Nevada
Invertebrates	Zigzag darner	*Aeshna sitchensis*	Prefers sedge and moss dominated northern poor fens and small cold northern open bogs in acidic peatland systems.
Invertebrates	Subarctic darner	*Aeshna subarctica*	Sphagnum bogs and deep fens with wet sphagnum.
Invertebrates	California floater	*Anodonta californiensis*	Most often found in the sand and mud of lakes and reservoirs or in stable areas of low-gradient stream reaches.
Invertebrates	Apache silverspot butterfly	*Argynnis nokomis apacheana*	Generally confined to wetlands, permanent water, and small habitat patches that support a mix of willows, grasses, sedges, and the butterflies' host plant. These include areas of insular seeps, springs, and riparian areas across the central and western Great Basin, the eastern Sierra foothills, and a few mountain valleys.
Invertebrates	Carson Valley silverspot	*Argynnis nokomis carsonensis*	wetland habitats where host plant *Viola nephrophylla* occurs; extremely wet meadow situations, with one or more native or non- native plants that produce nectar; may occur along riparian corridors, we lowland meadows including agricultural fields and perennial montane streams

Taxa	Common Name	Scientific Name	Habitat Associations
Invertebrates	Silverspot butterfly	*Argynnis nokomis nokomis*	The species requires moist, open meadows with a diversity of vegetation for shelter. Individuals require bog violet (*Viola* spp.) when in their larval stage, which they feed on exclusively.
Invertebrates	Silver-bordered fritillary	*Boloria selene*	Dependent on fen and Sphagnum bog sites located in the xeric steppe and open forests of the Columbia River Basin.
Invertebrates	Morrison bumblebee	*Bombus morrisonii*	Typically found in open dry scrub.
Invertebrates	Western bumblebee	*Bombus occidentalis*	Found in open grassy areas, prairie, urban parks and gardens, sagebrush steppe, mountain meadows to alpine tundra.
Invertebrates	Suckley's cuckoo bumblebee	*Bombus suckleyi*	The habitats of its known host species, Bombus occidentalis open grassy areas, urban parks and gardens, chaparral and shrub areas, and mountain meadows.
Invertebrates	Barry's hairstreak	*Callophrys gryneus chalcosiva*	Found in cedar or juniper areas which serve as a primary food source.
Invertebrates	Big Smoky wood nymph	*Cercyonis oetus alkalorum*	Grassy, alkaline flats; known only from the Big Smoky Valey between the Toiyabe and Toquima ranges in central Nevada
Invertebrates	Pallid wood nymph	*Cercyonis oetus pallescens*	Known only from a small alkaline area in the Reese River valley, Nevada.
Invertebrates	Carson Valley wood nymph	*Cercyonis pegala carsonensis*	Douglas, Carson City, and Washoe counties and in the Carson River drainage in Alpine Co., California.
Invertebrates	Plain-marked wood nymph	*Cercyonis pegala paucilineatus*	Endemic to north-central Nevada. Found in a variety of open habitats, such as open woodlands, woodland edges, fields, pastures, wet meadows, prairies, salt marshes, and savannas.
Invertebrates	White River wood nymph	*Cercyonis pegala pluvialis*	occurs in bottomland habitats along the White River near the White Pine and Nye county line and in the Steptoe Valley southeast of Ely
Invertebrates	Saint Anthony sand dunes tiger beetle	*Cicindela arenicola*	Patchily distributed in dune fields, largely along the Snake River Plain in ten counties of southeastern and south-central Idaho. Recently separated from the Bruneau Dunes tiger beetle.
Invertebrates	Bruneau Dunes tiger beetle	*Cicindela waynei*	Terrestrial beetle whose habitat consists of an isolated dune field in southern Idaho.
Invertebrates	Crescent Dunes adhodius scarab	*Cinacanthus crescentus*	Occurs in Crescent Dunes complex in Nye County, near Tonopah NV.
Invertebrates	Sand Mountain pygmy scarab	*Coenonycha pygmaea*	Occurs on Sand Mountain and Blow Sand Mountain, Nevada.
Invertebrates	Sullivan's sulphur	*Colias occidentalis sullivani*	Associated with a desert bush pea, Lathyrus rigidus, and occurs at the north end of the Steens Mountains in Harney County, Oregon in the lowland sagebrush/bunchgrass steppes.
Invertebrates	Dipluran	*Condeicampa langei*	Cave species found in Whipple Cave, Nevada
Invertebrates	Monarch butterfly	*Danaus plexippus*	The species is a milkweed obligate requiring these plants for larval development. Found throughout North America mainly in prairies, meadows, grasslands and along roadsides.

Taxa	Common Name	Scientific Name	Habitat Associations
Invertebrates	Humboldt aphodius beetle	*Dellacasiellus humboldti*	The genus Dellacasiellus is widely distributed through North America. All species appear to use pocket gophers as primary hosts. Members of a few species have been collected in prairie dog or other rodent burrows
Invertebrates	Darkling Beetle	*Eleodes inornata*	The genus Elodes is widely distributed through western North America.
Invertebrates	Fused Battoides blue	*Euphilotes battoides fusimaculata*	Known from two disjunct locations: the southern portion of the Toiyabe Range in Nye County Nevada and a single observation in the Robert Mountains in Eureka County Nevada.
Invertebrates	Inyo Mountains blue	*Euphilotes bernardina inyomontana*	This species' range is eastern Kern and Inyo Counties in California and adjacent Nevada counties.
Invertebrates	Peavine blue	*Euphilotes enoptes aridorum*	Known from three occurrences in southern Washoe County and Storey County, Nevada, and Pumas County, California, in sagebrush scrub and conifer woodlands.
Invertebrates	Early blue	*Euphilotes enoptes primavera*	Records of this subspecies only exist from Mineral County in the Wassuk Range. Trend unknown considered critically imperiled in Nevada
Invertebrates	Sand Mountain blue	*Euphilotes pallenscens arenamontana*	Exists only at Sand Mountain in Churchill County east of Fallon, Nevada; closely associated with its host plant, the Kearney buckwheat (*Eriogonum nummulare*).
Invertebrates	Honey Lake blue	*Euphilototes pallescens calneva*	Occurs in arid desert flats and sand dune edges.
Invertebrates	Rice's blue	*Euphilotes pallescens ricei*	Occurs in the Silver State Sand Dunes, north of Winnemucca, Nevada, USA, often in grassy or brushy habitat.
Invertebrates	Mattoni's blue	*Euphilotes pallescens mattonii*	Found primarily in the upper and lower Sonaran Zones, prairies, and sand dunes; found in pinyon-juniper woodlands and rolling prairie grasslands; host plant for the larvae is the buckwheat (*Eriogonum microthecum* nutt. Var. laxiflorum).
Invertebrates	Mono checkerspot	*Euphyryas editha monoensis*	Occurs along the eastern front of the Sierra Nevada Mountains.
Invertebrates	Gillette's checkerspot	*Euphydryas gillettii*	Occurs mostly as very widely scattered, localized, and usually small populations, apparently with little or no gene flow in most cases. Requires patches of four-line honeysuckle (*Lonicera involucrata*) exposed to morning sunlight.
Invertebrates	Railroad Valley skipper	*Hesperia uncas fulvapalla*	Found in alkali meadows on the floor of Railroad Valley in Nye County, Nevada
Invertebrates	White River Valley skipper	*Hesperia uncas grandiosa*	Alkaline meadows and saltgrass flats in early summer in the White River Valley Nevada
Invertebrates	Reese River Railroad Valley skipper	*Hesperia uncas reeseorum*	Found along the Reese River in Lander county and Mason Valley in Lyon county Nevada

Taxa	Common Name	Scientific Name	Habitat Associations
Invertebrates	Nevada viceroy	*Limenitis archippus lahontani*	This species is apparently restricted to Nevada; it is known from along the Humboldt River and lower tributaries.
Invertebrates	Western pearlshell	*Margaritifera falcata*	The species is found in cool and cold running streams that generally have a low to moderate gradient and are wider than 2 m; preferred habitat is stable sand or gravel substrates.
Invertebrates	Umatilla megomphix	*Megomphix lutarius*	This species relies on moist, shady, stable microclimates.
Invertebrates	Dune honey ant	*Myrmeocystus arenarius*	Occurs in fine dune sands. It has been documented from Sand Mountain and the Blow Sand Mountains in Churchill County, Nevada.
Invertebrates	Nye County army ant	*Neivamyrmex nyensis*	Known only from the type colony, located southeast of Beatty in Nye County, Nevada.
Invertebrates	Great Basin Yuma skipper	*Ochlodes yuma lutea*	This subspecies occurs in the Great Basin, from southern Nevada north of Las Vegas to southeastern Oregon. This subspecies only utilizes the American common reed (*Phragmites australis* ssp. *americanus*) as a larval host in rare alkaline wetland habitats.
Invertebrates	Great Basin blue	*Philotiella speciosa septentrionalis*	Distribution is unknown, but the type locality is from Fort Churchill Road in Lyon County. Larval host plants include yellowturbans (*Eriogonum pusillum*) and roundleaf oxytheca (*Oxytheca perfoliata*).
Invertebrates	Steptoe Valley crescentspot	*Phyciodes cocyta arenacolor*	Found in wetlands at Monte Neva Hot Springs, Nevada.
Invertebrates	Carson Valley sandhill skipper	*Polites sabuleti genoa*	Documented in the Carson River valley in Douglas County Nevada.
Invertebrates	Dark sandhill skipper	*Polites sabuleti negrescens*	Occurs in valley bottoms and spring habitats. Known only from the eastern part of Nevada- westward into western Eureka County from extreme east-central Elko County (Thousand Springs Creek) to north Lincoln County (Lake Valley) and northeastern Nye County.
Invertebrates	Bleached sandhill skipper	*Polites sabuleti sinemaculata*	Known only from one location, at Baltazor Hot Spring near Denio Junction in Humboldt County, Nevada.
Invertebrates	Nevada Alkali skipperling	*Pseudocopaeodes eunus flavus*	Found in desert salt grass spots on alkali flats.
Invertebrates	Carson wandering skipper	*Pseudocopaeodes eunus obscurus*	Salt grass (obligate host plant for larvae) and nearby nectarproducing flowers; salt grass typically is present where its root are inundated with water for short periods
Invertebrates	A mayfly	*Raptoheptagenia cruentata*	This species is associated with larger, perennially flowing prairie streams and rivers with sand-gravel dominated bottoms with cobble riffles.
Invertebrates	Pallid sylvinus hairstreak	*Satyrium sylvinus megapallidum*	Occurs in riparian areas. It has been documented from the Walker, Humbolt, lower Truckee, and Carson River drainages in Nevada.
Invertebrates	Crescent Dunes serican scarab	*Serica psammobunus*	Occurs at Crescent Dunes complex in Nye County, near Tonopah NV. The beetle's habitat is restricted to a small geographic area and includes the interface between wet and dry sand dunes.

Taxa	Common Name	Scientific Name	Habitat Associations
Invertebrates	Washoe stonefly	*Sierracapnia washoe*	This species is found in the Granite, Selenite, and Virginia Ranges of western Nevada
Invertebrates	Coronis fritillary	*Speyeria coronis coronis*	Various: chaparral, sage lands, open pine forest, canyons, meadows. Hosts are in genus Viola, and oak woodlands.
Invertebrates	Regal fritillary	*Speyeria idalia*	Found in wet meadows, undisturbed prairie near marshes, dry to mesic tallgrass prairie, shortgrass prairie, and restored prairie. These butterflies generally avoid areas with bare ground, instead preferring land with more litter and lower grazing intensities.
Invertebrates	Sand Mountain aphodius scarab	*Stenotothorax comosus*	Found at Sand Mountain and Blow Sand Mountain, Nevada.
Invertebrates	Lahontan aphodius scarab	*Stenotothorax lahontanensis*	Occurs under plants on dune substrates around the Pleistocene Lake Lahontan, Nevada.
Lichens	Aspicilia rogeri	*Aspicillia rogeri*	Grows on calcareous, gravelly soil in shrub-steppe habitats.
Lichens	Bryoria bicolor	*Bryoria bicolor*	This species occurs on trunks, branches, cork, and plant surfaces, as well as on siliceous rock
Lichens	White grouse pellet lichen	*Rhizoplaca idahoensis*	Grows over deep gravel calcareous alluvium soils and remains unattached to any substrates.
Lichens	Woven-spore lichen	*Texosporium sancti-jacobi*	Crustose lichen that grows on organic matter and soil. Endemic to arid regions of the western United States of America.
Lichens	Maculate tumbleweed shield lichen	*Xanthoparmelia camtschadalis*	Found in high elevation regions
Lichens	Idaho Range lichen	*Xanthoparmelia idahoensis*	Calcareous badlands, barren to sparsely covered with vascular vegetation. Slopes are approximately 45% or less. Surrounding vascular vegetation is shrub steppe, dominated by Artemisia or Atriplex.
Mammals	Pallid bat	*Antrozous pallidus*	Pallid Bats have been found in arid deserts, juniper woodlands, sagebrush shrub-steppe, and grasslands, often with rocky outcrops and water nearby. They are less abundant in evergreen and mixed conifer woodlands, but in British Columbia are found in ponderosa pine forest near cliffs. They typically roost in rock crevices or buildings, less often in caves, tree hollows, under bridges, and in abandoned mines.
Mammals	Pygmy rabbit	*Brachylagus idahoensis (Sylivalagus idahoensis)*	This rabbit generally occurs in dense stands of big sagebrush growing in deep loose soils. It is highly dependent on sagebrush for food and shelter throughout the year. Unlike most other rabbits, it digs burrows, which are around 3 inches in diameter; a burrow may have multiple entrances. Pygmy rabbits occasionally use of burrows abandoned by other species and may occur in areas of shallower or more compact soils if these sites support sufficient shrub cover

Taxa	Common Name	Scientific Name	Habitat Associations
Mammals	Gray wolf	*Canis lupus*	No particular habitat preference. Minimum of 10,000-13,000 sq km (with low road density) might be necessary to support a viable population. Young are born in an underground burrow that has been abandoned by another mammal or dug by wolf. In Northwest Territories, dens were most commonly located within 50 km of northern tree line, which resulted in maximal availability of caribou during the denning and pup rearing period; within the tundra zone, dens were not preferentially located near caribou calving grounds.
Mammals	Townsend's big-eared bat	*Corynorhinus townsendii pallescens*	Townsend's big-eared bat is a colonial nester, with relatively complex and restrictive hibernation roost requirements that feature a high degree of site fidelity. The species roosts in caves or mines. Individuals are thought to not migrate great distances and have been documented making movements of less than 30 miles between summer and winter roosts.
Mammals	White-tailed prairie dog	*Cynomys leucurus*	This loosely colonial species inhabits open shrublands, semidesert grasslands, and open valleys. It lives at higher elevations and in meadows with more diverse grass and herb cover than do black-tailed prairie dogs. Young are born in underground burrows.
Mammals	Black-tailed prairie dog	*Cynomys ludovicianus*	Habitat consists of dry, flat or gently sloping, open grasslands with low, relatively sparse vegetation, including areas overgrazed by cattle. The species occurs in open vacant lots at town edges in some areas. Young are born in underground burrows.
Mammals	Utah prairie dog	*Cynomys parvidens*	Utah prairie dogs are only found in southwestern and central Utah in open habitats. Habitat consists of swale-type formations where herbaceous vegetation is available. The species requires well, drained deep soil for burrowing.
Mammals	Desert kangaroo rat	*Dipodomys deserti*	Found in low deserts, in sandy soil with sparse vegetation, or in alkali sinks. It is found in shadscale scrub and creosote bush scrub, in the lower and upper Sonoran life zones. It is mostly restricted to deposits of deep, wind-blown sand.
Mammals	Panamint kangaroo rat	*Dipodomys panamintinus*	Occupies desert flats among Joshua trees, creosote bush scrub, and pinyon-juniper woodland. It also occupies big sagebrush in west-central Nevada.
Mammals	Big brown bat	*Eptesicus fuscus*	Habitats range from high mountains to low deserts, including cities. Summer roosts generally are in buildings, bridges, hollow trees, spaces behind exfoliating bark, rock crevices, tunnels, or cliff swallow nests, in sites that do not get too hot. Maternity colonies may form in attics, barns, rock crevices, or tree cavities. Most adult females return to the same maternity roost site in successive years. Caves, mines, and especially buildings and human-made structures are used for hibernation.

Taxa	Common Name	Scientific Name	Habitat Associations
Mammals	Spotted bat	*Euderma maculatum*	This species occurs in various habitats from desert to montane coniferous stands, including open ponderosa pine, pinyon-juniper woodland, canyon bottoms, riparian and river corridors, meadows, open pasture, and hayfields. Active foraging may be mostly in open terrain, including forest clearings, meadows, and open wetlands, sometimes in open areas near buildings.
Mammals	Wolverine	*Gulo gulo luscus, Gulo gulo luteus*	Alpine and arctic tundra, boreal and mountain forests (primarily coniferous). Limited to mountains in the south, especially large wilderness areas. Usually in areas with snow on the ground in winter. Riparian areas may be important winter habitat. May disperse through atypical habitat. When inactive, occupies den in cave, rock crevice, under fallen tree, in thicket, or similar site. Terrestrial and may climb trees. Young are born in a den among rocks or tree roots, in hollow log, under fallen tree, or in dense vegetation, including sites under snow.
Mammals	Western red bat	*Lasiurus blossevillii*	In California, roosting habitat includes forests and woodlands from lowlands up through mixed conifer forests of mountains; foraging habitat includes grasslands, shrublands, open woodlands and forests, and croplands, but not deserts. Red bats in California appear to be strongly associated with riparian habitats, particularly mature stands of cottonwood/sycamore in the Central Valley and lower reaches of the large rivers that drain the Sierra Nevada (Pierson et al. 2006). They sometimes use orchards, tamarisk, or other non-native trees; the degree to which sprayed orchard trees serve as viable habitats (versus population sinks) is unknown. In spring and summer, females occur primarily in lowland riparian habitat, whereas males more often are found at higher elevations.
Mammals	Eastern red bat	*Lasiurus borealis*	Inhabitats wooded and riparian areas and is reported to prefer elm, box elder, wild plum, willow, hawthorn, sumac, and a variety of other woody plants for roosting. It hibernates in woodpecker holes, tree foliage, and under loose bark.
Mammals	Hoary bat	*Lasiurus cinereus*	Hoary bats are solitary, tree roosting species and can be expected to live in any forested habitat. They are insectivores, primarily feed on moths. Impacts from wind energy have been documented at the population level, especially during migrations resulting in range wide declines of the species. Other threats to the species include increase in recreation in suitable habitats, mining activities or modifications, the spread of white-nose syndrome, and woodland management such as vegetation treatments, prescribed fire or fuels reduction projects. Much of their preferred habitat in CO is located on BLM-administered lands. Hoary bats are found in suitable habitat in every field office in Colorado...

Taxa	Common Name	Scientific Name	Habitat Associations
Mammals	Black-tailed jackrabbit	*Lepus californicus*	Inhabits open plains, fields and deserts, open country with scattered thickets or patches of shrubs. Rests by day in shallow depression (form).
Mammals	White-tailed jackrabbit	*Lepus townsendii*	Open grasslands and sagebrush plains. At higher elevations found in open areas adjacent to pine forests and in alpine tundra. Rests by day usually in shallow depressions (forms) at base of bush or beside or in cavity in snow. Young are born in a well concealed depression in the ground or in burrows abandoned by other animals.
Mammals	North American river otter	*Lontra canadensis*	Riverine species widespread across most major riverine systems in the Rocky Mountains.
Mammals	Canada lynx	*Lynx canadensis*	Occurs in boreal forests, subalpine forests, and areas with dense horizontal forest cover that have deep snow and a high density of snowshoe hares.
Mammals	Dark kangaroo mouse	*Microdipodops megacephalus*	In loose sands and gravel. Found in Shadscale Scrub, Sagebrush Scrub, and Alkali Sink plant communities in the Upper Sonoran life zone. May occur in sand dunes near margins of range. Underground when inactive.
Mammals	Fletcher dark kangaroo mouse	*Microdipodops megacephalus nasutus*	Prefer loose sands and gravel and are found in shadscale scrub, sagebrush scrub, and alkali sink plant communities in the Upper Sonoran life zone. They may occur in sand dunes near the margins of their range. Found among bushes growing in soils covered with gravel or on sand dunes.
Mammals	Pale kangaroo mouse	*Microdipodops pallidus*	Habitat is nearly restricted to fine sands in alkali sink and desert scrub dominated by Atriplex confertifolia (shadscale) or Artemisia tridentata (big sagebrush). This mouse often burrows in areas of soft, windblown sand piled at the bases of shrubs.
Mammals	California myotis	*Myotis californicus*	These bats occur in various habitats, including seacoasts, desert scrub, oak-juniper woodlands, montane and humid coastal forests, mountain meadows, canyons, riparian woodlands, grasslands, rural residential areas, and towns. Night roosts are in a wide range of sheltered sites, including trees, shrubs, mines, caves, bridges, and buildings. They roost by day in crevices of various kinds, including rock fissures, tree cavities, spaces behind loose tree bark, and nooks in bridges and buildings; occasionally they roost on small desert shrubs or on the ground. Hibernation sites include caves (including lava tubes), mines, tunnels, or buildings; often in buildings in the Pacific Northwest. Maternity colonies are in rock crevices, tree cavities, under bark, or in crevices of bridges or buildings. Reproductive females often change roost sites among different trees. Foraging occurs in a wide range of habitats: over meadows/grassland, shrubland, and wooded areas; over water; and around streetlights.

Taxa	Common Name	Scientific Name	Habitat Associations
Mammals	Western small-footed myotis	*Myotis ciliolabrum*	These bats generally inhabit desert, badland, and semiarid habitats; more mesic habitats in the southern part of the range); also, woodlands and dry open forests, riparian zones, and areas near cliffs and outcrop. In Utah, they occur in lowland riparian, desert shrub, juniper-sagebrush, juniper, piñon-juniper, sagebrush-rabbitbrush, sagebrush-greasewood (near piñon-juniper), highland riparian in lodgepole pine forest, montane forest and woodland (Douglas-fir-aspen), and montane grassland (grass-aspen).
Mammals	Long-eared myotis	*Myotis evotis*	These bats occupy a diverse array of habitats, including lowland, montane, and subalpine woodlands, forests, shrublands, and meadows, wooded stream courses, and areas over water bodies. Within a particular region, the range of occupied habitats may be more restricted. Daytime roosts are in buildings, railroad trestles, snags and hollow trees, spaces behind loose bark of trees or stumps, mines, caves, rock crevices (including those on the ground), erosional cavities and channels in the ground, and similar sites.
Mammals	Little brown myotis	*Myotis lucifigus*	The little brown and long-eared Myotis are found in forested areas and are thought to use rock crevices and abandoned mines for roosting and hibernacula. Management actions that may cause disturbance (OHV use, mineral extraction, vegetation treatments, etc.) can potentially impact this species. The little brown Myotis has exhibited extreme declines in local populations (over 90%) due to white-nose syndrome where the fungal pathogen occurs.
Mammals	Fringed myotis	*Myotis thysanodes*	These bats occur primarily at middle elevations in desert, riparian, grassland, and woodland habitats, but they have been recorded at 2,850 meters in spruce-fir habitat in New Mexico, and at low elevations along the Pacific Coast.
Mammals	Long-legged myotis	*Myotis volans*	These bats occur primarily in mountainous areas wooded with coniferous trees, but also may be found in riparian and desert (Baja California) habitats. They may change habitats seasonally. Hibernacula are in caves and mines, but winter habits are poorly known. Warm-season daytime roosts are in tree hollows or under loose bark, in crevices among rocks or in cliffs, or in buildings, but apparently not in caves or mines (these may be used at night).
Mammals	Yuma myotis	*Myotis yumanensis*	This species is more closely associated with water than most other North American bats. It is found in a wide variety of upland and lowland habitats, including riparian, desert scrub, moist woodlands, and forests, usually near open water. Foraging occurs over water or in open spaces over land. Warm-season roosts are in caves, cliff crevices, bridges, buildings, and tunnels, as well as abandoned cliff swallow nests and cavities and nooks in large live trees near water.

Taxa	Common Name	Scientific Name	Habitat Associations
Mammals	Allen's chipmunk	*Neotamias senex*	Coniferous forests and chaparral slopes; Transition and Canadian life zones. Does not readily climb trees.
Mammals	Monterey dusky-footed woodrat	*Neotoma macrotis luciana*	Habitat includes riparian, shrubland, chapparal, and forested woodlands.
Mammals	Big free-tailed bat	*Nyctinomops macrotis*	Habitat in the southwestern United States and Mexico includes rocky areas in rugged or hilly country in both lowland and highland areas, including evergreen forest, woodlands, desert scrub, river floodplain-arroyo associations, and stream courses in areas of mixed tropical deciduous forest and thorn forest. These bats apparently roost primarily in vertical or horizontal crevices near the tops of cliffs, but sometimes they are found in buildings, caves, or occasionally tree cavities.
Mammals	American pika	*Ochotona princeps*	Restricted to rocky talus slopes or rimrocks with deep fissures and crevices, primarily the talus-meadow interface. It also occupies areas above the tree line up to the limit of vegetation and lower elevations in rocky areas within forests or near lakes.
Mammals	Mountain goat	*Oreamnos americanus*	Alpine and subalpine habitat; steep grassy talus slopes, grassy ledges of cliffs, or alpine meadows. Usually at timberline or above. May seek shelter and food in stands of spruce or hemlock in winter. Young are born on rock ledges or steep cliffs.
Mammals	Rocky Mountain bighorn sheep	*Ovis canadensis canadensis*	Rocky Mountain Bighorn Sheep inhabit grassy mountain slopes, alpine meadows, and foothills near rugged, rocky cliffs and bluffs.
Mammals	Canyon bat	*Parastrellus hesperus*	Habitat includes desert mountain ranges, desert scrub flats, shrub-steppe, rocky canyons, and associated riparian zones, particularly in areas with cliffs and most often (but not always) close to water. In some areas, these bats range into coniferous forest/woodland at higher elevations. Roosts include crevices in cliffs, rock outcrops, caves, mines, and buildings, and possibly sometimes rodent burrows and spaces under rocks. Night roosts may include sagebrush shrubs. The bats hibernate in caves, mine tunnel, or rock crevices. Typically, they visit water and drink immediately after emergence each evening. Young are born in rock crevices or in buildings.
Mammals	Fisher	*Pekania pennanti*	This carnivore lives in thick coniferous or mixed coniferous and hardwood forests. It prefers habitats with lots of tree cover and lots of hollow trees for dens.
Mammals	Silky pocket mouse	*Perognathus flavus*	Sandy, sometimes rocky, soils in arid grasslands, shrublands, and pinyon-juniper woodland, in valley bottoms, hillsides, and mesas, sometimes in rather barren areas.
Mammals	Pygmy shrew	*Sorex hoyi*	Found in a variety of habitats. Appears to prefer grassy openings of boreal forest. Moist habitats are preferred over dry areas.

Taxa	Common Name	Scientific Name	Habitat Associations
Mammals	Merriam's shrew	*Sorex merriami*	Habitats include various grasslands, including grasses in sagebrush scrub and pinyon-juniper woodland, as well as mountain mahogany shrublands and mixed woodlands.
Mammals	Preble's shrew	*Sorex preblei*	Recorded habitats include arid and semiarid shrub-grass associations, openings in montane coniferous forests dominated by sagebrush (Washington), willow-fringed creeks, marshes (Oregon), bunchgrass associations, sagebrush-aspen associations (California), sagebrush-grass associations (Nevada), alkaline shrubland (Utah).
Mammals	Inyo shrew	*Sorex tenellus*	Habitats include riparian zones and canyon bottoms; rocky mountain habitat in areas with logs, boulders, or sagebrush scrub); and red fir communities. This species may be more tolerant of dry habitat than are closely related shrews. In Great Basin National Park, this shrew was found at 3,000 m elevation in habitat dominated by Engelmann spruce.
Mammals	Brazilian free-tailed bat	*Tadarida brasiliensis*	Habitat ranges from lowland deserts, shrublands, woodlands, and forests to high mountains. Major roosts are primarily in caves in the southwestern United States; generally, buildings (generally old ones) in the southeastern United States (sometimes in hollow trees), along the U.S. West Coast, and in Jamaica; in both buildings and caves in Puerto Rico. Individuals may roost in cliff faces and other rock crevices, under bridges, on signs, or in cliff swallow nests during migration. Generally, these bats roost high (at least 3 meters) above the ground to allow the amount of free fall required to attain flight. Large maternity colonies inhabit buildings and caves; culverts and bridges may also serve as maternity sites. Individuals tend to return to their natal cave to breed. Foraging bats make use of agricultural landscapes and natural habitats; in Texas, the latter were most important in late summer.
Mammals	Fish Spring pocket gopher	*Thomomys bottae abstrusus*	This species occurs in the lowlands of central, southern, and western Nevada, USA, including the Fish Springs Valley in Nye County. The lowlands consist of primarily of sagebrush, and grasses.
Mammals	Smoke Creek Desert pocket gopher	*Thomomys bottae canus*	*Thomomys bottae* comprises many reproductively isolated populations and distinct populations with little interbreeding. Patches of soil deep enough and suitable for burrowing are necessary for persistence.
Mammals	Walker River pocket gopher	*Thomomys bottae cinereus*	*Thomomys bottae* comprises many reproductively isolated populations and distinct populations with little interbreeding. Patches of soil deep enough and suitable for burrowing are necessary for persistence.

Taxa	Common Name	Scientific Name	Habitat Associations
Mammals	San Antonio pocket gopher	*Thomomys bottae curatus*	Associated with a wide range of vegetation and soil types. Residents of open habitats and meadows, where soils are deep enough to maintain permanent burrow systems. Two subspecies of priority interest are isolated to two valleys, T. b. abstrusus in Fish Spring valley (also known as Litle Fish Lake Valley) in Nye County, and T. b. curtatus in Big Smoky Valley. A third isolate occurs near Eastgate. Presumed extinct.
Mammals	Dixie Valley pocket gopher	*Thomomys bottae depressus*	*Thomomys bottae* comprises many reproductively isolated populations and distinct populations with little interbreeding. Patches of soil deep enough and suitable for burrowing are necessary for persistence.
Mammals	Moore's Creek pocket gopher	*Thomomys bottae fumosus*	*Thomomys bottae* comprises many reproductively isolated populations and distinct populations with little interbreeding. Patches of soil deep enough and suitable for burrowing are necessary for persistence.
Mammals	Fish Lake Valley pocket gopher	*Thomomys bottae lacrymalis*	*Thomomys bottae* comprises many reproductively isolated populations and distinct populations with little interbreeding. Patches of soil deep enough and suitable for burrowing are necessary for persistence.
Mammals	Cherry Creek pocket gopher	*Thomomys bottae latus*	*Thomomys bottae* comprises many reproductively isolated populations and distinct populations with little interbreeding. Patches of soil deep enough and suitable for burrowing are necessary for persistence.
Mammals	Eastgate pocket gopher	*Thomomys bottae lucrificus*	*Thomomys bottae* comprises many reproductively isolated populations and distinct populations with little interbreeding. Patches of soil deep enough and suitable for burrowing are necessary for persistence.
Mammals	Stewart Valley pocket gopher	*Thomomys bottae solitarius*	*Thomomys bottae* comprises many reproductively isolated populations and distinct populations with little interbreeding. Patches of soil deep enough and suitable for burrowing are necessary for persistence.
Mammals	Wyoming pocket gopher	*Thomomys clusius*	This is a fossorial species. Distribution modeling indicates that T. clusius is limited to areas with Gardner's saltbush, particularly in association with other moderately halophytic species such as winterfat. This suggests an association between T. clusius and salt desert scrub communities typically found in relatively flat areas of fine-textured saline substrates in and near the Great Divide Basin. Within south-central Wyoming, any area containing measurable cover of Gardner's saltbush, particularly on shallow slopes and in combination with winterfat, could be potential habitat for T. clusius. Although habitats characterized by Gardner's saltbush are more common within the range of T. clusius than adjacent areas of Wyoming, they represent a very limited area of potential habitat within a landscape largely dominated by big sagebrush.
Mammals	Idaho pocket gopher	*Thomomys idahoensis*	Occurs in open sagebrush, grassland plains, and subalpine mountain meadows in shallow, stony soils. Fossorial.

Taxa	Common Name	Scientific Name	Habitat Associations
Mammals	Merriam's ground squirrel	*Urocitellus canus*	Mainly in high desert (sagebrush, shadscale, greasewood, western juniper), grasslands, pastures; also, in river valley bottomland. Generally, in well-drained soils, especially embankments. Often around desert springs and irrigated fields. Makes extensive burrow systems. Young are born in a nest chamber in an underground burrow.
Mammals	Southern Idaho ground squirrel	*Urocitellus endemicus*	Southern Idaho Ground Squirrel populations occur in a mosaic of shrubland and grassland habitats common to foothills rangelands and pastures. They are also frequently associated with mowed fields, primarily alfalfa, found in drainage and valley bottoms.
Mammals	Piute ground squirrel	*Urocitellus mollis*	Mainly in high desert (sagebrush, shadscale, greasewood). In southwestern Idaho, highest densities were in winterfat-Sandberg's bluegrass communities, with intermediate densities in big sagebrush-dominated communities and lowest densities in shadscale communities; scarce in communities dominated by exotic annuals.
Mammals	Townsend's ground squirrel	*Urocitellus townsendii*	Townsend's ground squirrel historically occurred primarily in native shrub steppe, grasslands, and large patches of sagebrush at the lower edges of forest. A variety of human-modified habitats are now also occupied, including pastures, abandoned fields, orchards, vineyards, hop fields, canal banks, and sites adjacent to irrigated fields and springs. Occupied sites must have ample soil depths to provide space for burrow construction.
Mammals	Washington ground squirrel	*Urocitellus washingtoni*	Shrubsteppe and native grassland habitats are preferred, especially those occurring on deep silty loam soils, which provide ample digging space for burrows.
Mammals	Grizzly bear	*Ursus arctos horribilis*	Grizzly bears prefer forests with meadows and grasslands mixed in. They can also be found in dense forests, mixed-conifer forests, and riparian areas along rivers and streams
Mammals	Kit fox	*Vulpes macrotis*	Primarily open desert, shrubby or shrub-grass habitat. In central California, found in alkali sink, valley grassland, foothill woodland. In Mohave Desert, occurs in creosote bush; in Great Basin, in shadscale, greasewood and sagebrush. Young are born in an underground den. Den usually has multiple entrances (3 or more) and may be 3-6 m long, reaching 127 cm in depth. In Utah, most dens were on flat, well-drained uplands. Several dens may be used, especially in summer.

Taxa	Common Name	Scientific Name	Habitat Associations
Mammals	Swift fox	*Vulpes velox*	Habitat includes open prairie and arid plains, including areas intermixed with winter wheat fields. Viable populations exist in shortgrass prairie-sagebrush steppe transition habitat in southeastern Wyoming. Dens are in burrows. A fox may dig a burrow or use a burrow made by another mammal (e.g., marmot, prairie dog, badger), usually in sandy soil on high ground in open prairies, along fencerows, occasionally in plowed field. An individual may use several different dens throughout the year.
Mammals	Western jumping mouse	*Zapes princeps*	Found in mountain meadows and marshes and along banks of streams and ponds, in dense cover of tall grasses and herbs. It nests in burrows in well-drained mound or elevated banks or on the surface among vegetation.
Reptiles	Spiny softshell	*Apalone spinifera*	Primarily an animal of riverine systems, but also inhabits marshy creeks, bayous, oxbows, lakes, irrigation canals, and impoundments. A soft bottom in permanent bodies of water with some aquatic vegetation appears to be essential, and sandbars and/or mudflats, as well as partially submerged debris (trees, fallen logs, brush), are usually present.
Reptiles	Northern rubber boa	*Charina bottae*	Habitat includes woodlands, forest clearings, patchy chaparral, meadows, and grassy savannas, generally not far from water, also riparian zones in arid canyons and sagebrush in some areas. Generally, this snake is found in or under rotting logs or stumps, under rocks or in crevices, or under the bark of dead fallen trees.
Reptiles	Snapping turtle	*Chelydra serpentina*	Freshwater habitats with a soft mud bottom and cover such as abundant aquatic vegetation or submerged brush and logs, and brackish water in some areas.
Reptiles	Painted turtle	*Chrysemys picta*	Aquatic habitats include lakes, ponds, wetlands, and slow flowing areas of rivers and creeks. They prefer habitats that have muddy sediments and lots of aquatic vegetation.
Reptiles	Midget faded rattle snake	*Crotalus viridis concolor*	This species occurs in sagebrush communities, and needs rocky outcrops for cover, variable thermal conditions, and hibernation.
Reptiles	Great Basin collared lizard	*Crotaphytus bicinctores*	Found mainly in desert, sparsely vegetated, rocky areas on hillsides, rocky plains, and in canyons.
Reptiles	Ring-necked snake	*Diadophis punctatus*	This snake occurs in forests, woodlands, grassland, chaparral, and riparian corridors in arid regions. Habitats are moist, at least seasonally. One or multiple individuals often are found near abandoned buildings and in junk piles in wooded areas. During daylight hours, this snake generally hides underground, in or under logs, or under rocks, stumps or other surface cover. Eggs are laid (often communally) underground or under logs or rocks.
Reptiles	Western pond turtle	*Emys marmorata*	This aquatic turtle lives in streams, ponds, lakes, and permanent and ephemeral wetlands.

Taxa	Common Name	Scientific Name	Habitat Associations
Reptiles	Long-nosed leopard lizard	*Gambelia wislizenii*	Found in sandy and gravelly desert and semidesert areas with scattered shrubs or other low plants (for example, bunch grass, alkali bush, sagebrush, and creosote bush), especially areas with abundant rodent burrows. Occurs from sea level to approximately 6,000 feet (BLM 2017).
Reptiles	Plains hog-nosed snake	*Heterodon nasicus*	The Western Hog-nosed Snake prefers plains and savannahs with well drained sandy or gravelly soil where it can easily burrow or dig out prey. Where soils are appropriate can also be found in semi-agricultural areas. They have been reported in areas of sagebrush-grassland habitat underlain by sandy soils.
Reptiles	Mesa Verde nightsnake	*Hypsiglena chlorophaea loreala*	Found in a variety of habitats, often arid areas, from chaparral, Sagebrush flats, deserts, suburban lots and gardens, mountain meadows, grassland. Most commonly found in areas with abundant surface cover.
Reptiles	California kingsnake	*Lampropeltis californiae*	This primarily terrestrial snake occurs in a wide range of habitats, including forest, woodland, shrubland, swamps, marshes, river bottoms, grassland, semidesert, desert, and farmland. Periods of inactivity are spent in crevices or burrow, or under rocks, logs, stumps, vegetation, or other cover.
Reptiles	Western milksnake	*Lampropeltis gentilis*	Western milksnakes occur in most habitats within its elevation range, including shortgrass prairie, sandhills, shrubby hillsides, canyons, open stands of ponderosa pine, pinyon-juniper woodlands and arid river valleys.
Reptiles	Sonoran Mountain kingsnake	*Lampropeltis pyromelana*	Habitats are primarily rocky, montane, and often near streams or springs, but also include lower elevations in mesic canyons. Vegetation may include pinyon-juniper woodland, oak-juniper woodland, pine-oak woodland, pine-Douglas-fir woodland, or chaparral. During daylight hours, this snake may be found among rocks, logs, or dense clumps of vegetation, under objects, or exposed.
Reptiles	California Mountain kingsnake	*Lampropeltis zonata*	Typical habitat of this species consists of moist open coniferous forests, oak woodlands, riparian woodland, chaparral, coastal sage scrub, and openly wooded areas where there are rocks or rotting logs. During periods of inactivity, individuals seek shelter under rocks, logs, bark, or underground.
Reptiles	Smooth greensnake	*Opheodrys vernalis*	Habitats include meadows, grassy marshes, moist grassy fields at forest edges, mountain shrublands, stream borders, bogs, open moist woodland, abandoned farmland, and vacant lots. This snake has been found hibernating in abandoned ant mounds. Eggs are laid under rotting wood, underground, or under rocks.

Taxa	Common Name	Scientific Name	Habitat Associations
Reptiles	Pygmy short-horned lizard	*Phrynosoma douglassii*	Semiarid plains of sagebrush and bunch grass, to pinyon-juniper woodlands, to pine forests in high mountains. It is usually found in open, shrubby, or openly wooded areas with sparse vegetation at ground level. The soil may vary from rocky to sandy to hardpan, but pockets of fine loose soil or sand are typically present for burrowing. Occurs from 1,000 to 7,200 feet.
Reptiles	Greater short-horned lizard	*Phrynosoma hernandesi*	Ranges from semiarid plains to high mountains (2,000 to 10,500 feet); occupies a variety of habitats, including sagebrush, open pinyon-juniper woodland, and pine-spruce and spruce-fir forests. Substrate may be stony, sandy, or firm, but some fine, loose soil is usually present.
Reptiles	Southern Desert horned lizard	*Phrynosoma platyrhinos calidiarum*	Found on sandy flats, alluvial fans, along washes, and at the edges of dunes. Sometimes found on hardpan or among rocks, but patches of sand are generally present. Associated with sagebrush, saltbush, and greasewood in the Great Basin. Elevational range extends from below sea level in desert sinks to about 6,500 feet.
Reptiles	Northern Desert horned lizard	*Phrynosoma platyrhinos platyrhinos*	Found on sandy flats, alluvial fans, along washes, and at the edges of dunes. Sometimes found on hardpan or among rocks, but patches of sand are generally present. Associated with sagebrush, saltbush, and greasewood in the Great Basin. Elevational range extends from below sea level in desert sinks to about 6,500 feet.
Reptiles	Longnose snake	*Rhinocheilus lecontei*	Typical habitats include deserts, dry prairies, arid river valleys, thornbush, and shrubland; sometimes oak-hackberry woodland. This snake retreats underground or under rocks by day. Eggs are laid underground or under rocks.
Reptiles	Northern sagebrush lizard	*Sceloporus graciosus graciosus*	This species occurs in areas of sagebrush and other types of shrublands, mainly in the mountains, preferring open, sunny areas with scattered low bushes.
Reptiles	Western groundsnake	*Sonora semiannulata*	Found in arid habitats usually having loose or sandy soil ranging from rocky areas (talus slopes, canyon rims and outcroppings) to low desert shrub areas.
Snails	Harney Basin duskysnail	*Colligyrus depressus*	This species occurs in shallow, cold springs, and spring runs with rocky substrates and moderate to steep slopes, in sage scrub desert.
Snails	Rocky Mountain dusky snail	*Colligyrus greggii*	Presumed extirpated in Oregon.
Snails	Poplar Oregonian	*Cryptomastix populi*	This species is found primarily on moderately xeric basalt talus in canyons, typically in open situations rockslides and bushy draws, and less often on steep, cool lower slopes of major river basins. The surrounding vegetation is generally sage scrub or cottonwood.
Snails	Steptoe hydrobe	*Eremopyrgus eganensis*	Endemic to one set of springs in the Steptoe Valley, north of Ely, White Pine Co., Nevada.

Taxa	Common Name	Scientific Name	Habitat Associations
Snails	Shortface lanx	*Fisherola nuttalli*	Unpolluted, cold, well-oxygenated perennial streams and rivers, generally 100 to 325 feet wide, with a cobble-boulder substrate.
Snails	Pyramid Lake pebblesnail	*Fluminicola dalli*	Only known from the type locality and a small surrounding area in the northern area in Pyramid Lake
Snails	Ashy pebblesnail	*Fluminicola fuscus*	Inhabits clear, cold streams, under rocks and vegetation in the slow to rapid currents of streams but is sparse or absent in major rapids. Restricted to habitat with sufficient flow, oxygenation, and stable substrate.
Snails	Modoc pebblesnail	*Fluminicola modoci*	Occurs only in a small number of springs with cool clear water and rocky bottoms in southern Oregon and northern California
Snails	Turban pebblesnail	*Fluminicola turbiniformis*	This species occurs in cold, nutrient-poor springs.
Snails	Virginia Mountains pebblesnail	*Fluminicola virginius*	Found in a single spring in the Pyramid Lake basin in Washoe County
Snails	Western ridged mussel	*Gonidea angulata*	Inhabits bottom of cold creeks, rivers, and lakes from low to mid-elevations with substrates that vary from gravel to firm mud, and include at least some sand, silt or clay. Generally associated with constant-flow, shallow water (less than 10 feet in depth) and well oxygenated substrates.
Snails	Banbury Springs limpet	*Idaholanx fresti*	Requires cold, clear and well-oxygenated water with swift currents. Found on smooth basalt, boulders, or cobble-sized grounds ranging from 2 to 20 inches deep but avoid areas with green algae. Only exists at four cold-spring locations in Idaho that are isolated from each other.
Snails	Scalloped Juga	*Juga acutifilosa*	This species is found in springs, spring runs, and spring-fed creeks.
Snails	Eureka mountainsnail	*Oreohelix eurekensis*	An important habitat factor is the presence of limestone talus, outcrops, or high calcium soils. The species also requires shade from vegetation and a well-developed litter layer. This can be found under shrub or tree cover.
Snails	Costate mountainsnail	*Oreohelix idahoensis idahoensis*	This subspecies is found on steep slopes, generally talus or rock outcrops, like limestone or slate.
Snails	Whitepine mountainsnail	*Oreohelix hemphilli*	This species has a disjunct range on high elevation rocky areas mountains from a somewhat broad area
Snails	Goshute mountainsnail	*Oreohelix loisae*	Only known from two sites in the Goshute Mountains, Elko Co., Nevada.
Snails	Schell Creek mountainsnail	*Oreohelix nevadensis*	Known from a few sites and has limited distribution, in high elevation areas predominantly consisting of limestone.
Snails	Great Basin mountainsnail	*Oreohelix strigose depressa*	Found in the mountains of eastern Nevada,
Snails	Striate mountainsnail	*Orehelix strigosa goniogyra*	Composition of plant community is less important than substrate with the presence of exposed limestone being almost critical for occurrence although there are documented occurrences on sandstone.
Snails	Dalles mountainsnail	*Oreohelix variabilis ssp.*	This species occurs in areas of talus and basalt with limited vegetation cover.

Taxa	Common Name	Scientific Name	Habitat Associations
Snails	Whorled mountainsnail	*Oreohelix vortex*	This species is restricted mostly to large-scale, xeric basalt taluses and boulder fields. Sites are typically dry and open; the most common vegetation is grasses. The species prefers low to medium elevations in large stream valleys; dry open to brushy areas; vicinity of springs; basalt talus. Grasses are common at preferred sites, with some forbs and shrubs. This species occurs in association with basalt boulder fields and talus in xeric habitat. Grasses and occasionally shrubs or forbs are the most common plant associates.
Snails	Lava rock mountainsnail	*Oreohelix waltoni*	It is associated with basalt (particularly type locality) but also mixed schist/alluvium in rather dry, open areas of sage scrub vegetation. Common plants found at sites are grasses and shrubs including Artemisia, and Celrus; Sorbus, Prunus, and Physocarpus occur locally. It is associated with xeric habitat in basalt talus and mixed schist/alluvium. Dominant plants in the areas include sagebrush, netleaf hackberry, and grasses. This habitat occurs primarily along the Salmon River corridor and in the southwestern portion of the section. Much of this habitat occurs in wilderness.
Snails	Snake River physa	*Physella natricina*	Freshwater mollusk inhabiting areas of swift current on sand to boulder-sized substrate.
Snails	Black-footed tightcoil	*Pristiloma chersinella*	Little information on distribution or habitat is available. The species occurs in high-elevation places in British Columbia and the Pacific Northwest of the US
Snails	Archimedes springsnail	*Pyrgulopsis archimedis*	Found in spring-influenced areas of large lakes.
Snails	Dixie Valley pyrg	*Pyrgulopsis dixensis*	Found in Dixie Valley Nevada
Snails	Owyhee hot springsnail	*Pyrgulopsis fresti*	Requires clean, moderately swift, well-oxygenated waters, typically with gravel-boulder substrates. It inhabits thermal springs with temperatures of 24 to 33°C. The only area with known habitat for this species is in a major Owyhee river canyon with exposed basalt and other volcanic lithologies, in open and dry sage scrub
Snails	Surprise Valley pyrg	*Pyrgulopsis gibba*	Occurs in northwestern Great Basin (California, Nevada, and Oregon)
Snails	Emigrant pyrg	*Pyrgulopsis gracilis*	Occurs in the Emigrant Springs complex in the White River valley in Nye County, Nevada
Snails	Hamlin Valley pyrg	*Pyrgulopsis hamlinensis*	Recorded in two high-elevation, rocky springs in Beaver County in extreme western Utah
Snails	Upper Thousand Spring pyrg	*Pyrgulopsis hovinghi*	Freshwater snails have adapted to most North American habitats including permanent standing, intermittent, and flowing waters.
Snails	Hubbs pyrg	*Prygulopsis hubbsi*	Occurs in Hiko Spring and Crystal Springs in Lincoln County, NV.
Snails	Humboldt pyrg	*Prygulopsis humboldtensis*	Restricted to the Lahontan Basin
Snails	Kings River pyrg	*Pyrgulopsis imperialis*	Found in 13 isolated springs near Thacker Pass and the Montana Mountains, NV.

Taxa	Common Name	Scientific Name	Habitat Associations
Snails	Crooked Creek springsnail	*Pyrgulopsis intermedia*	Documented in Simpson Springs in Eureka County, Nevada.
Snails	Landyes pyrg	*Pyrgulopsis landyei*	Occurs in 2 springs along eastern edge of Egan Range in Steptoe Valley, Nevada.
Snails	Butterfield pyrg	*Pyrgulopsis lata*	Found in Butterfield Springs in White River Valley in Nye County, Nevada.
Snails	Crittenden pyrg	*Pyrgulopsis lentiglans*	Found in the Thousand Springs Creek drainage, Elko County, Nevada.
Snails	Lockes pyrg	*Pyrgulopsis lockensis*	Occurs in five thermal springs in Nye County, Nevada.
Snails	Western Lahontan pyrg	*Pyrgulopsis longiglans*	Occurs in springs and seeps in Humboldt, Washoe and Douglas Counties, Nevada.
Snails	Hardy springsnail	*Pyrgulopsis marcida*	Located in several springs in Nye, Lincoln and White Pine Counties, Nevada.
Snails	Northern Soldier Meadow pyrg	*Pyrgulopsis militaris*	Occurs in thermal spirngs in the Soldier Meadow area of Nevada
Snails	Camp Valley pyrg	*Pyrgulopsis montana*	Occurs in the Meadow Valley (Camp Valley) Wash in Nevada.
Snails	Neritiform Steptoe Ranch pyrg	*Pyrgulopsis neritella*	Occurs in Steptoe Valley Nevada.
Snails	Elongate Mud Meadows springsnail	*Pyrgulopsis notidicola*	Endemic to Soldier Meadow, Nevada, occur in small, usually fishless spring-fed water bodies.
Snails	Sub-globose Steptoe Ranch pyrg	*Pyrgulopsis orgiculata*	Restricted to two springs on private lands in White Pine County, Nevada.
Snails	A springsnail	*Pyrgulopsis owyheensis*	Lives in spring sources and stream outflows, some of which are thermal, and is found on a variety of hard substrates. Disjunctly distributed among five small areas (Owyhee River near Three Forks, Rattlesnake Creek drainage, Owyhee Spring area, lower Owyhee River, Malheur River drainage) in southeastern Oregon in Malheur County.
Snails	Big Warm Spring pyrg	*Pyrgulopsis papillata*	Found near the Duckwater tribal lands, Nevada
Snails	Bifid Duct pyrg	*Pyrgulopsis peculiaris*	Occurs in Snake and Spring Valleys in White Pine County, Nevada.
Snails	Ovate Cain Spring pyrg	*Pyrgulopsis pictilis*	Occurs in spring pools within the Reese River valley
Snails	Median-gland springsnail	*Pyrgulopsis pisteri*	Found in Marsh Spring, North Scruggs Springs, and below School Springs, Nevada all within 1.2 miles of each other
Snails	Flat-topped Steptoe pyrg	*Pyrgulopsis planulata*	Occurs in one spring near Clark Spring, Steptoe Valley, White Pine County, Nevada.
Snails	Jackson Lake springsnail	*Pyrgulopsis robusta*	Currently found in the Harney Lake-Malheur Lake area of Harney County, Oregon and one or two spring sites in the Lake Abert area of Lake County, Oregon.
Snails	Sada's pyrg	*Pyrgulopsis sadai*	Occurs in 15 sites across its range in Utah and Nevada.
Snails	White River Valley pyrg	*Pyrgulopsis sathos*	Reported from the White River Valley in Nye, Lincoln and White Pine Counties, Nevada.
Snails	Northern Steptoe pyrg	*Pyrgulopsis serrata*	Occurs in the northern Steptoe Valley, Nevada.
Snails	Sterile Basin pyrg	*Pyrgulopsis sterilis*	Known from three springs in Nye County, Nevada.

Taxa	Common Name	Scientific Name	Habitat Associations
Snails	Northwest Bonneville pyrg	*Pyrgulopsis variegata*	Found in springs in Utah's Box Elder and Tooele counties. The most common habitat for the Pyrgulopsis genus of freshwater snails is a rheocrene, which is a spring that flows freely from the ground.
Snails	Varner's pyrg	*Pyrgulopsis varneri*	Found in 3 spring complexes in Soldier Meadow Nevada.
Snails	Duckwater Warm Springs pyrg	*Pyrgulopsis villacampae*	Occurs in the Big Warm Springs complex in Nye County, Nevada.
Snails	Vinyard's pyrg	*Pyrgulopsis vinyardi*	Endemic to Nevada; This species found in rheocrene springs at elevations ranging from 1,689 to 1,698 m (5,541 to 5,571 ft).
Snails	Wong's pyrg	*Pyrgulopsis wongi*	Occurs in springs in far western Nevada and adjacent eastern California.
Snails	Unexpected snail	*Taylorconcha insperata*	Newly described species in the Malheur and Owyhee Rivers in Oregon. Occurs on stable substrates on the undersides of loose, large cobbles or boulders in back eddies below rapids in shallow rivers and tributary deltas (0 to 1m deep), and at elevations around 1200m.
Snails	Grated tryonia	*Tryonia clathrate*	Observed in Nye County, Nevada.
Snails	Monitor tryonia	*Tryonia monitorae*	Restricted to HotSprings, Potts Ranch and Monitor Valley, Nevada.
Snails	Lined ramshorn	*Vorticifex effusa diagonalis*	This species is found in freshwater habitats with a preference for still or slow-moving water with live aquatic vegetation

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Appendix 12

Reasonably Foreseeable Development Scenario

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ACRONYMS AND ABBREVIATIONS

	Full Phrase
°F	degrees Fahrenheit
2015 CO Plan	2015 Northwest Colorado Greater Sage-Grouse Proposed LUPA/Final EIS
2015 ID Plan	2015 Idaho and Southwestern Montana Greater Sage-Grouse Proposed LUPA/Final EIS
2015 SD Plan	2015 South Dakota Proposed LUPA/Final EIS
2015 WY Plan	2015 Wyoming Greater Sage-Grouse Land Use Plan Amendment
ACEC	Area of Critical Environmental Concern
BCF	billion cubic feet
BLM	Bureau of Land Management
CBNG	Coal Bed Natural Gas
CHMA	connectivity habitat management area
CSU	controlled surface use
DOE	United States Department of Energy
DOI	United States Department of Interior
DRECP	Desert Renewable Energy Conservation Plan
EGS	enhanced geothermal systems
EIS	Environmental Impact Statement
EPCA	Energy Policy and Conservation Act
FLPMA	Federal Land Policy and Management Act of 1976
FO	Field Office
GHMA	general habitat management area
GIS	geographic information system
GRSG	Greater Sage Grouse
HMA	habitat management area
IHMA	important habitat management area
Kwh	kilowatt hours
LCHMA	Linkage/Connectivity Habitat Management Area
LUPA	Land Use Plan Amendment
MCF	thousands of cubic feet
MMBO	million barrels of oil
MW	megawatt
NDOM	Nevada Division of Minerals
NEPA	National Environmental Policy Act
NSO	No Surface Occupancy
OHMA	other habit management area
ONNR	Office of Natural Resource Revenue
P&A	plugged and abandoned
PEIS	Programmatic Environmental Impact Statement
PHMA	priority habitat management area
RFD	reasonably foreseeable development
RHMA	restoration habitat management area
RMP	resource management plan
RMPA	resource management plan amendment
ROW	right-of-way
US	United States
WEMs	waivers, exemptions, and modifications
WOGCC	Wyoming Oil and Gas Conservation Commission

Appendix 12. Reasonably Foreseeable Development Scenario

This document was developed to support the Greater Sage Grouse planning effort. It is intended to provide a reasonable projection of future activity associated with mineral exploration and development in the planning area under each of the proposed alternatives, in order to assist in the analysis of impacts resulting from proposed actions. It is intended to provide an update to information in previous Greater Sage Grouse planning efforts. Information from these previous efforts was gathered, examined against development trends, advances in technologies, and economic conditions since the time of publication. This was examined in consultation with various Bureau of Land Management (BLM) resource specialists to determine the need for changes or updates to the assumptions and information used to develop expectations regarding mineral exploration and development in the planning area. Once any revisions were completed the information was used to analyze the impact of the proposed alternatives during the 20-year planning period.

12.1 Fluid Minerals – Colorado

12.1.1 Methodology

BLM mineral resource experts examined the reasonably foreseeable development (RFD) document produced for the 2015 Northwest Colorado Greater Sage Grouse (GRSG) Land Use Plan Amendment (LUPA) and Environmental Impact Statement (EIS) as well as development trends and data from development since that time and determined that the methodology and trends that were used to produce the projections did not need modifications given the lack of significant changes in trends surrounding fluid mineral development. Assumptions and methodology used to develop the updated projections below are the same assumptions and methodology described in Appendix N of the 2015 Northwest Colorado Greater Sage-Grouse Proposed LUPA/Final EIS (2015 CO Plan). These were used along with new information to revise the projections provided to the current date and to analyze the proposed Alternatives. Limited data on how the 2015 projections were created is available, but because the trend of the projections is consistent with conditions since that time, they were able to be extended into the future. The projections by alternative taken from Table N.17 were compared to the current Alternatives, to determine the closest matches of alternatives from the two plans using management direction. Alternative 1 would continue management from the 2015 CO Plan. Alternative 2 would continue management from the 2018 Northwest Colorado GRSG Proposed Resource Management Plan Amendment/Final Environmental Impact Statement which would open to leasing approximately 224,200 acres closed under Alternative 1 and add an allowance for exceptions to NSO stipulations; the 2018 Plan did not provide projections of future development, but this management is very similar to what was proposed under Alternative D in the 2015 Plan. Alternative 3 would close all GRSG habitat to leasing, which is similar management to Alternative C in the 2015 CO Plan which proposed closing occupied habitat areas to fluid mineral leasing and applied NSO to the majority of the remaining area; so Alternative C projections were used for Alternative 3. Alternatives 4, 5, 6 and the Proposed RMP Amendment would make approximately 751,000 acres of PHMA open to leasing with NSO stipulations and apply NSO buffers around Leks in the 786,000 acres of GHMA, NSO stipulations would allow for waivers, exemptions, and modifications (WEMs) under this Alternative. The Proposed RMP Amendment would also manage approximately 5,000 acres of the total PHMA as Limited Exception. When comparing against the 2015 CO Plan Alternatives, this proposed management falls between Alternative D which proposed NSO stipulations on 1,347,400 acres, and Alternative A which proposed NSO stipulations on 350,300 acres (2015

CO Plan Table 2.6). The average of the projections for Alternatives A and D was calculated for use as the projections for Alternative 4, 5, and the Proposed RMP Amendment. Alternative 6 would apply the same management as Alternative 5 except that it would consider the designation of certain areas as areas of critical environmental concern (ACECs), however much of the designated ACEC acreage is already closed to leasing from management of other resources so the ACEC designations were determined to be unlikely to cause major changes to projections.

Projections created for the 2015 CO Plan included wells and production from Federal Minerals under Forest Service surface, however Federal Minerals under Forest Service surface are not part of the decision area in the current planning effort, so these areas were removed from the projections by calculating the proportion of the 2015 decision area that was Federal Minerals under Forest Service surface and then reducing the projections by that proportion.

The 2015 projections of production of oil and gas by Alternative in Table N.18 in the 2015 CO Plan were used for current plan projections using the same match-up between the 2015 and current Alternatives as described for the well projections above. These production amounts were also reduced by the proportion of Federal Minerals under Forest Service surface in the GRSG habitat areas, the Forest Service was not involved in the current planning effort so federal mineral estate located under Forest Service surface estate, which require consent of the Forest Service before BLM can lease, were not included in the decision area and their impact was removed from the projection results.

It was noted that the projected 20-year oil production projections in the 2015 CO Plan were significantly higher than the peak production from the entire state of Colorado despite the analysis area not containing the highest producing fields in the state. According to Energy Information Administration[1] Colorado had a peak production of 192,238 thousand barrels in 2019 (192,238,000 * 20 years = 3,844,760,000 barrels), under the Proposed RMP Amendment in Table N.18 the 20-year production from Federal, State, and Fee Minerals, All Surface is listed as 44,879 million (44,879,000,000) barrels under the low case scenario and 72,617 million (72,879,000,000) barrels under the high case scenario. Because of this and based on production history from the counties containing the GRSG habitat, it was determined that the projections had been incorrectly converted and were off by a factor of 100, so projected barrels of production were converted by this amount (i.e., 35,903,966,373 barrels became 359,039,664 barrels).

Surface disturbance was calculated by the number of new wells under the high development scenario for each Alternative. Short-term disturbance calculations used the number of wells drilled, and long-term disturbance calculations used the number of wells completed for each Alternative. The disturbance acreage per well was derived from Tables 1 and 2 in the Reasonably Foreseeable Development (RFD) Scenario for Oil and Gas for Grand Junction Field Office,[2] which was chosen because it was the most recent RFD completed in the Planning area. Short term disturbance per well, which is the disturbance that occurs during drilling, was multiplied by the number of wells drilled for each Alternative. The long-term disturbance per well, which is the remaining disturbance necessary for the production of oil and gas after areas of disturbance only needed for drilling and completion of well have been reclaimed, was multiplied by the number of

[1] Energy Information Administration. 2023. Petroleum & Other Liquids- Colorado Field Production of Crude Oil. https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=pet&s=mcrfpco1&f=a

[2] Reasonably Foreseeable Development Scenario for Oil and Gas, Grand Junction Field Office, Colorado. United States Department of the Interior, Bureau of Land Management. June 18, 2012.

completed wells under each Alternative. Wells that are drilled but not completed would be plugged and abandoned, and the disturbance would be fully reclaimed.

Both a high and a low scenario are presented. The high scenario is based on RFDs from each field office in the decision area and is designed as a high case scenario, by assuming that both the number of wells drilled and production per well would be on the high side of what is likely to occur, in order to analyze the impacts of an increase in the rate of drilling and production. The low scenario adjusts projections based on actual spud information from the Automated Fluid Minerals Support System and production levels and is considered a more realistic scenario.

12.1.2 Oil and Gas

The oil and gas potential rankings created in response to the Energy Policy and Conservation Act (EPCA) were overlaid with GRSG habitat management areas (HMAs) using a geographic information system (GIS) to analyze the likelihood of development in priority habitat management area (PHMA) and general habitat management area (GHMA). While more recent assessments of oil and gas development potential are available for many states, the EPCA potential rankings were chosen for use because they are the most recent assessment that covers the entire GRSG planning area, this is desirable because it allows for comparison of development potential across different states. High potential areas are most likely to be developed, medium potential areas are the second most likely to be developed, and low potential areas are the least likely to be developed. The boundaries of HMAs vary slightly by alternative so the Alternative 4 boundaries were used for the purposes of calculation but the distribution of potential by HMA area does not vary significantly across the proposed Alternatives.

Table 1: EPCA Potential for Oil within Colorado GRSG HMAs

Alternative 4	Acres
GHMA	*786,000*
LOW	361,000
MEDIUM	149,000
HIGH	277,000
PHMA	*751,000*
LOW	326,000
MEDIUM	104,000
HIGH	321,000
Grand Total	**1,538,000**

Source: EPCA 2018, BLM GIS 2023

Table 2: EPCA Potential for Gas within Colorado GRSG HMAs

Alternative 4	Acres
GHMA	*786,000*
LOW	317,000
MEDIUM	211,000
HIGH	258,000
PHMA	*751,000*
LOW	344,000
MEDIUM	128,000
HIGH	280,000
Grand Total	**1,538,000**

Source: EPCA 2018, BLM GIS 2023

Existing Oil and Gas Leasing Activity

Existing leases, which could still be developed under the management associated with the resource management plan (RMP) which the lease was issued under, even in areas which would be closed or have more restrictive stipulations applied under the Proposed RMP Amendment, were overlaid with potential and HMA type in GIS to show how much of the oil and gas in the planning area might not be impacted by the proposed new management.

Table 3: Colorado EPCA Potential for Gas within GRSG HMAs with Existing Oil and Gas Lease Status

Alternative 4	Acres
GHMA	*101,000*
LOW	21,000
Authorized	17,000
Interim	0
Pending	3,000
MEDIUM	48,000
Authorized	44,000
Interim	0
Pending	3,000
HIGH	33,000
Authorized	32,000
Interim	0
Pending	0
PHMA	*135,000*
LOW	63,000
Authorized	55,000
Interim	1,000
Pending	7,000
MEDIUM	26,000
Authorized	26,000
Pending	0
HIGH	46,000
Authorized	38,000
Pending	8,000
Grand Total	**236,000**

Source: EPCA 2018, BLM GIS 2023

Projected Drilling Activity by Alternative

Projections of future oil and gas development contained in Appendix N of the 2015 Colorado GRSG Final EIS were used with details about the new proposed alternatives to create the following updated projections for the development of oil and gas in the planning area under the new proposed alternatives.

Table 4: Number of Oil and Gas Well Projected to be Drilled and Completed on BLM-managed Federal Minerals in the Planning Area During the 20-year Forecast Period

Alternative	Low Scenario	High Scenario
Alternative 1-wells drilled	8,635	16,963
Alternative 1-wells completed	8,204	15,910
Alternative 2- wells drilled	8,760	17,088
Alternative 2-wells completed	8,322	16,026
Alternative 3- wells drilled	8,687	12,716
Alternative 3-wells completed	8,253	11,997
Alternative 4- wells drilled	9,018	17,533
Alternative 4-wells completed	8,567	16,422
Alternative 5- wells drilled	9,018	17,533
Alternative 5-wells completed	8,567	16,422
Alternative 6-wells drilled	9,018	17,533
Alternative 6-wells completed	8,567	16,422
Proposed RMP Amendment-wells drilled	9,018	17,533
Proposed RMP Amendment-wells completed	8,567	16,422

Source: Derived from 2015 Colorado GRSG Final EIS Table N.17

Projected Surface Disturbance Due to Oil and Gas Activity by Alternative

Table 5: High Scenario Projected 20-year Surface Disturbance from Well Pads, Roads, and Pipelines

Alternative	Short term disturbance* (acres)	Long term disturbance* (acres)
Alternative 1-wells drilled	61,729	-
Alternative 1-wells completed	-	19,895
Alternative 2- wells drilled	62,181	-
Alternative 2-wells completed	-	20,040
Alternative 3- wells drilled	46,272	-
Alternative 3-wells completed	-	15,001
Alternative 4- wells drilled	63,804	-
Alternative 4-wells completed	-	20,535
Alternative 5- wells drilled	63,804	-
Alternative 5-wells completed	-	20,535
Alternative 6-wells drilled	63,804	-
Alternative 6-wells completed	-	20,535
Proposed RMP Amendment --wells drilled	63,804	-
Proposed RMP Amendment --wells completed	-	20,535

Source: Derived using data from Table 1 and Table 2 in the Grand Junction Field Office RFD (2012) and high scenario oil and gas well projections above.

*Short term disturbance is generated by pads for all wells drilled, and construction of roads and pipelines. Long term disturbance is generated by pads for completed wells, and road and pipeline disturbance remaining after reclamation of areas disturbed by construction, well pads for wells that are not completed are reclaimed.

Projected Production by Alternative

Table 6: Projected 20-Year Oil and Gas Production by Alternative

Alternative 1		Alternative 2		Alternative 3		Alternative 4, 5, 6, and Proposed RMP Amendment	
Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO)	Gas (BCF)	Oil (MMBO)
Low Scenario							
Federal Minerals Below All Surface except Forest Service							
13,100	183.79	13,288	186.44	12,962	138.61	13,715	203.50
High Scenario							
Federal Minerals Below All Surface except Forest Service							
25,406	356.44	25,591	359.04	18,842	201.49	26,288	389.95

Sources: Derived from the 2015 Colorado GRSG Final EIS table N.18.
BCF = billion cubic feet; MMBO = million barrels of oil

12.1.3 Geothermal

Although the potential for geothermal development is high in some areas, there currently is no ongoing geothermal power generation on BLM lands in Colorado. Recent increased interest and technological advancements increase the likelihood of its development in the future.

The 2015 and 2018 Sage Grouse Plans did not project the occurrence of geothermal development. Because there is no existing development and no previous estimates to use, the following assumptions are made to analyze the impacts of geothermal development and associated surface disturbance. For the purposes of analysis, it is assumed that under all Alternatives except Alternative 3 up to one 20 megawatt (MW) geothermal power generation facility would be developed on BLM-managed lands in GRSG habitat over the next 20 years. This facility would disturb up to 6 acres for the drilling of up to 6 thermal gradient wells and would disturb up to 24 acres for the drilling of up to 8 production and injection wells. Construction of pipelines would disturb up to 14 acres, and an additional 10 acres could be disturbed for the construction of the generating plant. An assumed 10 miles of road would disturb approximately 50 acres, and 8 miles of power line would disturb approximately 40 acres. Under Alternative 3, it is assumed that no geothermal power development would occur on BLM-managed lands in GRSG habitat because under this alternative all GRSG habitat would be closed to fluid mineral leasing.

12.2 Fluid Minerals – Idaho

12.2.1 Methodology

Assumptions and methodology used to develop the updated projections below are the same assumptions and methodology described in Appendix O of the 2015 Idaho and Southwestern Montana Greater Sage-Grouse Proposed LUPA/Final EIS.[3] These were used along with new information to revise the projections provided to the current date and to analyze the proposed Alternatives.

Tables O-1 and O-2 from Appendix O of the 2015 Idaho and Southwestern Montana Greater Sage-Grouse Proposed LUPA/Final EIS (2015 ID Plan) were used as the basis for updating projections. Dillion Field Office is located in Montana and was removed from the data for Idaho and moved to the Montana projections for the current planning effort. The proposed management in the current Alternatives was compared to the management in the proposed 2015 ID Plan Alternatives. Alternative 1 would continue the Proposed RMP Amendment management from the 2015 ID Plan. Based on the information in the 2015 ID Plan, it is

[3] https://eplanning.blm.gov/eplanning-ui/project/103344/510

reasonably foreseeable that under this Alternative that 15 new oil and gas exploratory wells would be developed on federal fluid mineral estate in the decision area in the next 20 years. Under Alternative 2, areas within PHMA and important habitat management area (IHMA) will be open to mineral leasing, development, and geophysical exploration, subject to NSO stipulations with limited exception, GHMA will be open to mineral leasing and development and geophysical exploration subject to controlled surface use stipulations. Compared to Alternative 1, Alternative 2 would allow for exceptions to NSO stipulations in certain situations if approved by the BLM Authorized Officer but would otherwise apply the same management. It is reasonably foreseeable for planning purposes that 20 new oil and gas exploratory wells would be developed on federal fluid mineral estate in the decision area within the next 20 years under Alternative 2. Alternative 3 is similar to the 2015 Plan Alternative C and would close GRSG to habitat to fluid mineral leasing. Under this Alternative, 13 new oil and gas exploratory wells are projected to be developed on federal fluid mineral estate in the decision area within the next 20 years. Alternative 4 would apply NSO in PHMA and IHMA with WEMs available, and an NSO buffer around Leks in GHMA with WEMs available. Compared to Alternative A from the 2015 Plan this would have fewer acres closed to leasing, but more acres managed with NSO stipulations and would allow waivers, exceptions, and modifications (WEMs) to NSO stipulations if approved by the BLM Authorized Officer. It is reasonably foreseeable for planning purposes that 25 new oil and gas exploratory wells would be developed on federal fluid mineral estate in the decision area within the next 20 years. Compared to Alternative 4, Alternative 5 would decrease the number of acres open with standard stipulations by approximately 1.65 million acres and increase the number of acres open with moderate stipulations by approximately 1.28 million. Acres managed as closed to leasing would have a small decrease and acres managed as open with major stipulations would increase slightly. Moderate stipulations typically have a minimal impact, especially in exploratory drilling, where minor changes in drill location have little consequence (versus established fields where drill locations established in layouts located to maximize resource recovery). It is reasonably foreseeable for planning purposes that 24 new oil and gas exploratory wells would be developed on federal fluid mineral estate in the decision area within the next 20 years under Alternative 5. Alternative 6 would apply Alternative 5 management and in addition designate certain areas as ACECs, which would be closed to leasing. However, most of the area that would be designated as ACECs are already closed or under NSO stipulations under the Alternative 5 management, so changes in development due to the ACEC designation would be minimal. Disturbance estimates were based on the projected number of wells under each alternative using the estimated disturbance associated with each well provided in Table O-2 in Appendix O of the 2015 ID Plan. The Proposed RMP Amendment would manage implement approximately the same management as under Alternative 5.

Geothermal projections were based on information provided in Appendix O of the 2015 ID Plan and on Table O-3 in the plan, as well as information about geothermal development provided in the more recent Four Rivers Resource Management Plan (2020). It was assumed that up to 70MW of geothermal generations could be developed during the 20-year planning period in the FRFO RMP and 40MW in Appendix O of the 2015 ID Plan, surface disturbance associated with that level of development was calculated based on information provided in Table O-3 of the 2015 ID Plan and information from the Four Rivers Resource Management Plan (2020).

12.2.2 Oil and Gas

Over 180 oil and gas wells have been drilled in Idaho of which 19 were drilled between 2015 and 2022. Currently there is only one region with active Federal oil and gas leases in the state, the Southwest Idaho oil and gas play near Payette, Idaho. Until 2008, no commercially viable oil or gas resources had been found in Idaho, despite the drilling of around 150 wells throughout the state by that time. In 2008, a natural gas field

named Willow Field was discovered in the Southwest Idaho oil and gas play and then in 2015, commercial production began from six wells on private lands. The resource is a relatively small, conventional deposit. The reservoir includes porous sand, is accessed via vertical and directional drilling, and does not require hydraulic fracturing (also referred to as fracking). The field was discovered largely due to recent advances in three-dimensional seismic technology.[4]

There are no existing or pending leases anywhere within the Sage Grouse HMA boundaries proposed under Alternatives 4, 5, 6 and the Proposed RMP Amendment.

Projected Drilling Activity by Alternative

The total estimated future surface disturbance for wells, roads, and well pads by Alternative is shown in the table below. These estimates were derived based on information from Table O-1 in Appendix O of the 2015 Idaho and Southwestern Montana Greater Sage-Grouse Proposed LUPA/Final EIS. The proposed alternatives were compared to the proposed management in that document. Alternative 1 proposed approximately the same management as the Proposed RMP Amendment from the 2015 document. Alternative 2 was based on the Proposed RMP Amendment from the changes made to GRSG management in Idaho in 2019 and 2020, the management allows for more mineral leasing and development, and geophysical exploration than Alternative 1. Alternative 3 is substantially similar to Alternative C from the 2015 Idaho and Southwestern Montana Greater Sage-Grouse Proposed LUPA/Final EIS. Alternative 4 would have fewer closed acres than Alternative 1, would manage PHMA and IHMA as open to leasing with No Surface Occupancy (NSO) stipulations that allow exceptions, and apply a NSO lek buffer around leks in GHMA. Alternatives 5, 6, and the Proposed RMP Amendment would apply similar management as Alternative 4 but would decrease the number of acres open with standard stipulations and increase the number of acres open with moderate stipulations. The application of moderate stipulations (CSU and/or timing limitations) typically have a minimal impact, especially in exploratory drilling where minor changes in drill location have little consequence (versus established fields where drill patterns are often carefully designed to maximize resource recovery). Alternative 6 will also designate some areas as ACECs which would be managed as closed to leasing.

Table 7: Reasonably Foreseeable Development Scenario for the Idaho in the next 20 years.

Alternative	Total Wells	Acres of Drill Pads[1]	Miles of Road[2]	Acres of Roads[3]
Alternative 1	15	45	30	150
Alternative 2	20	60	40	200
Alternative 3	13	39	26	130
Alternative 4	25	75	50	250
Alternative 5	24	72	48	240
Alternative 6	24	72	48	240
Proposed RMP Amendment	24	72	48	240

Source: updates to data from Table O-1 in Appendix O of the 2015 Idaho and Southwestern Montana Greater Sage-Grouse Proposed LUPA/Final EIS based on changes to management under the proposed Alternatives.
[1] Assumes 3 acres each.
[2] Miles of road per exploration well varies by RFDS. Miles of road for step-out wells equals one mile per well (in accordance with Idaho well spacing rule).
[3] Assumes 5 acres per mile.

[4] https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/about/idaho

12.2.3 Geothermal Summary

The only utility scale geothermal power development in the state of Idaho is the Raft River geothermal project located in Cassia County Idaho, at a former United States Department of Energy (DOE) geothermal site.

The project was acquired by US Geothermal in 2002 and construction began in June 2006. The plant began commercial operation in January 2008 and utilizes a binary-cycle water cooled system. The Raft River Plant was acquired by Ormat in 2018 and provides about 11MW of net capacity.[5]

The Raft River Geothermal Power plant in the Raft River Valley in Idaho expanded onto public land in GHMA between the 2015 Sage Grouse Plan and the 2018 Sage Grouse Plan Amendment.

According to the Proposed Four Rivers RMP and Final EIS[6] based on the geothermal potential for the planning area, it is reasonable to assume that a 50 MW plant might be developed in those areas determined to have high potential for indirect use. It is reasonable to assume that a 20-MW geothermal power plant might be developed anywhere along a fault zone that trends northwest from east of Mountain Home, Idaho to the Oregon Border, particularly on the southwest (valley) side of the fault zone, over the 20-year life of the plan. This northwest trending fault zone has a medium to high geothermal potential. According to the Proposed Four Rivers RMP and Final EIS, cumulative disturbance associated with development of a 50 MW plant is anticipated to be between 147 and 181 acres, while disturbance associated with developing a 20 MW plant is anticipated to be between 60 and 75 acres. This development includes the construction of drill pads to support the drilling of 20 temperature-gradient wells and 25 production and injection wells, road construction, power plant development, and pipeline and transmission line construction. Much of this disturbance would be reclaimed after each phase of development, such that once the power plant is operational, the actual disturbance would be considerably less than the cumulative total. Development is likely to occur in stages, however this is not always the case. Surface disturbances associated with direct use activities are expected to be much less than those anticipated for indirect use.

Projected Activity by Alternative

Geothermal projections and surface disturbance were developed based on the geothermal section of the RFD in the 2015 ID GRSG Plan[7] and additional information contained in the 2020 Four Rivers RMP Geothermal RFD,[8] as well as existing conditions and recent development as described in the summary above. The total of 70MW of geothermal power development predicted in the Proposed Four Rivers RMP and Final EIS was added to the total of 40MW of geothermal power development outside of the Four Rivers Field Office that was predicted in the 2015 ID GRSG Plan. Acres of disturbance associated with the total of

[5] https://oemr.idaho.gov/sources/re/geothermal/

[6] Bureau of Land Management. 2020. Four Rivers Field Office, Proposed Resource Management Plan and Final Environmental Impact Statement, Four Rivers Field Office, Boise District, Idaho (Volume 2), Appendix T – Fluid Minerals Reasonably Foreseeable Development Scenario. https://eplanning.blm.gov/public_projects/lup/1250/20012897/250017691/Four_Rivers_Field_Office_Proposed_Resource_Management_Plan_and_Final_Environmental_Impact_Statement_Volume_2.pdf

[7] Bureau of Land Management. 2015. Idaho State Office, Idaho and Southwestern Montana Greater Sage-Grouse Approved Resource Management Plan Amendment. https://eplanning.blm.gov/public_projects/lup/103344/143603/176718/2015_IDMT_ARMPA.pdf

[8] Bureau of Land Management. 2020. Four Rivers Field Office, Proposed Resource Management Plan and Final Environmental Impact Statement, Four Rivers Field Office, Boise District, Idaho (Volume 2), Appendix T – Fluid Minerals Reasonably Foreseeable Development Scenario. https://eplanning.blm.gov/public_projects/lup/1250/20012897/250017691/Four_Rivers_Field_Office_Proposed_Resource_Management_Plan_and_Final_Environmental_Impact_Statement_Volume_2.pdf

110MW predicted development were developed based on the information regarding facility sizes in the two documents. Alternative 3 would manage all GRSG habitat as PHMA and would close it to fluid mineral leasing, this would prevent new leasing that would be required for some geothermal development which would reduce development on federal mineral estate, resulting in reduced total geothermal development or shifting of development to non-federal mineral estate, however some development could still occur on existing leases. To reflect this, the total projected MW under Alternative 3 was reduced.

Table 8: Reasonably Foreseeable New Generating Capacity and Total Disturbance Acreage by Alternative for Geothermal Resources over the next 20-years

Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5, 6, and Proposed RMP Amendment
MW Predicted	110	110	35	110	110
Acres Disturbed by Thermal Gradient Drilling (1 acre per well)	31	31	10	31	31
# of Prod/ Inj. Wells Predicted	39	39	13	39	39
Acres of Drill Pads (3 acres each)	117	117	39	117	117
Total Miles of Road	30	30	9.5	30	30
Acres of Roads (5 acres Per mile)	150	150	47.5	150	150
Acres of Powerplant Construction (1/2 acre per MW)	55	55	17.5	55	55
Pipeline Construction disturbance (acres)	75	75	24	75	75
Transmission Line Construction (5 acres per mile)	25 miles = 125 acres	25 miles = 125 acres	8 miles = 40 acres	25 miles = 125 acres	25 miles = 125 acres
Total Permanent Disturbance (acres)	553	553	178	553	553

Source: updates to data from Table O-3 in Appendix O of the 2015 Idaho and Southwestern Montana Greater Sage-Grouse Proposed LUPA/Final EIS, based on changes to management under the proposed Alternatives.

12.3 FLUID MINERALS – MONTANA

12.3.1 Methodology

BLM mineral resource experts examined the RFD projections in plans produced for the 2015 GRSG planning effort, including the Miles City, HiLine, Billings, Lewistown, and Southwest Montana Plans. They also looked at updates such as the 2021 Lewistown RMP Revision, as well as development trends and data from development since that time and determined that the methodology and trends that were used to produce projections did not need significant modifications given the minimal changes in trends surrounding fluid mineral development in the state.

Assumptions and methodology used to develop the updated projections below are the same assumptions and methodology described in the RFDs developed for the Billings, Hi-Line, Lewistown, Miles City, Dillon, and Butte Field Offices. The Upper Missouri River Breaks National Monument is also part of the planning area but is withdrawn from all forms of entry, location, selection, sale, or leasing or other disposition under

the public land laws, however it does have some legacy leases which predate the monument designation that could be developed. All of the above information was used, along with new information, to revise the projections provided to the current date and to analyze the proposed Alternatives.

To develop updated projections for Montana for the current planning effort the projections from all the field office plans that were created in 2015 were collected. These projections were then examined and updated to remove developments that did not occur and modify information on developments that have not met the level of development previously expected. This included removing all projected coalbed natural gas wells, because development of that type in the planning area has not been economically viable due to recovery rates and natural gas prices, so planned projects were abandoned, and no coalbed natural gas development has occurred recently. The Bowdoin Natural Gas Project Area in the HiLine District was also removed because specialists reported that it had been developed and was played out with no further wells expected.

The Alternatives from the current planning effort were then compared to earlier Alternatives to determine how the projections would vary by Alternative. Based on the proposed management of PHMA and GHMA including the acres of closed to leasing, open to leasing with additional NSO stipulations, open to leasing with additional minor stipulation or open with standard stipulations. It was determined that the Alternatives 1, 2, 4, 5, 6, and the Proposed RMP Amendment are substantially similar to each other, and to the selected management in the various 2015 plans (HiLine Alternative E, Billings Pompey Alternative D, Lewistown Alternative C2, Miles City Alternative E, [Dillon did not project any oil and gas production under any Alternative]). Alternative 3 from the current plan is similar to the various lowest development alternatives from the 2015 plans (Alternative B for all plans). The Billings, and Dillon RMPs did not differentiate the projected number of wells by alternatives, due to low levels of development expected, the projections from these plans were carried forward into the update without differentiation by alternative. The projections for the total number of wells, surface disturbance, and production of oil and gas projected to occur under the Alternatives in each of the field offices that were most similar in management to the current alternatives being considered were added together to get totals for each of the current Alternatives.

Because there is no geothermal development ongoing or planned within the planning area and no earlier projections of geothermal development are available, no projections were developed for this planning effort.

12.3.2 Oil and Gas

Oil and Gas Development Potential

The tables below show the development potential ranking for oil and gas resources in the planning area by proposed GRSG habitat areas under Alternative 4. The decision area is slightly different under the different Alternatives, so the Alternative 4 decision area was used for the following calculations, but the results are generally applicable across all the Alternatives. Lease status is not considered in development potential rank, both leased and unleased areas are included.

From 2013 to 2023 a total of 755 wells were completed in the state across all mineral estate types.[9]

[9] Montana Board of Oil & Gas Conservation. 2024. Well Activity. https://bogapps.dnrc.mt.gov/dataminer/Statistics/StatsHorzCompletionCount.aspx

Table 9: Montana Oil Development Potential Ranking in Alternative 4 GRSG Habitat Boundaries*

HMA and Potential	Acres
GHMA	1,844,000
Low Potential	1,658,000
Medium Potential	120,000
High Potential	66,000
PHMA	3,307,000
Low Potential	3,048,000
Medium Potential	164,000
High Potential	95,000
RHMA	94,000
Low Potential	72,000
Medium Potential	1,000
High Potential	22,000
Grand Total	**5,246,000**

Source: EPCA 2018, BLM GIS 2023
RHMA = restoration habitat management area
*The decision area is slightly different under the different Alternatives, so the Alternative 4 decision area was used to calculate tables.

Table 10: Montana Gas Development Potential Ranking in Alternative 4 GRSG Habitat Boundaries

HMA and Potential	Acres
GHMA	1,844,000
Low Potential	1,190,000
Medium Potential	655,000
High Potential	0
PHMA	3,307,000
Low Potential	1,908,000
Medium Potential	1,399,000
High Potential	0
RHMA	94,000
Low Potential	68,000
Medium Potential	27,000
High Potential	0
Grand Total	**5,246,000**

Source: EPCA 2018, BLM GIS 2023

RFD Scenario

The Montana study area for the projections below includes Billings, Butte, Dillon, Hi-Line, Lewistown, and Miles City Field Offices, and the Upper Missouri River Breaks National Monument. A number of the Field Office RFDs prior to the 2015 Greater Sage Grouse planning effort projected large amounts of development of coal-bed natural gas, however BLM specialists reported that since that time coal-bed natural gas development in the state has been much less than was projected and that coal-bed natural gas was no longer considered economically viable in the area. As a result, projections of coal-bed natural gas wells or development were not included in this analysis. The projected number of wells developed on Federal mineral estate in Montana under the proposed Alternatives, and resulting surface disturbance, and oil and gas production is shown in the tables below.

Table 11: Oil and Gas Well 20-year Projections Federal Minerals in Montana

Alternative	Oil and Gas Wells
Alternative 1	2,180
Alternative 2	2,180
Alternative 3	1,272
Alternative 4	2,180
Alternative 5	2,180
Alternative 6	2,180
Proposed RMP Amendment	2,180

Source: Derived from tables and information in the GRSG RMP/EISs and Appendix documents for Billings, Butte, Dillon, Hi-Line, Lewistown, and Miles City Field Offices, adjusted for the proposed alternatives.

Table 12: Potential Surface Disturbance from Oil and Gas Drilling on BLM Minerals 2023-2043 in Montana

Alternative	Short term Disturbance (Acres)	Long Term Disturbance (Acres)
Alternative 1	9,118	2,427
Alternative 2	9,118	2,427
Alternative 3	6,020	1,960
Alternative 4	9,118	2,427
Alternative 5	9,118	2,427
Alternative 6	9,118	2,427
Proposed RMP Amendment	9,118	2,427

Source: Source: Derived from tables and information in the GRSG RMP/EISs and Appendix documents for Billings, Butte, Dillon, Hi-Line, Lewistown, and Miles City Field Offices, adjusted for the proposed alternatives.

Table 13: Forecast of the Montana Study Area Federal Oil and Gas Production 2023-2043.

Alternative	Oil (barrels)	Gas (MCF)
Alternative 1	130,104,338	565,943,852
Alternative 2	130,104,338	565,943,852
Alternative 3	125,743,303	301,863,108
Alternative 4	130,104,338	565,943,852
Alternative 5	130,104,338	565,943,852
Alternative 6	130,104,338	565,943,852
Proposed RMP Amendment	130,104,338	565,943,852

Sources: Source: Source: Derived from tables and information in the GRSG RMP/EISs and Appendix documents for Billings, Butte, Dillon, Hi-Line, Lewistown, and Miles City Field Offices, adjusted for the proposed alternatives.
MCF= thousands of cubic feet

12.3.3 Geothermal

Geothermal energy is heat energy contained in the rocks of the earth's crust. Certain geologic conditions and processes resulted in shallow geothermal resources that underlie substantial portions of many western states, including land administered by the BLM in Montana.

These shallow resources can be classified as low temperature (less than 194 degrees Fahrenheit [° F]), moderate temperature (194° F to 302° F), and high temperature (greater than 302° F). Low and moderate temperature resources are generally used for heating, rather than power generation. Binary steam plants can generate power with fluid temperatures between 225° and 360° F.

Montana's geothermal systems reflect local and regional geology. The Basin and Range, Yellowstone Hotspot, Northern Great Plains, and intrusive rocks provide favorable conditions for geothermal waters. Montana hosts approximately 150 low- to moderate-temperature springs and wells; most are in the southwestern part of the State. Co-produced water from petroleum wells in eastern Montana reaches temperatures of over 300°F. Naturally occurring hot water and steam, including hot water coproduced or produced from re-purposed petroleum wells, can be used in heat exchangers or steam turbines to generate electrical power. However, direct-use applications in the state are currently limited to local use for heating structures and for recreation and resorts.[10] There is currently a low level of interest in developing federally owned geothermal resources in Montana, so no development is expected in GRSG habitat, and no projections were deemed necessary.

12.4 Fluid Minerals – Nevada and Northeastern California

12.4.1 Methodology

This report is an update to Appendix P- Fluid Minerals Reasonably Foreseeable Development Scenario of the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS with the most current publicly available information. Trends from the 2015 RFD are assumed to continue and it is assumed that the demand for renewable energy, including geothermal will continue to increase and may be influenced by such factors as advances in enhanced geothermal systems (EGS). Technological advances could increase the size and scope of the impacts. These impacts should be considered as potential developments that could lead to further increase in exploration and development of geothermal resources in Nevada in typical geothermal systems and in areas not generally recognized as having high geothermal potential.

This document is limited to publicly available information and does not include confidential drilling data. It does not attempt to quantify the potential impacts of advances in EGS or other technology that is currently being tested for viability and has not been commercially proven. If future developments exceed predictions the BLM will assess these impacts at that time.

Updated projections were developed based on consultation with BLM specialists and the data available from the Nevada Division of Minerals (NDOM). Projections are based on the assumptions and methodology used in the 2015 RFD which were examined in connection to ongoing trends and determined to still be valid.

Projections for oil and gas development were based on Table P-5 from Appendix P of the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS. In this plan a large proportion of the wells projected in Table P-5 were attributed to a development being planned for the Elko-Noble area. BLM specialists confirmed that this planned development was no longer ongoing, and no further wells were expected. As a result, the Elko-Noble area projections were removed from the updated table. The current

[10] https://www.mbmg.mtech.edu/MontanaGeology/EnergyResources/geothermal.asp#

Alternatives were matched up to the Alternatives from 2015 based on the proposed management. Current Alternative 3 proposes similar fluid mineral management as was proposed under Alternative C in the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS, and all other current Alternatives propose the same or very similar management as under the Proposed RMP Amendment in the same Plan.

Surface disturbance projections were derived from the same Alternative matches described in the previous paragraph. These were based on Table P-9 in the Appendix P of the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS. The production of oil was based on information in Appendix P that based on production data, production wells within the planning area produce on average 14 barrels per day per well. The planning area does not produce significant quantities of natural gas so no projections for natural gas were created.

Geothermal projections from the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS were identified as being potentially too low given the level of ongoing and planned development. There are 732 megawatts (MW) of geothermal power generation operational on federal lands in Nevada as of 2023.[11] Additionally, there is approximately 180MW of generation which has been authorized but not yet constructed, and there is an additional approximately 300 MW of generation in the permitting stage, for a total of 1,042MW likely to be online in the near future. Based on this trend it was assumed that up to 1150MW of generating capacity could be operational by 2035. In 2015 480MW of generating capacity was operational. A linear regression was created using these data three points (480MW in 2015, 732MW in 2023, and 1150MW in 2035) to extend the projections out to 2043, the end of the 20-year planning period. Table P-1 from Appendix P of the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS was used to estimate surface disturbance but the disturbance from power plant and substation facilities was increased from 10 acres of temporary and permanent disturbance per facility to 20 acres of temporary and 15 acres of permanent disturbance per facility because BLM specialists reported that operators were trending towards larger facilities and producing more MW per facility.

12.4.2 Oil and Gas

Oil production has decreased from 281,382 barrels in 2015 to 223,493 barrels in 2021.[12] This decline is assumed to continue unless new reserves or fields are discovered. Most of the production and exploration activities since 2015 were concentrated in Railroad Valley, Nye County and Pine Valley in Eureka County. There is very little natural gas production in Nevada. The California portion of the decision area has minimal oil and gas development.

Since 2013 a total of 19 oil and gas wells were drilled in Nevada, a number of the wells did not successfully produce. The results of these wells where information is available are described as follows. In December of 2017 True Oil drilled a well in Railroad Valley in Nye County, the well was plugged and abandoned (P&A) in January of 2018. Major Oil drilled a well in Hot Creek Valley, Nye County, in May 2018, the well was P&A in May 2019. Major Oil also drilled another well in Hot Creek Valley in November 2020, the well was P&A in April of 2021. Grant Canyon Oil and Gas drilled two conventional horizontal wells in the 3 Bar Field in Pine Valley, Eureka County, since 2015. One well was drilled in May of 2019 and completed in May of 2019, the well is averaging approximately 994 barrels of oil and 807 barrels of water per month. Another well was drilled in the 3 Bar Field and had reported production of 111 barrels oil and 907 barrels water in May of 2023. Sam Oil drilled a well in White River Valley, Nye County, the well is shut in and has no reported

[11] Alex Jensen, BLM Nevada State Office Geothermal Program Lead 9/28/2023.
[12] https://data-ndom.opendata.arcgis.com/pages/oilgasandgeothermalproduction

production. Other exploration wildcat wells have been drilled in Newark Valley (all reported as shut in) in Nye County. A well was drilled by Great Basin Operating in 2022 in southwest Elko County, the well is reported as being shut in.[13] The Elko-Noble Project which was a large contributor to the projected number of wells in the 2015 Nevada RFD was less successful than anticipated and is no longer active. Wells that may be drilled in the area are no longer called out as a separate item in projections below.

Oil and Gas Well Projections

Oil and gas well projections by Alternative are shown below in the table.

Table 14: Oil and Gas Well Projections for the Nevada-California GRSG Decision Area for the 20-year Planning Period

Alternative	Oil Wells Expected to be Drilled			Oil Wells Expected to be Producing		
	On Existing Leases	On New Leases	Total	On Existing Leases	On New Leases	Total
1	14	19	33	3	4	7
2	14	19	33	3	4	7
3	10	0	10	2	0	2
4	14	19	33	3	4	7
5	14	19	33	3	4	7
6	14	19	33	3	4	7
Proposed RMP Amendment	14	19	33	3	4	7

Source: Derived from Table P-5 from the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final and Proposed Alternative information.

Based on production data within the planning area, production wells produce on average 14 barrels per day per well. Gas production in expected to be negligible. Estimated production by alternative is shown below.

Table 15: Decision Area New Well Production by Alternative

Alternative	New Annual Production (barrels)	Total 20-year Production from New Oil Wells (barrels)
1	35,770	715,400
2	35,770	715,400
3	10,220	204,400
4	35,770	715,400
5	35,770	715,400
6	35,770	715,400
Proposed RMP Amendment	35,770	715,400

Source: Derived from Appendix P Fluid Minerals Reasonably Foreseeable Development Scenario the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final and Proposed Alternative information.

[13] Nevada Division of Minerals, Well Database, 2022.

12.4.3 Geothermal

Nevada has eighteen operating geothermal power plants with federal interest, for a total generating capability of over 600 MW, and nearly 400 MW of additional geothermal projects in the permitting, exploration, development, and construction phases are expected to increase that capacity in the near future.[14]

Geothermal leases are for an initial 10-year period with 50 percent of the funds disbursed to the state, 25 percent is disbursed to the respective county, and 25 percent remaining in the Department of the Treasury.

The average kilowatt hours (Kwh) produced using geothermal energy in Nevada shows an increasing trend.[15] The trend for generation from Federal leases is also increasing as shown in the table below.

Table 16: Reported Electrical generation, Federal Geothermal leases.

Nevada Geothermal - Electrical Generation, Federal Leases	Kilowatt Hours (kwh)
2003	658,510,043
2004	674,485,049
2005	681,692,924
2006	637,744,978
2007	586,048,771
2008	569,422,744
2009	726,844,239
2010	1,011,707,412
2011	1,023,720,775
2012	1,213,710,003
2013	1,440,832,542
2014	1,551,677,028
2015	1,871,102,791
2016	2,129,884,592
2017	2,117,036,922
2018	2,327,248,799
2019	2,420,865,506
2020	2,666,774,942
2021	2,683,281,628
2022	2,731,770,420

Source: Office of Natural Resources Revenue 2023

There is also reported geothermal production from federal leasing in Lassen County California which is in the Nevada-California decision area. Electrical generation was reported from 2014 through 2018 and is shown in the table below. It is not clear if electrical generation stopped after 2018 or if the reporting type changed. Geothermal direct utilization, which is reported in millions of British thermal units, also was reported in Lassen County California from 2003 through 2023. This is shown in **Table 17** below. The data obtained from the Office of Natural Resources Revenue does not contain the name of the reporting facilities, but a search of federal leases in Lassen County shows only one currently active lease (CACA105468859)

[14] https://www.blm.gov/programs/energy-and-minerals/renewable-energy/geothermal-energy/regional-information/nevada

[15] https://minerals.nv.gov/uploadedFiles/mineralsnvgov/content/Programs/Geo/Geo-NVGeoPowerProdAndPrice2021(1).pdf

issued to the Honey Lake power plant, which is a biomass electrical generation facility that uses geothermal resources to preheat boiler feed water to increase plant generation efficiency.[16]

Table 17: Federal Geothermal Leases Reported Use, Lassen County, California

Geothermal - Electrical Generation Lassen County, California	Kilowatt Hours (kwh)
2014	734,855
2015	666,434
2016	533,990
2017	468,609
2018	167,947
Geothermal - Direct Utilization	**Millions of British Thermal Units (MMBTU)**
2003	288,029
2004	165,885
2005	260,242
2006	238,147
2007	217,500
2008	219,089
2009	179,171
2010	224,486
2011	228,011
2012	271,470
2013	276,337
2014	200,405
2015	170,924
2016	136,144
2017	122,616
2018	272,031
2019	242,702
2020	286,226
2021	255,801
2022	252,412

Source: Office of Natural Resources Revenue 2023

Geothermal Production Projections

The table below shows the projected geothermal generation capacity on federal leases in the Nevada-California GRSG planning area over the next 20 years. Approximately 672 MW of geothermal generation capacity would be added over the next 20 years. Typical existing geothermal plants range from 20 to 40 MW of generation capacity with an average of 24 MW per plant, due to efficiencies associated with scaling up it was assumed that future plants might be slightly larger at approximately 30 MW generating capacity per plant. The addition of 672 MW may translate into 23 new power plants (672 MW ÷ 30 MW average per power plant = 23 power plants). Based on the typical existing plant which produces 24MW using 5 production and 3 injection wells, the new plants would require approximately 225 wells (672 MW ÷ 3 MW per well = 225 new wells). Geothermal plant capacity and the number of wells required to support each

[16] https://www.calbiomass.org/facilities/greenleaf-honey-lake-power/

plant can vary drastically based on the characteristics of the geothermal resource being utilized so individual projects can be expected to deviate from the above averages.

Table 18: Projected Geothermal Generation Capacity on Federal Leases in Nevada 2023-2043

Year	Geothermal Generation Capacity in Megawatts (MW)
2023	743
2024	776
2025	810
2026	843
2027	877
2028	911
2029	944
2030	978
2031	1,011
2032	1,045
2033	1,079
2034	1,112
2035	1,146
2036	1,179
2037	1,213
2038	1,247
2039	1,280
2040	1,314
2041	1,347
2042	1,381
2043	1,415

Source: Derived from information contained in Appendix P of the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS and information from the BLM Nevada Geothermal webpage.[17]

As of 2022 there were approximately 160,000 acres of existing nonproducing federal geothermal leases in GRSG habitat in Nevada, and a total of approximately 476,000 acres of non-producing federal geothermal leases in all of Nevada. There are approximately 14,000 acres of producing federal geothermal leases in GRSG habitat in Nevada, and approximately 56,000 acres total of producing federal geothermal leases in Nevada. Based on the production capacity of existing producing leases, the amount of acreage under existing nonproducing leases within Greater Sage Grouse habitat is sufficient to meet the projected growth in geothermal generation capacity during the 20-year planning period several times over, so assuming development is pursued on these leases and exploration determines that most have suitable geothermal resources. Increases in the amount of geothermal generation are expected to be the same under all the proposed Alternatives. Alternative 3 would close Greater Sage Grouse habitat to new geothermal leasing,

[17] https://www.blm.gov/programs/energy-and-minerals/renewable-energy/geothermal-energy/regional-information/nevada "Nevada BLM has eighteen operating geothermal power plants with federal interest, for a total generating capability of over 600 MW and nearly 400 MW of additional geothermal projects in the permitting, exploration, development and construction phases."

which could prevent some future development in Alternative 3 PHMA, but it is likely that the development that would have occurred in these areas would relocated to other geothermal leases in Nevada.

Geothermal Activity Surface Disturbance Projections

Most geothermal development in the planning area has been of air-cooled binary systems which have the largest acreage disturbance for geothermal development, however that disturbance has been trending down, averaging less than 2 acres per MW of capacity for recent developments. Advances in drilling technology such as directional drilling have allowed for smaller surface disturbance. EGS technology has the potential to use far less groundwater to create binary geothermal production, however it has not yet been proven at the commercial scale, so estimates are based on traditional geothermal developments.

Table 19: Estimated Total New Decision Area Disturbance from Geothermal Development During the Planning Period

Disturbance Type	Temporary Disturbance per Facility (acres)	Permanent Disturbance per Facility (acres)	Number of New Facilities	Total New Temporary Disturbance (acres)	Total New Permanent Disturbance (acres)
Production & Injection Wells (Disturbance from all facility wells)	36	23	27	972	621
Power Plant & Substation	20	15	27	540	405
Switching Station	7	7	27	189	189
Access Roads & Pipelines	18	18	27	486	486
TOTAL:	**81**	**63**	-	**2,187**	**1,701**

Source: Derived from Table P-1 from the 2015 Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final and updated geothermal production capacity estimates.

12.5 FLUID MINERALS – NORTH DAKOTA

12.5.1 Methodology

Since the publication of the 2015 Greater Sage Grouse plan for North Dakota an updated Reasonably Foreseeable Development Scenario for Oil and Gas Development in North Dakota[18] was published in 2022 as part of the revision of the North Dakota Resource Management Plan. Assumptions and methodology used to develop the updated projections below are the same assumptions and methodology described in the RFD for the North Dakota RMP revision. These were used along with new information where available to revise the projections provided to the current date, focus the analysis on the portions of the state with GRSG, and to analyze the proposed Alternatives. GRSG habitat management area in North Dakota is in the south-west corner of the state and limited to a small amount of the total area of the state. Much of the BLM fluid mineral decision area is already under an existing lease with approximately 15 percent unleased. To develop the below projections, the parcels of BLM-administered federal mineral estate that are within the GRSG planning area and the North Dakota boundaries were examined by township and information on the acres of BLM-administered federal mineral and amount leased vs available to lease in each township was recorded. The 20-year projections wells producing federal minerals for townships containing GRSG habitat were counted, and it was determined that under the existing rate of development a total of 222 production wells and 29 support (non-producing) wells are projected to be drilled on BLM-administered federal mineral estate over the next 20 years. To figure out projections by year the total projected federal North Dakota wells projected in a particular year were divided by the total 20-year projected federal wells and then

[18] https://eplanning.blm.gov/public_projects/1505069/200366341/20072477/250078659/NDRMP_Oil%20and%20Gas%20RFD_Oct2022_508.pdf

multiplied by the total GRSG area wells to get the proportion of the total wells that occurred in that year. A similar method was used to get the projected production in GRSG habitat, the total production from new federal wells for a specific year was divided by the total number of new federal wells to get per well production for that year which was then multiplied by the number of new GRSG area federal production wells for that year. The reduction under Alternative 3, which would manage all GRSG habitat as closed to leasing, was calculated by determining the proportion of unleased federal mineral estate in the North Dakota GRSG planning area. Approximately 15.38 percent of the area is unleased and thus would not be leasable or able to be developed under Alternative 3, so the projection totals from the other Alternatives were reduced by 15.38 percent for this Alternative.

Surface disturbance projections were based on information from the Reasonably Foreseeable Development Scenario for Oil and Gas Development in North Dakota which assumed that 1.3 acres of surface disturbance per well would occur for new wells on BLM minerals. However, the GRSG area is outside the Bakken/Three Forks Formation where locating many horizontal wells on a single pad, which results in smaller per well disturbance, is the typical method of development. As a result, it was assumed 3 acres of surface disturbance per well would occur to be more in line with the type of development seen in the GRSG area of North Dakota.

12.5.2 Oil and Gas

Since the publication of the 2015 Greater Sage Grouse plan for North Dakota an updated Foreseeable Development Scenario[19] oil and gas development in North Dakota was published in 2023 as part of the revision of the North Dakota Resource Management Plan. Assumptions and methodology used to develop the updated projections below are the same assumptions and methodology described in the RFD for the ongoing North Dakota RMP revision. These were used along with new information where available to revise the projections provided to the current date, focus the analysis on the portions of the state with GRSG, and to analyze the proposed Alternatives. GRSG habitat management area in North Dakota is in the south-west corner of the state and limited to a small amount of the total area of the state. Much of the BLM fluid mineral decision area is already under an existing lease with approximately 15 percent unleased.

Oil and Gas Development Potential

The North Dakota decision area is located on areas given a development potential rank of medium to high in the North Dakota Field Office RFD prepared for 2020-2040, updated in 2022, and released in 2023 with the Draft RMP/EIS as part of the North Dakota Resource Plan Revision and EIS.[20]

Since 2015 there have been six wells drilled on BLM administered lands in the Greater Sage Grouse decision area in North Dakota, all the drilled wells were located in PHMA,[21] however it is likely that there are other wells that are located outside of the decision area but are producing from federal minerals within the decision area by horizontal or directional drilling.

[19] https://eplanning.blm.gov/public_projects/1505069/200366341/20072477/250078659/NDRMP_Oil%20and%20Gas%20RFD_Oct2022_508.pdf
[20] https://eplanning.blm.gov/eplanning-ui/project/1505069/510
[21] IHS Enerdeq 2023

RFD Scenario

Projected Drilling Activity by Alternative

The 2020-2040 North Dakota RFD predicted that up to 222 wells would be drilled on federal minerals in the North Dakota GRSG decision area. In North Dakota, the vast majority of wells are horizontal wells.

Under the proposed Alternatives almost all of the North Dakota decision area would be PHMA so only PHMA management is presented in the following summary. Under Alternative 1 (existing management) PHMA would be managed as open to fluid mineral leasing subject to NSO stipulation, without waiver or modification, and with limited exception. Because much of the are decision area is already under existing leases which would not be impacted by the application of NSO stipulations to new leases, the potential area impacted by the proposed Alternatives is small. Also, because the vast majority of wells in North Dakota are horizontal, the impacts of NSO stipulations is not expected to have a major impact on the rate of development in most cases. Operators wanting to develop NSO area would be able to locate wellheads outside of NSO and horizontally drill into the minerals without much change to their standard development process. Alternative 2 would apply the same management as Alternative 1. Alternative 3 would manage all GRSG habitat as PHMA, under this Alternative all PHMA would be closed to leasing which would prevent any currently unleased BLM-administered federal mineral estate from being leased and developed. This would reduce the number of wells and total production compared to Alternative 1, but development and production would still occur on existing federal leases in the area, and private minerals would still be available for leasing. Under Alternatives 4, 5 and 6, PHMA would be managed as open to fluid mineral leasing subject to NSO stipulation with waivers, modifications, and exceptions available at the discretion of the authorized officer. The allowance for waivers, modifications, and exceptions might result in increased development and production compared to Alternative 1, but because waivers, modifications, and exceptions are discretionary it is impossible to quantify any potential increase.

Table 20: Oil and Gas Well and Production Projections on BLM Administered Federal Minerals in the North Dakota GRSG Decision Area Over the 20-year Forecast Period

Year	Alternatives 1, 2, 4, 5, 6, & Proposed RMP Amendment				Alternative 3			
	GRSG Area BLM Mineral Producing Well Spuds	GRSG Area BLM Support Wells	GRSG Area BLM Mineral New Well Oil Production (Barrels)	GRSG Area BLM Mineral New Well Gas Production (MCF)	GRSG Area BLM Producing Well Spuds	GRSG Area BLM Support Wells	GRSG Area BLM Mineral New Well Oil Production (Barrels)	GRSG Area BLM Mineral New Well Gas Production (MCF)
2023	4.47	0.58	524,702	1,079,562	3.79	0.49	443,993	913,505
2024	5.81	0.76	918,328	1,889,438	4.92	0.64	777,072	1,598,807
2025	9.14	1.19	1,533,654	3,155,454	7.74	1.01	1,297,749	2,670,086
2026	9.32	1.21	1,893,439	3,895,704	7.89	1.03	1,602,193	3,296,472
2027	9.68	1.26	2,193,417	4,512,901	8.19	1.06	1,856,029	3,818,732
2028	9.98	1.30	2,463,888	5,069,388	8.45	1.10	2,084,896	4,289,622
2029	10.22	1.33	2,711,891	5,579,648	8.65	1.12	2,294,752	4,721,394
2030	10.48	1.36	2,953,200	6,076,135	8.87	1.15	2,498,943	5,141,513
2031	10.68	1.39	3,180,324	6,543,436	9.04	1.17	2,691,131	5,536,934
2032	10.89	1.42	3,403,177	7,001,951	9.22	1.20	2,879,705	5,924,920
2033	11.06	1.44	3,547,674	7,299,251	9.36	1.22	3,001,976	6,176,490
2034	11.28	1.47	3,677,824	7,567,030	9.55	1.24	3,112,106	6,403,080
2035	11.41	1.48	3,743,933	7,703,049	9.66	1.25	3,168,046	6,518,176
2036	11.72	1.52	3,827,079	7,874,120	9.91	1.29	3,238,403	6,662,933
2037	11.79	1.53	3,887,687	7,998,820	9.98	1.30	3,289,689	6,768,452

Year	Alternatives 1, 2, 4, 5, 6, & Proposed RMP Amendment				Alternative 3			
	GRSG Area BLM Mineral Producing Well Spuds	GRSG Area BLM Support Wells	GRSG Area BLM Mineral New Well Oil Production (Barrels)	GRSG Area BLM Mineral New Well Gas Production (MCF)	GRSG Area BLM Producing Well Spuds	GRSG Area BLM Support Wells	GRSG Area BLM Mineral New Well Oil Production (Barrels)	GRSG Area BLM Mineral New Well Gas Production (MCF)
2038	11.65	1.51	3,847,130	7,915,373	9.86	1.28	3,255,370	6,697,841
2039	11.70	1.52	3,856,162	7,933,957	9.90	1.29	3,263,012	6,713,566
2040	11.90	1.55	3,972,327	8,172,963	10.07	1.31	3,361,309	6,915,809
2041	12.53	1.63	4,184,601	8,609,712	10.60	1.38	3,540,931	7,285,377
2042	12.98	1.69	4,348,299	8,946,515	10.98	1.43	3,679,449	7,570,375
2043	13.29	1.73	4,445,723	9,146,964	11.25	1.46	3,761,888	7,739,990
Total	**222**	**28.85**	**65,114,459**	**133,971,369**	**188**	**24**	**55,098,642**	**113,364,076**

Source: Derived from the RFD for the 2022 North Dakota RMP revision, updated for the GRSG forecast period. Federal mineral estate located under US Forest Service administered federal surface estate is not included.

Projected Surface Disturbance Due to Oil and Gas Activity by Alternative

Much of the BLM-administered federal mineral estate in the planning area is split estate (meaning the surface is not federal land). Additionally, there is US Forest Service administered federal surface overlying federal mineral estate in some areas, which is not included in the decision area for this Greater Sage Grouse planning effort. The following disturbance calculations project disturbance resulting from development of BLM-administered federal minerals but much of the surface disturbance would occur on non-federal surface, both because only there are 55,000 acres of BLM-administered federal mineral estate but only approximately 33,000 acres of BLM-administered federal surface estate in the decision area, and because operators generally prefer to locate wells on non-federal surface where possible because permitting and documentation required in order to operate on BLM-managed surface adds cost to the project.

The RFD for the 2022 North Dakota RMP/EIS assumed an average of 1.3 acres per well and associated infrastructure for new wells on BLM minerals. However, the GRSG decision area is outside the Bakken/Three Forks Formation where locating many horizontal wells on a single pad is the preferred method of development, so disturbance is likely to be greater; it was assumed that 3 acres of surface disturbance per well would occur in the GRSG area in order to be avoid the chance of underestimating surface disturbance. Using this methodology, it is assumed that approximately 666 acres of total surface disturbance from well pads, roads and tank batteries associated with oil and gas development on BLM-administered federal mineral estate could occur over the 20-year forecast period.

12.5.3 Geothermal

Currently, little geothermal development exists in North Dakota and the state has lower potential than many other western states.[22] However, the extensive deep drilling for oil and gas that has occurred in the state provides an extensive record of subsurface conditions.[23] Research into using co-produced fluids (petroleum and hot water) from deep oil wells is ongoing, and researchers at the University of North Dakota completed a test of the technology that successfully generated geothermal power from hot water that flows naturally from petroleum wells in the Williston Sedimentary Basin in western North Dakota.[24] Research

[22] https://www.osti.gov/servlets/purl/1209221

[23] https://www.ndstudies.gov/energy/level2/module-5-biofuels-geothermal-recovered/geothermal-energy-north-dakota

[24] https://www.energy.gov/eere/success-stories/articles/eere-success-story-doe-funded-project-first-permanent-facility-co

into redeveloping end of life oil wells into geothermal generation wells is also ongoing. Development of electrical generation using geothermal resources could occur anywhere in the state where existing oil wells coproduce sufficient amounts of water at high temperatures, but the scalability and commercial viability of the technology has yet to be proven.

No development of geothermal resources on BLM-administered federal mineral estate in the GRSG planning area is reasonably foreseeable during the 20-year plan life. This is due to a number of factors including the likely need to obtain a federal geothermal lease for use of existing oil wells for development, and heat at depth being higher in parts of the state outside the GRSG planning area.[25]

12.6 FLUID MINERALS – OREGON

12.6.1 Methodology

There is no ongoing development of oil and gas or geothermal resources on BLM administered surface or mineral estate within the planning area. No projections of development of these types could be developed based on available information. Given the possibility of future geothermal development an assumption was made regarding the possible size and disturbance associated with a theoretical geothermal development for the purpose of being able to analyze impacts associated with any future geothermal development that might occur.

12.6.2 Oil and Gas

Oil and Gas Development Potential

Assessment of oil and gas potential conducted as part of Section 604 of the EPCA ranks all Greater sage grouse HMAs in Oregon as having low potential for both oil and gas. None of the producing oil and gas fields in Oregon are located in GRSG habitat. There are approximately 78,652 acres of oil and gas leases on BLM-managed federal fluid mineral estate within GRSG historical range as of 3/3/2023, none of the leases are producing.

Projected Activity by Alternative

Sage Grouse habitat in the Oregon planning area is presumed to have low oil and gas development potential, however there are current leases. It is expected that minimal if any, leasing, production, or surface disturbance associated with oil and gas exploration and development would occur in the planning area in Oregon over the next 20-years. Because there is no history of development no trend is available to estimate any future production.

12.6.3 Geothermal

There is no ongoing geothermal power generation on BLM-managed fluid mineral estate in Oregon. There are approximately 22,057 acres of authorized or pending federal geothermal leases within the Oregon Sage Grouse historical range as of 3/3/2023.

The state of Oregon has some of the nation's best geothermal resources.[26] Oregon's first geothermal power plant began operating in 2010 at the Oregon Institute of Technology in Klamath Falls. The initial electricity-generating capacity was 0.28 MW. A second plant at Oregon Institute of Technology generates 1.75 MW of power. The only commercial producing geothermal power plant is the Neal Springs plant in Malheur County. It is not within the GRSG planning area. The facility has five permitted production wells and six permitted injection wells, and the plant has an average net production of 22 MW. The city of Klamath Falls uses

[25] https://www.osti.gov/servlets/purl/1209221
[26] https://www.eia.gov/state/analysis.php?sid=OR

geothermal energy to heat buildings, homes, pools, and melt snow and ice from sidewalks and roads. In the town of Lakeview, a geothermal well system is used to heat school properties and hospital buildings.[27]

AltaRock Energy developed an EGS demonstration project[28] and Newberry geothermal research project at Newberry, which lies within the Deschutes National Forest and is near but not within the GRSG planning area. Alta Rock announced that results from the site could support construction of a 35 MW binary geothermal power plant utilizing a dry cooling system[29] but no development has been proposed at the site. Funding from the US Department of Energy expired in 2015[30] so future use of the site appears to be uncertain, however the operator is applying for additional Department of Energy grants and is planning to restart stimulation and exploration. EGS technology has the potential to be developed in the planning area, but because EGS technology has not been proven to be commercially viable at this time the scope of such projects is unknown.

Projected Activity by Alternative

The 2015 and 2019 Sage Grouse Plans for Oregon did not project the occurrence of geothermal development in Oregon. Because there was no existing development and no previous estimates to use, the following assumption is made to analyze the impacts of potential geothermal development and associated surface disturbance. For the purposes of analysis, it is assumed that under all Alternatives except Alternative 3 up to one 20MW geothermal power generation facility would be developed on BLM-managed lands in GRSG habitat over the next 20 years. This facility would disturb up to 6 acres for the drilling of up to 6 thermal gradient wells and would disturb up to 24 acres for the drilling of up to 8 production and injection wells. Construction of pipelines would disturb up to 14 acres, and an additional 10 acres could be disturbed for the construction of the generating plant. An assumed 10 miles of road would disturb /approximately 50 acres, and 8 miles of power line would disturb approximately 40 acres. The total estimated disturbance acres for this scenario equals 144 acres. Under Alternative 3, all BLM-managed minerals in GRSG habitat would be closed to fluid mineral leasing so it is assumed that geothermal power development would be less under this alternative, but existing leases could still be used for development.

12.7 FLUID MINERALS – SOUTH DAKOTA

12.7.1 Methodology

BLM mineral resource experts examined the RFD projections produced for the 2015 South Dakota GRSG RMP/EIS as well as development trends and development data available since that time and determined that the methodology and trends that were used to produce the projections for that document did not need modifications given the lack of significant changes in trends surrounding fluid mineral development in the state.

Assumptions and methodology used to develop the updated projections below are the same assumptions and methodology described in the RFD for the of the 2015 South Dakota Proposed LUPA/Final EIS (2015 South Dakota Plan). These were used, along with development data since 2015, to revise the projections in that document to fit the current planning timeline, and to analyze the new proposed Alternatives.

[27] https://www.oregon.gov/energy/energy-oregon/Pages/Geothermal.aspx
[28] https://energyinfo.oregon.gov/blog/2016/06/21/oregon-geothermal-on-the-rise
[29] https://altarockenergy.com/projects/newberry-egs-demonstration/
[30] Cladouhos, T. T., S. Petty, M. W. Swyer, M. E. Uddenberg, K. Grasso, Y. Nordin. Results from Newberry Volcano EGS Demonstration, 2010–2014. Geothermics, Volume 63, 2016. https://doi.org/10.1016/j.geothermics.2015.08.009

The original RFD for South Dakota was produced in 2009, however as part of the 2015 GRSG planning effort the BLM produced an updated analysis for the planning area titled "Oil and Gas Reasonably Foreseeable Development by Alternative for the South Dakota RMP April 2014", this document contains a summary table for the RFD projections adjusted for the management of the 2015 proposed alternatives. This table was used to analyze the proposed alternatives from the current planning effort. Alternative 1 would continue the management in the preferred Alternative (Alternative D) analyzed in the 2015 South Dakota Plan. Alternative 2 would apply similar management to Alternative 1, as would Alternatives 4 and 5 except that they would allow for more WEMs. Alternative 6 would apply the same management as Alternative 5 except that it would designate ACECs which would be closed to leasing, however no ACEC areas would be designated in South Dakota, so impacts would not differ from Alternative 5. Alternative 3 in the current planning effort proposes approximately the same management as was proposed under Alternative C in the 2015 SD Plan. The projected number of new wells spud (drilled), producing from the Alternatives C and D were carried forward to the updated summary table below. Projections of surface disturbance were similarly taken from the Alternatives C and D projections shown in Table 4-5 in the 2015 SD Plan.

Production projections were created using Table 6 in the 2009 South Dakota Reasonably Foreseeable Development Scenario. The proportion of BLM-administered federal minerals within the GRSG planning area out of the total RFD study area was used to scale the annual production projections for oil and gas provided in the RFD to only the GRSG decision area. The projections provided in the RFD were for the years 2010 through 2029 so the regression equations for the projections of annual production of oil and of gas were calculated and used to extend the projections through 2043, the end of the 20-year planning period of the current effort. Information in the "Oil and Gas Reasonably Foreseeable Development by Alternative for the SD RMP April 2014" Table 6 presented a baseline of expected production. Based on the number of wells projected under the action alternatives compared to the baseline it was determined that Alternatives 1, 2, 4, 5, 6, and the Proposed RMP Amendment represented an approximately 8 percent reduction in production compared to the baseline and that Alternative 3 represented an approximately 9 percent reduction in production compared to the baseline. The projections of oil and gas production within the South Dakota GRSG mineral decision area were reduced by these percentages to calculate the projected production under each of the current Alternatives during the planning period.

There is no ongoing development of geothermal resources on BLM administered surface or mineral estate within the planning area. No geothermal development is expected, and no projections of geothermal development were created.

12.7.2 Oil and Gas

Oil and Gas Development Potential

The table below shows the potential ranking of the RFD scenario area, however GRSG are only found in the portion of the RFD scenario area considered in the 2015 South Dakota RMP Revision.

Table 21: South Dakota Oil and Gas Development Potential in the RFD Scenario

Development Potential	Total Acres in RFD Study Area (All Ownerships)	Acres of BLM Administered Federal Minerals	Number of Townships	Percent of RFD Study Area (All Ownerships)
High	318,000	113,473	13.81	1.24
Moderate	476,000	80,459	20.65	1.86
Low	1,082,000	284,555	46.95	4.23

Development Potential	Total Acres in RFD Study Area (All Ownerships)	Acres of BLM Administered Federal Minerals	Number of Townships	Percent of RFD Study Area (All Ownerships)
Very Low	22,068,000	1,138,091	957.82	86.33
None	1,617,000	54,162	70.20	6.33

Source: 2015 South Dakota Proposed RMP/Final EIS, Table 4-2.

Projected Drilling Activity by Alternative

The projections for the number of wells drilled on Federal minerals in the decision area are shown in the table below. It is estimated that during the 20-year forecast period approximately 355 conventional wells and up to 71 coalbed methane wells would be drilled on non-BLM administered minerals in the state.

Table 22: Oil and Gas Well Projections for Federal Minerals (except federal minerals under US Forest Service surface) Over the 20-year Forecast Period

Well Type	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Proposed RMP Amendment
Number of oil and gas wells drilled	59.9	59.9	55.5	59.9	59.9	59.9	59.9
Producing oil and gas wells	53.6	53.6	50	53.6	53.6	53.6	53.6
Number of CBNG gas wells drilled	2.3	2.3	1.4	2.3	2.3	2.3	2.3
Producing CBNG gas wells	2	2	1.3	2	2	2	2

Source: Derived from the RFD Summary Table in the 2015 the South Dakota RMP RFD updated and adjusted to remove Forest Service decision area from the projections.
CBNG = Coal bed natural gas

Projected Surface Disturbance Due to Oil and Gas Activity by Alternative

Because of split estate (non-federal surface over federal minerals) and use of horizontal and directional drilling in the planning area most development of federal minerals will occur using wells that are not located on BLM-managed surface. The project disturbance from development of federal minerals regardless of surface ownership, and projected disturbance on BLM-administered surface are both shown in the table below.

Table 23: Potential Surface Disturbance from Oil and Gas and Coalbed Gas Drilling on BLM Land 2023-2043

Alternative	Total Wells Projected on BLM-Managed Federal Minerals	Short-Term Surface Disturbance on Federal Minerals (5.3 acres per well)	Long-Term Surface Disturbance on Federal Minerals (3.2 acres per well)	Percent of Federal Minerals Overlain by BLM Surface	Total Wells Projected for BLM-Managed Surface	Short-Term Surface Disturbance on BLM Surface (5.3 acres per well)	Long-Term Surface Disturbance on BLM Surface (3.2 acres per well)
Potential Surface Disturbance from Oil and Gas Drilling							
Alternative 3	55.5	294	178	16	9	48	29
Alternatives 1,2,4,5,6, and Proposed RMP Amendment	60	318	192	16	10	53	32
Potential Surface Disturbance from Coalbed Gas Drilling							
Alternative 3	1.5	8	4.8	16	0.2	1	0.6
Alternatives 1,2,4,5,6, and Proposed RMP Amendment	2.5	13.2	8	16	0.4	2	1.3

Source: Derived from Table 4-5 in the 2015 South Dakota Proposed RMP/Final EIS, adjusted to reflect changes in well projections.

Projected Production by Alternative

Table 24: Projected South Dakota Study Area Annual and Cumulative Oil and Gas Production for 2023 Through 2043

Year	Annual Oil (Barrels) All Mineral Estate	Annual Gas (Thousand Cubic Feet) All Mineral Estate	Alternatives 1/2/4/5/6/ Proposed RMP Amendment BLM Administered Annual Oil (Barrels)	Alternatives 1/2/4/5/6 Proposed RMP Amendment BLM Administered Gas (Thousand Cubic Feet)	Alternative 3 BLM Administered Oil (Barrels)	Alternative 3 BLM Administered Gas (Thousand Cubic Feet)
2023	1,875,085	20,109,885	98,210	1,053,279	97,142	1,041,831
2024	1,920,304	19,715,937	100,578	1,032,646	99,485	1,021,422
2025	1,913,306	19,842,636	100,212	1,039,282	99,122	1,027,985
2026	1,943,632	20,196,635	101,800	1,057,823	100,694	1,046,325
2027	1,882,287	21,069,274	98,587	1,103,529	97,515	1,091,534
2028	1,863,648	20,408,592	97,611	1,068,925	96,550	1,057,306
2029	1,929,270	21,204,288	101,048	1,110,600	99,949	1,098,528
2030	1,929,627	22,147,590	101,067	1,160,007	99,968	1,147,398
2031	1,938,634	22,610,546	101,538	1,184,255	100,435	1,171,382
2032	1,947,641	23,073,502	102,010	1,208,502	100,901	1,195,367
2033	1,956,648	23,536,458	102,482	1,232,750	101,368	1,219,351
2034	1,965,655	23,999,414	102,954	1,256,998	101,834	1,243,335
2035	1,974,662	24,462,370	103,425	1,281,246	102,301	1,267,320
2036	1,983,669	24,925,326	103,897	1,305,494	102,768	1,291,304

Year	Annual Oil (Barrels) All Mineral Estate	Annual Gas (Thousand Cubic Feet) All Mineral Estate	Alternatives 1/2/4/5/6/ Proposed RMP Amendment BLM Administered Annual Oil (Barrels)	Alternatives 1/2/4/5/6 Proposed RMP Amendment BLM Administered Gas (Thousand Cubic Feet)	Alternative 3 BLM Administered Oil (Barrels)	Alternative 3 BLM Administered Gas (Thousand Cubic Feet)
2037	1,992,676	25,388,282	104,369	1,329,742	103,234	1,315,288
2038	2,001,683	25,851,239	104,841	1,353,990	103,701	1,339,272
2039	2,010,690	26,314,195	105,312	1,378,238	104,168	1,363,257
2040	2,019,697	26,777,151	105,784	1,402,486	104,634	1,387,241
2041	2,028,704	27,240,107	106,256	1,426,733	105,101	1,411,225
2042	2,037,711	27,703,063	106,728	1,450,981	105,567	1,435,210
2043	2,046,718	28,166,019	107,199	1,475,229	106,034	1,459,194
Total	**41,161,946**	**494,742,509**	**2,155,907**	**25,912,735**	**2,132,473**	**25,631,075**

Sources: Derived from Table 6 *Forecast of South Dakota Study Area annual and cumulative oil and gas production for 2010 through 2029* in the South Dakota RMP RFD (2009) updated and adjusted to remove Forest Service decision area from the projections.

12.7.1 Geothermal

Currently, little geothermal development exists in South Dakota and no high temperature geothermal resources (greater than 302°F). have been identified in the state. The development that does exist is comprised of hot springs developed for recreational use (located in the town of Hot Springs) and a few local heating ventures in the western part of the state, none of which are on public land. The few hot springs are connected by faults to deeply buried reservoirs that contain geothermal water that moves upward along the fault zones to discharge at the land surface. See Chapter 3 of the 2015 South Dakota Proposed RMP/Final EIS for more information.

No development of geothermal resources is reasonably foreseeable or likely to occur on federal minerals in the planning area during the 20-year plan life.

12.8 Fluid Minerals – Utah

12.8.1 Methodology

BLM mineral resource experts examined the RFD projections produced for the 2015 Utah Greater Sage-Grouse LUPA and EIS, the 2019 Utah Greater Sage-Grouse Resource Management Plan Amendment (RMPA) and EIS, and the 2020 Utah Greater Sage-Grouse Supplemental EIS.[31] They also looked at development trends and production data available since that time. It was determined that because of the lack of significant changes in trends associated with fluid mineral development in the state, the methodology and trends that were used to produce projections of well development and production in the 2015 Utah Greater Sage-Grouse LUPA and EIS did not need modifications. The assumptions and methodology described in the Oil and Gas Reasonably Foreseeable Development Scenario for Greater Sage-Grouse Occupied Habitat in Utah Sub-Region which was included as Appendix R as part of the 2015 Utah Greater Sage-Grouse Proposed LUPA/Final EIS,[32] were used to develop the updated projections below. These assumptions and methodology were used to incorporate new development data and other relevant

[31] Call 1/26/2023 with Quincy Bahr, Mary Higgins, Kevin Kelley, Laura Opal, Teresa Snyder, Duane Spencer, and David Chase (BLM), and Francis Craig and Kate Krebs (EMPSi), and a call 2/15/2023 with Quincy Bahr and Angela Wadman (BLM) and Francis Craig and Kate Krebs (EMPSi).

[32] https://eplanning.blm.gov/public_projects/lup/103346/143763/177169/AppendixR_OilGasForeseeableDevelopment.pdf

information regarding oil and gas development since 2015 to revise the projections provided to the current planning period and to analyze the current proposed Alternatives. Data incorporated included the number, trend and location of wells drilled since 2013, production from federal mineral estate in the state, and information on federal leases in the decision area.

Well projections from the 2015 Utah Proposed Land Use Plan Amendment/Final Environmental Impact Statement Appendix R[33] Table R.1. The projections of new oil and gas wells in the 2015 plan were for a 15-year planning period and included federal minerals estate under Forest Service surface estate in GRSG habitat in the decision area. Because the current planning process is considering a 20-year timeline and federal minerals under Forest Service surface are not included in the current decision area the projections required adjustment. The total number of wells was from Table R.1 was reduced using a factor of approximately 0.786, the ratio of the change in the decision area total acreage of approximately 3,151,000 acres in 2023 from the approximately 4,008,600-acre total in the 2015 plan, to calculate the number of new wells projected in the new decision area (assuming equal distribution of the wells across the landscape). The resulting total number of projected new wells was divided by 15 to calculate the annual average number of new wells and then multiplied by 20 to calculate the total for the 20-year planning period of the current effort.

The Proposed RMP Amendment and Alternative C from the 2015 RFD were brought forward for use in projections for the current planning effort. These Alternatives were selected because they applied similar management to the current alternatives being considered. Alternative 3 would designate all GRSG habitat in the decision area as PHMA and close all PHMA to fluid mineral leasing, Alternative C from 2015 closed all GRSG habitat to fluid mineral leasing and used a similar decision area, so the rate of development from this alternative was extended forward. Alternative 1 would continue management from the 2015 Proposed RMP Amendment, PHMA would be open to leasing with NSO stipulations applied subject to WEMs and GHMA would be NSO around Leks. Alternative 2 would apply essentially the same management for fluid minerals as Alternative 1, and Alternatives 4 and 5 would also apply the same management but with minor changes to PHMA boundaries and the addition of WEMs. Alternative 6 would apply the same management as Alternative 5 but with the addition of NSO stipulations applied in ACECs, however most of the acreage that would be designated as ACECs under Alternative 6 already are closed to leasing or has existing NSO stipulations applied to protect resources other than GRSG, so this alternative would be minimally different from Alternative 5 in impacts on oil and gas development. The Proposed RMP Amendment would implement management most similar to Alternative 4, but with minor adjustments to habitat boundaries For all Alternatives other than Alternative 3 the management of fluid minerals would be sufficiently similar, and differences between them due to the allowances for WEMs under some alternatives, are not quantifiable because WEM decisions are made by the BLM Authorized Officer on a case-by-case basis and cannot be predicted in advance. As a result it is assumed that impacts on fluid mineral development would be approximately the same under Alternatives 1, 2, 4, 5, 6, and the Proposed RMP Amendment; and as a result the projections of oil and gas development from the Proposed RMP Amendment management from the 2015 Plan was extended forward for use in the analysis of impacts on oil and gas development under these alternatives for the current planning effort.

Production was determined using information from the 2015 Utah Proposed Land Use Plan Amendment/Final Environmental Impact Statement Appendix W[34] which details the expected average

[33] https://eplanning.blm.gov/public_projects/lup/103346/143763/177169/AppendixR_OilGasForeseeableDevelopment.pdf
[34] https://eplanning.blm.gov/public_projects/lup/103346/143763/177174/AppendixW_EconomicImpactAnalysisMethodology.pdf

production of oil and gas from new oil and gas wells as 200 thousand barrels of oil per oil well and 1,471 million cubic feet per gas well, over a 20 year well life. These production amounts were multiplied by the number of new oil and gas wells, respectively, over the 20-year planning period that were derived using the process described above. Surface disturbance was determined based on the total number of new wells in the 20-year planning period multiplied by the average disturbance per each feature type from Tables R.3 through R.7 in the 2015 Utah GRSG RMP/EIS Appendix R.

12.8.2 Oil and Gas

In order to show the oil and gas potential of the Utah GRSG planning area and allow for comparison of the development potential across the entire GRSG planning area, the assessment of oil and gas potential conducted under part of the Section 604 of the EPCA was intersected with GRSG HMAs in the current BLM decision area. The boundaries of GRSG habitat vary slightly between some of the alternatives so the Alternative 4 and 5 boundaries were used in the calculations shown in the table below. Very little of the planning area has a high development potential for either oil or gas.

Table 25: Oil and Gas Potential Ranking in the Decision Area

Utah Oil Potential by GRSG Habitat Type	Acres
PHMA	3,388,000
Low Potential	2,193,000
Moderate Potential	2,120,000
High Potential	0
GHMA	1,195,000
Low Potential	950,000
Moderate Potential	234,000
High Potential	11,000
Utah Gas Potential by GRSG Habitat type	
PHMA	2,193,000
Low Potential	2,031,000
Moderate Potential	162,000
High Potential	0
GHMA	1,195,000
Low Potential	848,000
Moderate Potential	347,000
High Potential	0

Source: EPCA 2018, BLM GIS 2018

Historical Drilling Trends

In Utah there are 94,000 acres of federal oil and gas leases in PHMA and 276,000 acres of federal leases in GHMA. Of these 89,000 acres in PHMA and 211,000 acres in GHMA are authorized, no matter which Alternative is chosen, these leases would be available for development in the future unless they expire, are relinquished, or are surrendered due to lack of diligent development. The remaining lease acres are listed under pending or interim status.

Since 2013 there have been 4,883 new wells spud (meaning drilling of the well was started) within Utah on both federal and non-federal lands, out of these approximately 90 percent were intended to be producing wells. Approximately 42% of the wells were directional wells, 14% were horizontal wells, and 44 percent

were vertical wells.[35] The trend in the number of well spuds per year is highly variable as shown in **Table 26**, below.

Table 26: Well Spuds by Year

Year	Well Spuds
2013	685
2014	1434
2015	402
2016	246
2017	501
2018	474
2019	303
2020	69
2021	292
2022	350
2023*	127

Source: IHS Enerdeq 2023, query date 7/24/2023
*2023 data complete through approximately mid-July 2023.

A total of 60 wells have been recorded as being drilled at a surface location in GRSG PHMA or GHMA federal surface in the decision area, but more wells producing federal minerals by horizontal or directional drilling from a non-federal surface location likely exist.

Projections produced as part of RFD scenarios typically aim to estimate levels of development that would be nearer the upper bound of expected development in order to allow for an analysis of impacts associated with fluid mineral development that avoids understating possible impacts. If actual levels of development have exceeded the projections it is an indicator that an update to the projections is needed, however if actual levels of development have not reached the level projected that is acceptable.

The projections below were based on the development scenarios created in the 2015 Utah GRSG RFD which were based on criteria including past and present oil and gas exploration, development and production activity within and near Greater Sage-Grouse occupied habitat, existing oil and gas leases, expressions of interest submitted by industry, exploration and development trends, locations of seismic surveys, existing infrastructure, and commodity prices.

The Carbon, Uintah, and Rich population areas (Carbon, Duchesne, Daggett, Rich, Summit and Uintah Counties) are the areas expected to have the majority of the oil and gas development that would potentially be impacted under the proposed Alternatives. The rest of the planning area is expected to have minimal to no future oil and gas development.

Because the planning effort for which this document has been developed is being conducted on a range-wide scale, projections were extended at the state-level scale rather than the population area scale that was used in previous planning.

Projections by Proposed Alternative

Proposed Alternatives 1 and 2 continue the management from the 2015 and 2018 GRSG planning efforts, respectively, in order to form the dual No Action Alternatives. Proposed Alternative 1 is the same as the Proposed RMP Amendment from the 2015 Utah GRSG LUPA and EIS, the projections assumptions which

[35] IHS Enerdeq 2023, query date 7/24/2023.

were defined in the 2015 Utah GRSG RFD continue to be used for Alternative 1. Proposed Alternative 2 is the same management Proposed RMP Amendment from the 2018 Utah GRSG RMPA and Final EIS. The analysis of the Proposed RMP Amendment in the 2018 Utah GRSG RMPA and Final EIS concluded that the projected number of wells under the 2018 Proposed RMP Amendment would be approximately the same as the number of wells that was projected under the 2015 Proposed RMP Amendment. Thus Alternatives 1 and 2 continue to result in the same proposed levels of oil and gas development. Proposed Alternative 3 would manage all GRSG habitat as PHMA and close all PHMA to fluid mineral leasing. This same management was proposed and analyzed as Alternative C in the 2015 Utah GRSG LUPA and EIS, and the 2015 Utah GRSG RFD. The analysis and assumptions from those documents are carried forward and used in the Analysis of Alternative 3 below. Proposed Alternatives 4 and 5 would manage PHMA as open to leasing with NSO stipulations, subject to waivers, exemptions, and modifications; and manage GHMA as open to leasing with NSO applied around leks only. This would result in effectively the same management of fluid minerals as under Alternative 1. As a result, the projections of future oil and gas development are the same across Alternatives 1, 2, 4, 5, and 6. Alternative 3 would result in reduced oil and gas development and production compared to the other Alternatives, due to the decision to close all PHMA to leasing, but because preexisting lease that are in the new PHMA boundary could still be developed, some new well drilling and production would continue under Alternative 3. The results are shown in the tables below.

Table 27: Projected Wells Drilled in GRSG Habitat 2023-2043

Alternative	Total Wells	Total Gas Wells	Total Oil Wells
1	3,111	2,436	676
2	3,111	2,436	676
3	2,775	2,159	616
4	3,111	2,436	676
5	3,111	2,436	676
6	3,111	2,436	676
Proposed RMP Amendment	3,111	2,436	676

Source: Derived using information from Table R.1 in Appendix R of the 2015 Utah Greater Sage-Grouse Proposed LUPA/Final EIS, and Proposed alternatives.

Table 28: 20-year Projected Oil and Gas Production from Federal Mineral Estate in the Decision Area by Alternative

Alternative	20-year Gas Production (Millions of Cubic Feet)	20-year Oil Production (Barrels)
1	3,582,970	135,202,315
2	3,582,970	135,202,315
3	3,175,530	123,187,946
4	3,582,970	135,202,315
5	3,582,970	135,202,315
6	3,582,970	135,202,315
Proposed RMP Amendment	3,582,970	135,202,315

Source: Derived using information from Appendix W, and Tables R.1 and R.2 in Appendix R of the 2015 Utah Greater Sage-Grouse Proposed LUPA/Final EIS, and Proposed alternatives.

Table 29: Estimated 20-Yr Surface Disturbance from Oil and Gas Development of BLM-Administered Federal Mineral Estate

Type of Development	Alternative	1	2	3	4	5	6	Proposed RMP Amendment
Well pads	Total Wells	3,111	3,111	2,775	3,111	3,111	3,111	3,111
	Total Well Pads	831	831	741	831	831	831	831
	Average Disturbance per Pad	5.4	5.4	5.4	5.4	5.4	5.4	5.4
	Total Pad Disturbance Acres	4,487.74	4,487.74	4,002.99	4,487.74	4,487.74	4,487.74	4,487.74
Roads	Road Miles	536.51	536.51	478.56	536.51	536.51	536.51	536.51
	Average Disturbance per Road Mile	4.8	4.8	4.8	4.8	4.8	4.8	4.8
	Road Disturbance Acres	2,576.30	2,576.30	2,298.01	2,576.30	2,576.30	2,576.30	2,576.30
Pipelines	Pipeline Miles	545.98	545.98	487	545.98	545.98	545.98	545.98
	Average Disturbance per Mile	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Pipeline Disturbance Acres	655.38	655.38	584.59	655.38	655.38	655.38	655.38
Total Ancillary Features Acres		480	480	480	480	480	480	480
TOTAL Disturbance Acres		**8,199.42**	**8,199.42**	**7,365.60**	**8,199.42**	**8,199.42**	**8,199.42**	**8,199.42**

Source: Derived using information from Appendix R of the 2015 Utah Greater Sage-Grouse Proposed LUPA/Final EIS, and Proposed alternatives.

Total Estimated Future Surface Disturbance for Geophysical Exploration

Estimated surface disturbance associated with seismic exploration is shown in the table below.

Table 30: Estimated 20-Yr Seismic Exploration Surface Disturbance

Alternative	Miles of Seismic Lines	Average Disturbance per Mile	Disturbance Acres
1	1,248.70	1.2	1,498.02
2	1,248.70	1.2	1,498.02
3	1,113.82	1.2	1,336.21
4	1,248.70	1.2	1,498.02
5	1,248.70	1.2	1,498.02
6	1,248.70	1.2	1,498.02
Proposed RMP Amendment	1,248.70	1.2	1,498.02

Source: Derived using information from Appendix R of the 2015 Utah Greater Sage-Grouse Proposed LUPA/Final EIS, and Proposed alternatives.

12.8.3 Geothermal

Utah currently has three operational utility scale geothermal energy facilities with an installed capacity of 72.5MW. The Blundell Plant operated by PacifiCorp Energy consists of a 23MW flash steam plant and 10MW secondary recovery binary plant.[36] The Cove Fort Hybrid Plant operated by Enel Green Power is a geothermal-hydro hybrid power plant with a 25MW installed capacity.[37] The Thermo Geothermal Power Plant operated by Cyrq Energy consists of a 14.5MW binary process plant.[38] Both Blundell and Cove Fort plants have federal geothermal leases, but neither are located in GRSG HMAs. The Utah BLM has conducted geothermal lease sales during three of the past 4 years; 3045.19 acres were leased in 2023, 21,685.35 acres were leased in 2022, and 26,200.62 acres were leased in 2020.[39]

The table below shows geothermal electrical generation from federal geothermal leases in Utah from 2013 to 2023. This shows the trend over time which is tied to the amount of geothermal development.

Table 31: Utah Geothermal Electrical Generation from Federal Geothermal Leases in Kilowatt Hours

Year	Kilowatt Hours (kwh)*
2013	12,986,766
2014	132,080,000
2015	130,138,400
2016	150,003,437
2017	144,419,064
2018	132,624,724
2019	143,793,551
2020	112,090,593
2021	129,606,607
2022	128,459,411
Total	**1,216,202,553**

Source Office of Natural Resources Revenue 2023
*Some geothermal electrical generation in Utah is reported by ONNR in thousands of pounds (presumed to be of steam for a flash steam plant) which are not able to be converted to kilowatt hours generated without additional information, as a result that data is not included in these totals.

The 2015 Utah Greater Sage-Grouse LUPA and EIS contained the following as an RFD scenario for Geothermal:

> *It is possible that the existing Thermo Geothermal Field (currently, Cyrq-owned wells and generation plant) could expand in the future to include an adjacent 980-acre geothermal lease (UTU-087662) that is located within the Bald Hills Populated Area. Development of this lease is expected to comprise of drilling five geothermal energy production or produced fluid injection wells. With an estimated surface disturbance of 7 acres per well, including respective access roads and pipelines, a total of 35 acres of long-term surface disturbance would result.*

[36] https://geology.utah.gov/docs/emp/geothermal/ugwg/pdf/larsen0408.pdf
[37] https://www.enelgreenpower.com/our-projects/operating/cove-fort-hybrid-plant
[38] https://cyrqenergy.com/energy-plant-locations/#minersville-ut
[39] https://www.blm.gov/programs/energy-and-minerals/renewable-energy/geothermal-energy/regional-information/utah

It also noted that geothermal resources are plentiful in the middle and northwest portions of the state, although a lack of transmission capacity may hinder electricity development in the northwest corner.

The 2019 Utah Greater Sage-Grouse RMPA and EIS did not provide an updated RFD scenario for geothermal development, but did provide the following updates to geothermal information:

> *Between 2015 and 2017, the BLM has offered for lease 24,468 acres within HMAs. Lease stipulations apply as described in the leases as analyzed in the 2015 Final EIS.*
>
> *Six geothermal development permits have been approved and drilled on existing pads on existing leases. McGinness Hills Phase 3 Environmental Assessment authorized up to 42 acres of disturbance on existing leases, which will be offset according to the mitigation hierarchy.*

Since 2019 the BLM in Utah has conducted annual geothermal lease sales which can be viewed on the Utah Geothermal Energy webpage.[40]

Geothermal RFD scenario

Over the next 20 years both exploration and development activities could occur on existing and future geothermal leases. Test and thermal gradient wells typically disturb approximately 1 acre per well and production and injection wells for power generation typically disturb up to 7 acres. For the purposes of analysis, it is assumed that one 30MW geothermal power generation facility would be developed on BLM-managed lands in GRSG habitat over the next 20 years. This facility could disturb up to 6 acres for the drilling of up to 6 thermal gradient wells and would disturb up to 56 acres for the drilling of up to 8 production and injection wells. Construction of pipelines would disturb up to 14 acres, and an additional 10 acres could be disturbed for the construction of the generating plant. An assumed 10 miles of road would disturb approximately 50 acres, and 8 miles of power line would disturb approximately 40 acres. Because the existing issued geothermal leases are likely sufficient develop a facility of this size this could occur under any of the proposed Alternatives, but it would be less likely under Alternative 3 because the closure of all GRSG PHMA to new fluid mineral leasing would not allow new geothermal leases to be issued within GRSG HMAs under Alternative 3. The potential surface disturbance from the development of a new geothermal facility by Alternative are shown in the table below.

Table 32: Surface Disturbance Associated with the Development of a Geothermal Generating Facility

Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Proposed RMP Amendment
Thermal Gradient Well Disturbance (acres)	6	6	6	6	6	6
Production and Injection Well Disturbance (acres)	56	56	56	56	56	56

[40] https://www.blm.gov/programs/energy-and-minerals/renewable-energy/geothermal-energy/regional-information/utah

Alternative	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Proposed RMP Amendment
Pipeline Construction Disturbance (acres)	14	14	14	14	14	14
Generating Plant Disturbance (acres)	10	10	10	10	10	10
Road Disturbance (acres)	50	50	50	50	50	50
Powerline Disturbance (acres)	40	40	40	40	40	40
Total (acres)	**176**	**176**	**176**	**176**	**176**	**176**

Source: 2015 Utah Greater Sage-Grouse LUPA and EIS modified based on current alternatives

12.9 FLUID MINERALS – WYOMING

12.9.1 Methodology

Production projections from the 2015 document were derived from earlier Field Office RFDs which are largely no longer reflective of conditions due to changes in fluid mineral development technology and methods allowing for more production from fewer wells. Additionally, there was limited documentation of how older projections were adapted to the 2015 plan. As a result, new projections of oil and gas development were created using available data and information. Data on the production of oil and gas from federal mineral estate in Wyoming was pulled from the US Department of Interior (DOI) Office of Natural Resource Revenue (ONNR).[41] Data on total production of oil and gas in Wyoming was sourced from the Wyoming Oil and Gas Conservation Commission[42](WOGCC). An initial attempt to was made to develop projections of new wells and oil and gas production using the rate of new wells and historic production. However, in Cooperating Agency review the WOGCC raised concerns that due to changes in methods of development occurring within the period of historic data used, and the use of a linear approximation of well production decline, this method would underestimate the impacts on production of oil and gas that would result from reduction in the number of wells that was projected under some of the Alternatives. In coordination with WOGCC, BLM revised the methodology to incorporate well decline curves based on recent wells located in areas where future development is anticipated to occur. WOGCC obtained 20-year monthly production tables from industry partners for use in the analysis. The data used was for federal and mixed mineral production wells (wells which are producing from both federal and non-federal mineral estate). The State was bisected with the High Plains District (HP) on one side and the High Desert/Wind River and Bighorn Basin Districts (HD) on the other, with typical HP development being horizontal drilling and typical HD development being directional drilling. Due to improvements in drilling technology allowing for greater reach and production from a single well, the rate of well spuds in the planning area has decreased in recent years. The number of new wells that would be drilled each year over the 20-year planning period for Alternatives 1 and 2 which would continue existing management, was determined in the HP district by averaging the number of federal and mixed mineral wells with first production dates from 2015-2023, which is 145 wells per year. In the HD, the same methodology yielded an unreasonably high estimate of 174 wells per year due to the variability of the number of wells starting production each year. In recent years only 30-

[41] https://revenuedata.doi.gov/query-data?dataType=Production
[42] https://pipeline.wyo.gov/grouptrpMenu.cfm

70 wells have begun production each year. Based on the knowledge of current and expected future development the BLM and WOGCC concluded that an average of 100 wells per year for this area was representative of future conditions. Legacy production for both oil and gas was determined by fitting a decline curve to federal and mixed mineral production from 2015-2023 using only wells with a first production date prior to 2015 for each of the two areas. Total production was derived by the sum of annual production from legacy and new wells for each year.

While Coal Bed Natural Gas (CBNG) wells were seeing considerable interest in the period leading up to the development of the 2015 Greater Sage Grouse planning, since that time the economics have been unfavorable and developments have underperformed. In Wyoming no CBNG wells have been drilled in the planning area in the past 10 years and none are likely in the future. As a result, CBNG wells were removed from all projections and not projected forward into the future.

For updating well projections, Table 4-43[43] from the 2015 Wyoming Greater Sage-Grouse Land Use Plan (LUP) Amendment (2015 WY Plan), was used as a starting point. For Alternatives 1 and 2 which would continue current management, the rate of new wells with first production dates from 2015-2023, the years for which the current plan has been in effect, were used as described above. For Alternative 3, concerns were raised with how the Alternative C projections from the 2015 plan which proposed approximately the same management as Alternative 3 in the current plan did not fully account for the impacts associated with closing lands around existing undeveloped leases, the extent of possible development in areas with NSO stipulations, and ROW exclusions preventing the construction of new off-lease roads and pipelines required for development of existing undeveloped leases. Similar concerns were raised that Alternatives 4, 5, and 6 would need to account for areas where existing undeveloped leases surrounded by NSO would be stranded due to lack of access, and areas where NSO would be too far from locations where surface facilities could be placed to develop NSO by horizontal or directional drilling. To account for these concerns a process was developed in consultation with WOGCC staff. All proposed NSO areas in alternatives 3, 4, 5, 6, and the Proposed RMP Amendment were reverse buffered using GIS software to calculate the area within the average reach of directional or horizontal drilling technology, a 0.5 mile inward buffer distance from all edges of NSO areas was used for all areas of Wyoming, except for the Power River Basin (as delineated by the Wyoming State Geologic Survey[44]) which used a 2-mile inward buffer distance because the producing formations in the Powder River Basin are horizontal and continuous making them straightforward to develop using long reach horizontally drilling. In the remaining NSO area, and all areas that would be closed to new leasing, existing leases that were not recorded as held by production (existing leases held by production are assumed to already have needed off-lease infrastructure in place) were overlaid with data of existing roads and pipelines to determine how many of these leases would be able to be accessed using existing roads and production pipelines, and how many could be cut off from being able to access the lease to develop wells and transport produced oil and gas to market. It was assumed that the existing leases not held by production that intersected roads or pipelines would be able to use these corridors to construct additional off lease road or pipeline infrastructure if needed. The results of these steps created a layer which was termed "developable NSO" (NSO within the reach of horizontal or directional drilling, on an existing lease that is held by production, or on an existing lease not held by production but with road or pipeline access), this area was considered able to be developed in comparisons of the alternatives used to adjust projection. The remaining non-accessible NSO acreage, which would not be able to be developed because it would be out

[43] https://eplanning.blm.gov/public_projects/lup/103347/143798/177223/11_Chapter-4_Environmental-Consequences_FEIS_052115.pdf

[44] https://www.wsgs.wyo.gov/pubs-maps/gis.aspx see the "Wyoming Basins" dataset under the Geology tab.

of reach of horizontal or directional drilling, or unable to be accessed by a new ROW or using existing infrastructure was treated as effectively closed to leasing when comparing against the 2015 WY Plan projections.

An additional concern raised was that existing leases in areas that would be closed to leasing would not be considered for extension, and many leases in areas with new NSO stipulations applied would be likely to have reduced leasing interest making them less likely to be renewed. Information from US Government Accountability Office Report 21-138[45] which calculated that approximately 25 percent of existing leases get developed in their first term was used to account for this impact in adjusting projections by the Alternatives. Using data of acreage of existing leases by lease status and production status, the total acreage of existing leases not held by production in NSO and closed areas was reduced by 75 percent to reflect that only 25 percent of leases in these areas are likely to be developed. The results of this were factored into projection comparisons. The output map of proposed management under each alternative with developable NSO, non-developable NSO, and existing leases, was examined for 'islands' of minerals open to leasing fully surrounded by areas with NSO stipulations or closed to leasing, that are also managed as ROW exclusion and with no existing roads/or pipeline corridors, because these areas would not be able to be accessed for development, and any such areas were added to the projection comparisons as a reduction of the acres total. The results of this process were used to adjust projections of wells for Alternatives 3, 4, 5, 6, and the Proposed RMP Amendment. The end results determined that under Alternative 3 approximately 30% as many new wells would be drilled as under Alternatives 1 and 2; under Alternative 4 approximately 63% as many wells would be drilled as under Alternatives 1 and 2; under Alternative 5 approximately 94% as many wells would be drilled as under Alternatives 1 and 2; under Alternative 6 approximately 93% as many wells would be drilled as under Alternatives 1 and 2. Under the Proposed RMP Amendment, which applies similar management as under Alternative 5 but with an area within PHMA managed as limited exception which would be expected to result in slightly reduced development compared to Alternative 5, approximately 93% as many wells would be drilled as under Alternatives 1 and 2.

There is no ongoing development of geothermal resources on BLM administered surface or mineral estate within the planning area. No projections of geothermal development could be developed based on available information. However, given that the possibility of future geothermal development exists, an assumption was made regarding the possible size and disturbance associated with a theoretical geothermal development for the purpose of being able to analyze impacts associated with future geothermal development that might occur.

12.9.2 Oil and Gas

Oil and Gas Development Potential

The 2015 GRSG plan for Wyoming did not fully anticipate the level of changes associated with technological improvements in horizontal and directional drilling. Improvements in horizontal drilling and geosteering technology have allowed for a reduction in surface impacts associated with developing of oil and gas. Multiple horizontal wells can be located on a single well pad and extend well bores horizontally for two or more miles out in the productive formations under ideal conditions. This allows a reduction in surface infrastructure as a single well pad can produce from the same area that would previously have required numerous conventional or less advanced wells in the past. This allows for a reduction in disturbance associated with development infrastructure such as roads and pipelines which now only route to a small

[45] Oil and Gas: Onshore Competitive and Noncompetitive Lease Revenues. US Government Accountability Office. GAO-21-138. Published: November 19, 2020. https://www.gao.gov/products/gao-21-138

number of multi-well pads rather than numerous pads across the landscape. Improvements in this technology also allow for greater development of resources in areas where NSO stipulations are applied. In basins where the characteristics of the productive formations are well suited to this type of development, including the Powder River Basin in the Buffalo Field Office and Casper Field Office, this has become the dominate form of development resulting in a reduction of surface impacts per unit of production.

The Wyoming Oil and Gas Conservation Commission database repots a total of 6,455 unique well spuds of oil, gas, and coalbed methane production wells in both federal and non-federal minerals in the state from 2013 through 2023.[46]

The tables below show the EPCA development potential ranking for oil and gas in the proposed GRSG management areas from Alternative 4. The decision area is slightly different under the different Alternatives, so the Alternative 4 decision area was used for the following calculations, but the results are generally applicable across all the Alternatives, except Alternative 3 which would manage all HMA as PHMA. Not all areas were given a developmental potential rank, so the totals below do not add up to the entire decision area.

Table 33: EPCA Oil Development Potential within Alternative 4 Greater Sage-grouse HMAs in Wyoming

Wyoming	Acres
PHMA	13,370,000
Low	5,949,000
Medium	2,188,000
High	5,233,000
GHMA	13,095,000
Low	5,606,000
Medium	2,399,000
High	5,090,000
Grand Total	**26,465,000**

Source: EPCA 2018, BLM GIS 2023

Table 34: EPCA Gas Development Potential within Alternative 4 Greater Sage-grouse HMAs in Wyoming

Wyoming	Acres
PHMA	10,917,000
Low	6,452,000
Medium	3,556,000
High	909,000
GHMA	13,184,000
Low	7,229,000
Medium	4,805,000
High	1,150,000
Grand Total	**24,101,000**

Source: EPCA 2018, BLM GIS 2023

The table below shows the acres of existing leases by status in the proposed GRSG management areas under Alternative 4. Approximately 24% of the HMAs are under an existing lease. Many recently issued leases in

[46] Wyoming Oil and Gas Conservation Commission. 2024. Count of Spuds by Type and Year(s). Internet website: http://pipeline.wyo.gov/online_stats_bk/spud_stats.cfm

Wyoming, including some recorded as authorized, are currently under litigation and cannot be developed until litigation is resolved.

Table 35: BLM Fluid Mineral Lease Status within Alternative 4 Greater Sage-grouse HMAs in Wyoming

Alternative 4	Acres
GHMA	4,481,000
Authorized	4,231,000
Pending	124,000
Interim	126,000
PHMA	3,206,000
Authorized	3,023,000
Pending	61,000
Interim	122,000
Grand Total	**7,957,000**

Source: BLM GIS 2023

Projected Oil and Gas Activity by Alternative

The estimated number of wells and future surface disturbance associated with wells, roads, and pads is shown in the table below.

Table 36: Reasonably Foreseeable Development Scenario for Oil and Gas Development and Surface Disturbance in Wyoming GRSG Habitat in the next 20 years.

Alternative	1	2	3	4	5	6	Proposed RMP Amendment
Projected number of oil and gas wells	4,900	4,900	1,453	3,102	4,600	4,540	4,540
Projected number of CBNG wells*	0	0	0	0	0	0	0
Total Projected Short-term Surface Disturbance from new well pads, roads, and pipelines (acres)	37,975	37,975	11,257	24,042	35,648	35,183	35,183
Total Projected Long-term Surface Disturbance from new well pads, roads, and pipelines (acres)	20,825	20,825	6,173	13,184	19,549	19,294	19,294

Source: updates to data from Table 4-43 in the 2015 Wyoming Greater Sage-Grouse Land Use Plan Amendment based on changes to management under the proposed Alternatives and changes to the decision area. Wyoming Oil and Gas Conservation Commission 2024.

*Coal Bed Natural Gas (CBNG) wells were seeing considerable interest in the period leading up to the development of the 2015 Greater Sage Grouse planning, however since that time the economics have been unfavorable and developments have underperformed, in Wyoming no CBNG wells have been drilled in the planning area in the past 10 years and none are likely in the future, CBNG wells were removed from the projections.

Projected Production by Alternative in the Decision Area

Under Alternatives 1 and 2 approximately 1,463,605,462 barrels of oil and 19,862 Bcf of natural gas are projected to be produced over the 20-year planning period of 2023-2043.

Under Alternative 3, approximately 801,162,784 barrels of oil and 12,807 Bcf of natural gas are projected to be produced over the 20-year planning period of 2023-2043.

Under Alternative 4, approximately 1,119,048,213 barrels of oil and 16,147 Bcf of natural gas are projected to be produced over the 20-year planning period of 2023-2043.

Under Alternative 5 approximately 1,405,252,186 barrels of oil and 19,254 Bcf of natural gas are projected to be produced over the 20-year planning period of 2023-2043.

Under Alternative 6 approximately 1,392,469,048 barrels of oil and 19,145 Bcf of natural gas are projected to be produced over the 20-year planning period of 2023-2043.

Under the Proposed RMP Amendment approximately 1,392,469,048 barrels of oil and 19,145 Bcf of natural gas are projected to be produced over the 20-year planning period of 2023-2043.

12.9.3 Geothermal

Geothermal Summary

There is no existing use of geothermal resources in Wyoming for power generation.[47] A study conducted for the Wyoming Energy Authority found that:[48]

> *Detailed literature review and analysis suggests Wyoming's geothermal resources are moderate to low temperatures, approximately 300 °F or less… and situated in localized regions throughout the state. Most of the geothermal resources are below 200 °F, below ideal electrical generation potential temperatures. There are no indications for a widespread high temperature geothermal resource that would provide significant geothermal value to Wyoming and the costs and risks of exploration for high-temperature resources are high; however, technologies to utilize lower temperature resources are likely to have the greatest economic impact and benefit for Wyoming, given the widespread indication of potential low temperature geothermal resources.*

There has been discussion of the possibility of converting oil and gas wells with favorable temperature characteristics that are no longer productive for oil and gas into use as geothermal wells, but this has not been commercially proven at this time.

Projected Geothermal Activity by Alternative

It is unlikely that any geothermal energy development would occur in GRSG habitat during the 20-year planning period. However, for the purposes of analysis it is assumed that under all Alternatives except Alternative 3 up to one 20MW geothermal power generation facility would be developed on BLM-managed lands in GRSG habitat over the next 20 years. A facility of this size could disturb up to 6 acres for the drilling of up to 6 thermal gradient wells and disturb up to 24 acres for the drilling of up to 8 production and injection wells. Construction of pipelines would disturb up to 14 acres, and an additional 10 acres could be disturbed for the construction of the generating plant. An assumed 10 miles of road would disturb approximately 50 acres, and 8 miles of power line would disturb approximately 40 acres. Under Alternative 3 it is assumed that no geothermal power development would occur on BLM-managed lands in GRSG habitat because under this alternative all GRSG habitat would be closed to fluid mineral leasing and there are no existing geothermal leases that could be developed.

[47] https://www.wsgs.wyo.gov/energy/geothermal.aspx

[48] Batir, J., E. Gentry, K. Kitz, M. Richards, J. Boak, H. Soroush, Petrolern LLC. 2022. Final Report of Geothermal Resource and Applicable Technology for Wyoming, Final Report for Wyoming Energy Authority. July 2022. Ref. No. WYO0722RE01. Internet website: https://wyoenergy.org/wp-content/uploads/2022/11/Petrolern_FinalReportWYGeothermalPotentialAndApplicableTechnology_FINAL1Aug2022.pdf

12.10 WIND AND SOLAR ENERGY

12.10.1 Wind Energy

The following criteria and assumptions were used in the development of the RFD table (**Table 37**).

General Assumptions

- Alternative 1 - See **Table 38** of this document.
- Alternative 2 - No changes from Alternative 1. Nevada exceptions do not apply to the RFD Table. Utah avoidance criteria are not incorporated due to the fact that exact lek locations are not known.
- Alternative 3 - All habitat is managed as exclusion.
- Alternative 4 - PHMA is managed as exclusion areas for utility scale wind. IHMA is managed as avoidance areas for utility scale wind. All BLM managed surface (regardless of PHMA, GHMA, IHMA or non-HMA status) within 0.5 miles of PHMA are managed as utility scale wind avoidance areas. GHMA not included in the 0.5-mile buffer is managed as avoidance areas for utility scale wind projects.
- Alternative 5 - PHMA and IHMA would be avoidance areas for utility scale wind and solar energy development. GHMA is open with minimization measures.
- Alternative 6 - PHMA and IHMA would be avoidance areas for utility scale wind and solar energy development. GHMA is open with minimization measures.
- Proposed RMP Amendment – PHMA and PHMA with Limited Exception would be exclusion. GHMA would be open with applicable state specific minimization measures, and some states would manage GHMA as avoidance.
- Existing Avoidance and Exclusions include protections for other resources, Wind Mapper exclusion and avoidance datasets combined to create this data.

Data Gaps

- Colorado - No Linkage Management Area (LMA) in calculations, No GHMA Avoidance or Exclusion ROW data available
- Nevada and California - No other habit management area (OHMA) in calculations
- Montana - No restoration habitat management area (RHMA) or connectivity habitat management area (CHMA) in calculations
- North and South Dakota - There is no existing ROW avoidance or exclusion data.
- Utah - No GHMA Acres under Alternative 2

GIS Workflow

Wind energy development constraints (ROW avoidance, RMP wind energy avoidance, low wind energy potential, etc.) are all combined together to create a total constraints layer. The wind potential layer then has this master constraints layer erased from it to identify areas where there are no constraints to wind energy development (labeled as "potential developable wind resources"); this layer is combined with the master constraints layer to create a comprehensive wind development layer indicating constraints or lack of constraints and annual wind speeds for these areas. The comprehensive wind development layer is then clipped to BLM-managed surface across the 10 states included in the RFD. This layer is then combined with the GRSG Habitat Management Area layer(s) for each alternative (these have also been clipped to BLM surface). The output of this workflow is a layer that contains wind speed data for each GRSG HMA by alternative, and information on constraints to wind energy development that might impact the ability to develop wind energy in these areas.

Data Sources

BLM GIS (U.S. Bureau of Land Management Geographic Information Systems) data used in the Greater Sage Grouse Planning alternatives, affected environment, and impact analysis (BLM GIS 2023).

Wind Potential Source: National Renewable Energy Laboratory United States Wind Speed at 80-Meter above Surface Level (National Renewable Energy Laboratory 2017).

Wind Constraints source: Wind Energy Development Exclusions and Resource Sensitivities for the BLM West-wide Wind Mapping Project (Argonne National Laboratory 2016).

Table 37: RFD Acres by Alternative

Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternatives 5 and 6		Proposed RMP Amendment	
Status	**Acres**	**Status**	**Acres**	**Status**	**Acres**	**Status**	**Acres**	**Status**	**Acres**	**Status**	**Acres**
Idaho											
Total Acres of BLM Surface within HMAs	9,656,000	Total Acres of BLM Surface within HMAs	9,642,000	Total Acres of BLM Surface within HMAs	9,644,000	Total Acres of BLM Surface within HMAs	9,644,000	Total Acres of BLM Surface within HMAs	9,644,000	Total Acres of BLM Surface within HMAs	9,975,000
Land Unsuitable for Wind Resources	1,333,000	Land Unsuitable for Wind Resources	1,329,000	Land Unsuitable for Wind Resources	1,311,000	Land Unsuitable for Wind Resources	1,311,000	Land Unsuitable for Wind Resources	1,311,000	Land Unsuitable for Wind Resources	1,309,000
Existing Open to Development	5,913,000	Existing Open to Development	5,912,000			Existing Open to Development	5,915,000				
Existing Avoidance Area	771,000	Existing Avoidance Area	771,000			Existing Avoidance Area	764,000				
Existing Exclusion Area	1,640,000	Existing Exclusion Area	1,629,000			Existing Exclusion Area	1,654,000				
Proposed Open to Development	1,288,000	Proposed Open to Development	1,288,000	Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	1,103,000	Proposed Open to Development	1,174,000
Proposed Avoidance Area	771,000	Proposed Avoidance Area	771,000	Proposed Avoidance Area	0	Proposed Avoidance Acres [GHMA, IHMA, and areas within of 0.5 miles of PHMA]	8,422,000	Proposed Avoidance Area	5,576,000	Proposed Avoidance Area	1,940,000
Proposed Exclusion Area	4,855,000	Proposed Exclusion Area	4,818,000	Proposed Exclusion Area	8,333,000	Proposed Exclusion Acres (PHMA)	5,164,000	Proposed Exclusion Area	1,654,000	Proposed Exclusion Area	5,552,000
						Proposed Avoidance Acres [within 0.5 miles of PHMA]	5,254,000				
Montana											
Total Acres of BLM Surface within HMAs	5,776,000	Total Acres of BLM Surface within HMAs	5,776,000	Total Acres of BLM Surface within HMAs	5,173,000	Total Acres of BLM Surface within HMAs	5,465,000	Total Acres of BLM Surface within HMAs	5,465,000	Total Acres of BLM Surface within HMAs	5,471,000
Land Unsuitable for Wind Resources	143,000	Land Unsuitable for Wind Resources	143,000	Land Unsuitable for Wind Resources	104,000	Land Unsuitable for Wind Resources	105,000	Land Unsuitable for Wind Resources	105,000	Land Unsuitable for Wind Resources	104,000
Existing Open to Development	5,087,000	Existing Open to Development	5,087,000			Existing Open to Development	4,665,000				
Existing Avoidance Area	222,000	Existing Avoidance Area	222,000			Existing Avoidance Area	182,000				
Existing Exclusion Area	158,000	Existing Exclusion Area	158,000			Existing Exclusion Area	118,000				
Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	5,209,000	Proposed Open to Development	0
Proposed Avoidance Area	2,292,000	Proposed Avoidance Area	2,292,000	Proposed Avoidance Area	0	Proposed Avoidance Acres [GHMA and areas within of 0.5 miles of PHMA]	5,174,000	Proposed Avoidance Area	151,000	Proposed Avoidance Area	2,102,000
Proposed Exclusion Area	3,175,000	Proposed Exclusion Area	3,175,000	Proposed Exclusion Area	5,068,000	Proposed Exclusion Acres (PHMA)	3,183,000	Proposed Exclusion Area	0	Proposed Exclusion Area	2,929,000
						Proposed Avoidance Acres [within 0.5 miles of PHMA]	3,391,000				
South Dakota											
Total Acres of BLM Surface within HMAs	151,000	Total Acres of BLM Surface within HMAs	151,000	Total Acres of BLM Surface within HMAs	151,000	Total Acres of BLM Surface within HMAs	151,000	Total Acres of BLM Surface within HMAs	151,000	Total Acres of BLM Surface within HMAs	151,000
Land Unsuitable for Wind Resources	6,000	Land Unsuitable for Wind Resources	6,000	Land Unsuitable for Wind Resources	6,000	Land Unsuitable for Wind Resources	6,000	Land Unsuitable for Wind Resources	6,000	Land Unsuitable for Wind Resources	6,000
Existing Open to Development	145,000	Existing Open to Development	145,000			Existing Open to Development	145,000				
Existing Avoidance Area	ND	Existing Avoidance Area	ND			Existing Avoidance Area	ND				
Existing Exclusion Area	ND	Existing Exclusion Area	ND			Existing Exclusion Area	ND				
Proposed Open to Development	23,000	Proposed Open to Development	23,000	Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	23,000	Proposed Open to Development	0
Proposed Avoidance Area	ND	Proposed Avoidance Area	ND	Proposed Avoidance Area	0	Proposed Avoidance Acres [GHMAand areas within of 0.5 miles of PHMA]	154,000	Proposed Avoidance Area	122,000	Proposed Avoidance Area	23,000

Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternatives 5 and 6		Proposed RMP Amendment	
Status	**Acres**	**Status**	**Acres**	**Status**	**Acres**	**Status**	**Acres**	**Status**	**Acres**	**Status**	**Acres**
Proposed Exclusion Area	122,000	Proposed Exclusion Area	122,000	Proposed Exclusion Area	145,000	Proposed Exclusion Acres (PHMA)	122,000	Proposed Exclusion Area	0	Proposed Exclusion Area	122,000
						Proposed Avoidance Acres [within 0.5 miles of PHMA]	131,000				
North Dakota											
Total Acres of BLM Surface within HMAs	33,000	Total Acres of BLM Surface within HMAs	33,000	Total Acres of BLM Surface within HMAs	33,000	Total Acres of BLM Surface within HMAs	33,000	Total Acres of BLM Surface within HMAs	33,000	Total Acres of BLM Surface within HMAs	33,000
Land Unsuitable for Wind Resources	22,000	Land Unsuitable for Wind Resources	22,000	Land Unsuitable for Wind Resources	22,000	Land Unsuitable for Wind Resources	22,000	Land Unsuitable for Wind Resources	22,000	Land Unsuitable for Wind Resources	22,000
Existing Open to Development	11,000	Existing Open to Development	11,000			Existing Open to Development	11,000				
Existing Avoidance Area	ND	Existing Avoidance Area	ND			Existing Avoidance Area	ND				
Existing Exclusion Area	ND	Existing Exclusion Area	ND			Existing Exclusion Area	ND				
Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	0
Proposed Avoidance Area	0	Proposed Avoidance Area	ND	Proposed Avoidance Area	0	Proposed Avoidance Acres [GHMA and areas within of 0.5 miles of PHMA]	33,000	Proposed Avoidance Area	11,000	Proposed Avoidance Area	0
Proposed Exclusion Area	11,000	Proposed Exclusion Area	11,000	Proposed Exclusion Area	11,000	Proposed Exclusion Acres (PHMA)	11,000	Proposed Exclusion Area	0	Proposed Exclusion Area	11,000
						Proposed Avoidance Acres [within 0.5 miles of PHMA]	33,000				
Colorado											
Total Acres of BLM Surface within HMAs	1,680,000	Total Acres of BLM Surface within HMAs	1,777,000	Total Acres of BLM Surface within HMAs	1,584,000	Total Acres of BLM Surface within HMAs	1,681,000	Total Acres of BLM Surface within HMAs	1,681,000	Total Acres of BLM Surface within HMAs	1,681,000
Land Unsuitable for Wind Resources	318,000	Land Unsuitable for Wind Resources	310,000	Land Unsuitable for Wind Resources	292,000	Land Unsuitable for Wind Resources	318,000	Land Unsuitable for Wind Resources	318,000	Land Unsuitable for Wind Resources	318,000
Existing Open to Development	1,291,000	Existing Open to Development	1,398,000			Existing Open to Development	1,292,000				
Existing Avoidance Area	0	Existing Avoidance Area	0			Existing Avoidance Area	0				
Existing Exclusion Area	0	Existing Exclusion Area	0			Existing Exclusion Area	ND				
Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	0
Proposed Avoidance Area	621,000	Proposed Avoidance Area	559,000	Proposed Avoidance Area	0	Proposed Avoidance Acres GHMA and areas within of 0.5 miles of PHMA]	1,721,000	Proposed Avoidance Area	1,363,000	Proposed Avoidance Area	691,000
Proposed Exclusion Area	670,000	Proposed Exclusion Area	839,000	Proposed Exclusion Area	1,292,000	Proposed Exclusion Acres (PHMA)	673,000	Proposed Exclusion Area	0	Proposed Exclusion Area	674,000
						Proposed Avoidance Acres [within 0.5 miles of PHMA]	1,102,000				
Nevada											
Total Acres of BLM Surface within HMAs	21,176,000	Total Acres of BLM Surface within HMAs	21,168,000	Total Acres of BLM Surface within HMAs	22,651,000	Total Acres of BLM Surface within HMAs	22,629,000	Total Acres of BLM Surface within HMAs	22,629,000	Total Acres of BLM Surface within HMAs	22,629,000
Land Unsuitable for Wind Resources	333,000	Land Unsuitable for Wind Resources	315,000	Land Unsuitable for Wind Resources	4,568,000	Land Unsuitable for Wind Resources	4,561,000	Land Unsuitable for Wind Resources	4,561,000	Land Unsuitable for Wind Resources	4,561,000
Existing Open to Development	2,126,000	Existing Open to Development	3,151,000			Existing Open to Development	2,734,000				
Existing Avoidance Area	1,103,000	Existing Avoidance Area	1,393,000			Existing Avoidance Area	1,494,000				
Existing Exclusion Area	10,279,000	Existing Exclusion Area	3,711,000			Existing Exclusion Area	1,681,000				
Proposed Open to Development	1,553,000	Proposed Open to Development	1,549,000	Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	17,322,000	Proposed Open to Development	0

Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternatives 5 and 6		Proposed RMP Amendment	
Status	**Acres**	**Status**	**Acres**	**Status**	**Acres**	**Status**	**Acres**	**Status**	**Acres**	**Status**	**Acres**
Proposed Avoidance Area	336,000	Proposed Avoidance Area	1,393,000	Proposed Avoidance Area	0	Proposed Avoidance Acres [GHMA and areas within of 0.5 miles of PHMA]	16,284,000	Proposed Avoidance Area	746,000	Proposed Avoidance Area	2,438,000
Proposed Exclusion Area	11,619,000	Proposed Exclusion Area	5,313,000	Proposed Exclusion Area	18,083,000	Proposed Exclusion Acres (PHMA)	9,195,000	Proposed Exclusion Area	0	Proposed Exclusion Area	12,464,000
						Proposed Acres within 0.5 miles of PHMA- closed to surface occupancy and use.	13,630,000				
California											
Total Acres of BLM Surface within HMAs	1,360,000	Total Acres of BLM Surface within HMAs	1,330,000	Total Acres of BLM Surface within HMAs	1,376,000	Total Acres of BLM Surface within HMAs	1,376,000	Total Acres of BLM Surface within HMAs	1,376,000	Total Acres of BLM Surface within HMAs	1,459,000
Land Unsuitable for Wind Resources	333,000	Land Unsuitable for Wind Resources	315,000	Land Unsuitable for Wind Resources	335,000	Land Unsuitable for Wind Resources	335,000	Land Unsuitable for Wind Resources	335,000	Land Unsuitable for Wind Resources	335,000
Existing Open to Development	831,000	Existing Open to Development	829,000			Existing Open to Development	986,000				
Existing Avoidance Area	0	Existing Avoidance Area	0			Existing Avoidance Area	0				
Existing Exclusion Area	0	Existing Exclusion Area	0			Existing Exclusion Area	0				
Proposed Open to Development	441,000	Proposed Open to Development	438,000	Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	1,041,000	Proposed Open to Development	0
Proposed Avoidance Area	0	Proposed Avoidance Area	0	Proposed Avoidance Area	0	Proposed Avoidance Acres [GHMA and areas within of 0.5 miles of PHMA]	1,344,000	Proposed Avoidance Area	0	Proposed Avoidance Area	502,000
Proposed Exclusion Area	390,000	Proposed Exclusion Area	391,000	Proposed Exclusion Area	1,040,000	Proposed Exclusion Acres (PHMA)	692,000	Proposed Exclusion Area	0	Proposed Exclusion Area	622,000
						Proposed Acres within 0.5 miles of PHMA- closed to surface occupancy and use.	692,000				
Oregon											
Total Acres of BLM Surface within HMAs	10,386,000	Total Acres of BLM Surface within HMAs	10,383,000	Total Acres of BLM Surface within HMAs	11,225,000	Total Acres of BLM Surface within HMAs	11,225,000	Total Acres of BLM Surface within HMAs	11,225,000	Total Acres of BLM Surface within HMAs	10,408,000
Land Unsuitable for Wind Resources	966,000	Land Unsuitable for Wind Resources	966,000	Land Unsuitable for Wind Resources	1,131,000	Land Unsuitable for Wind Resources	1,131,000	Land Unsuitable for Wind Resources	1,131,000	Land Unsuitable for Wind Resources	1,017,000
Existing Open to Development	7,299,000	Existing Open to Development	7,297,000			Existing Open to Development	7,674,000				
Existing Avoidance Area	1,604,000	Existing Avoidance Area	517,000			Existing Avoidance Area	1,753,000				
Existing Exclusion Area	517,000	Existing Exclusion Area	0			Existing Exclusion Area	666,000				
Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	9,557,000	Proposed Open to Development	0
Proposed Avoidance Area	4,899,000	Proposed Avoidance Area	4,003,000	Proposed Avoidance Area	0	Proposed Avoidance Acres [GHMA and areas within of 0.5 miles of PHMA]	10,996,000	Proposed Avoidance Area	537,000	Proposed Avoidance Area	2,105,000
Proposed Exclusion Area	4,521,000	Proposed Exclusion Area	2,391,000	Proposed Exclusion Area	10,093,000	Proposed Exclusion Acres (PHMA)	5,964,000	Proposed Exclusion Area	0	Proposed Exclusion Area	7,286,000
						Proposed Acres within 0.5 miles of PHMA- closed to surface occupancy and use.	6,867,000				

Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternatives 5 and 6		Proposed RMP Amendment	
Status	**Acres**	**Status**	**Acres**	**Status**	**Acres**	**Status**	**Acres**	**Status**	**Acres**	**Status**	**Acres**
Utah											
Total Acres of BLM Surface within HMAs	2,564,000	Total Acres of BLM Surface within HMAs	2,123,000	Total Acres of BLM Surface within HMAs	3,642,000	Total Acres of BLM Surface within HMAs	3,459,000	Total Acres of BLM Surface within HMAs	3,459,000	Total Acres of BLM Surface within HMAs	3,074,000
Land Unsuitable for Wind Resources	806,000	Land Unsuitable for Wind Resources	612,000	Land Unsuitable for Wind Resources	1,114,000	Land Unsuitable for Wind Resources	1,054,000	Land Unsuitable for Wind Resources	1,054,000	Land Unsuitable for Wind Resources	936,000
Existing Open to Development	1,503,000	Existing Open to Development	1,287,000			Existing Open to Development	2,091,000				
Existing Avoidance Area	227,000	Existing Avoidance Area	214,000			Existing Avoidance Area	265,000				
Existing Exclusion Area	28,000	Existing Exclusion Area	10,000			Existing Exclusion Area	50,000				
Proposed Open to Development	216,000	Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	2,354,000	Proposed Open to Development	
Proposed Avoidance Area	227,000	Proposed Avoidance Area	0	Proposed Avoidance Area	0	Proposed Avoidance Acres [GHMA and areas within of 0.5 miles of PHMA]	391,000	Proposed Avoidance Area	51,000	Proposed Avoidance Area	82,000
Proposed Exclusion Area	1,529,000	Proposed Exclusion Area	1,511,000	Proposed Exclusion Area	2,528,000	Proposed Exclusion Acres (PHMA)	1,624,000	Proposed Exclusion Area	0	Proposed Exclusion Area	215,000
						Proposed Acres within 0.5 miles of PHMA	2,503,000				
Wyoming											
Total Acres of BLM Surface within HMAs	17,200,000	Total Acres of BLM Surface within HMAs	17,200,000	Total Acres of BLM Surface within HMAs	17,016,000	Total Acres of BLM Surface within HMAs	17,025,000	Total Acres of BLM Surface within HMAs	17,025,000	Total Acres of BLM Surface within HMAs	17,279,000
Land Unsuitable for Wind Resources	1,172,000	Land Unsuitable for Wind Resources	1,172,000	Land Unsuitable for Wind Resources	1,171,000	Land Unsuitable for Wind Resources	1,172,000	Land Unsuitable for Wind Resources	1,172,000	Land Unsuitable for Wind Resources	1,172,000
Existing Open to Development	15,387,000	Existing Open to Development	15,387,000			Existing Open to Development	15,223,000				
Existing Avoidance Area	0	Existing Avoidance Area	0			Existing Avoidance Area	0				
Existing Exclusion Area	641,000	Existing Exclusion Area	0			Existing Exclusion Area	631,000				
Proposed Open to Development	8,315,000	Proposed Open to Development	8,315,000	Proposed Open to Development	0	Proposed Open to Development	0	Proposed Open to Development	15,853,000	Proposed Open to Development	0
Proposed Avoidance Area	7,072,000	Proposed Avoidance Area	7,072,000	Proposed Avoidance Area	0	Proposed Avoidance Acres [GHMA and areas within of 0.5 miles of PHMA]	16,948,000	Proposed Avoidance Area	0	Proposed Avoidance Area	8,041,000
Proposed Exclusion Area	641,000	Proposed Exclusion Area	641,000	Proposed Exclusion Area	15,845,000	Proposed Exclusion Acres (PHMA)	9,304,000	Proposed Exclusion Area	0	Proposed Exclusion Area	7,989,000
						Proposed Avoidance Acres [within 0.5 miles of PHMA]	10,398,000				

ND = No Data Available

^The colors used in Alternative 1 in Table 36 correspond to the proposed ROW management in Table 37.

Table 38: Alternative 1 ROW Management

Region	PHMA or IHMA	GHMA
North Dakota	Exclusion	Avoidance
Idaho	Exclusion	Open
Southwest Montana	Exclusion	Avoidance
Nevada/Northeastern California	Exclusion	Yes
Colorado	Exclusion	Avoidance
Oregon	Exclusion	Avoidance
South Dakota	Exclusion	ND
Utah	Exclusion	Open
Wyoming	Avoidance	Open

Table 39: Calculation Theory

Alternative 1	Data Inputs
Total Acres of BLM Surface within HMAs	State Total
Land Unsuitable for Wind Resources	"Low Wind Resources"
Existing Open to Development	Potentially developable wind resources - All HMAs
Existing Avoidance Area	ROW avoidance - All HMAs
Existing Exclusion Area	ROW exclusion - All HMAs
Proposed Open to Development	Potentially developable wind resources - GHMA
Proposed Avoidance Area	Potentially developable wind resources - IHMA, ROW avoidance - GHMA and IHMA
Proposed Exclusion Area	Potentially developable wind resources - PHMA, Row Avoidance - PHMA, Row Exclusion - GHMA, IHMA, and PHMA
Alternative 2	**Data Inputs**
Total Acres of BLM Surface within HMAs	State Total
Land Unsuitable for Wind Resources	"Low Wind Resources"
Existing Open to Development	Potentially developable wind resources - All HMAs
Existing Avoidance Area	ROW avoidance - All HMAs
Existing Exclusion Area	ROW exclusion - All HMAs
Proposed Open to Development	Potentially developable wind resources - GHMA
Proposed Avoidance Area	Potentially developable wind resources - IHMA, ROW avoidance - GHMA and IHMA
Proposed Exclusion Area	Potentially developable wind resources - PHMA, Row Avoidance - PHMA, Row Exclusion - GHMA, IHMA, and PHMA
Alternative 3	**Data Inputs**
Total Acres of BLM Surface within HMAs	State Total
Land Unsuitable for Wind Resources	"Low Wind Resources"
ROW Avoidance Acres	N/A - All HMAs are Exclusion
ROW Exclusion Acres	Potentially developable wind resources, ROW avoidance, ROW exclusion
Alternative 4	**Data Inputs**
Total Acres of BLM Surface within HMAs	State Total
Land Unsuitable for Wind Resources	"Low Wind Resources"
Existing Open to Development	Potentially developable wind resources - All HMAs

Alternative 4	Data Inputs
Existing Avoidance Area	ROW avoidance - All HMAs
Existing Exclusion Area	ROW exclusion - All HMAs
Land Open for Development	State Total-Land Unsuitable-ROW Avoidance
Proposed Avoidance Acres [GHMA and IHMA and areas within of 0.5 miles of PHMA]	Potentially Developable Wind Resources - GHMA and IHMA, ROW Avoidance - GHMA and IHMA
Proposed Exclusion Acres (PHMA)	Potentially developable wind resources - PHMA, Row Avoidance - PHMA, Row Exclusion - All HMAs
Proposed Avoidance Acres [within 0.5 miles of PHMA]	0.5mi buffer of PHMA
Alternatives 5 and 6	**Data Inputs**
Total Acres of BLM Surface within HMAs	State Total
Land Unsuitable for Wind Resources	"Low Wind Resources"
Land Open for Development	Potentially Developable Wind Resources - GHMA
Proposed Avoidance Area	Potentially Developable Wind Resources - PHMA and IHMA, ROW Avoidance - All HMAs
Proposed Exclusion Area	ROW Exclusion – All HMAs
Proposed RMP Amendment	**Data Inputs**
Total Acres of BLM Surface within HMAs	State Total
Land Unsuitable for Wind Resources	"Low Wind Resources"
ROW Exclusion Acres	Wind ROW exclusion - PHMA
ROW Avoidance Acres	Wind ROW avoidance – GHMA except in Idaho and Wyoming
Land Open for Development	State Total-Land Unsuitable-ROW Avoidance-ROW Exclusion

12.10.2 Solar Energy

The RFD for solar development is needed to guide analyses on the effect of alternatives being considered to solar power generation. The solar development RFD for this GRSG EIS incorporates and builds on the RFD from the 2023 Solar Programmatic EIS (PEIS), under concurrent development.

In order to evaluate the adequacy of lands available for application in meeting the nation's renewable energy goals, the Solar PEIS developed a projection of the land area and electricity-generating capacity (power) requirements for future solar energy development. For the 2024 Solar PEIS (BLM 2024), the amount of land area and power projected for utility-scale solar energy development in the 11-state Solar PEIS planning area through the year 2045 is used as the RFD. The year 2045 was used because it allows for approximately 20 years of development, which is the typical time period the BLM uses for programmatic planning. The amount of land area projected for utility-scale solar energy development in the Solar PEIS 11-state planning area is shown in **Table 3-10**.

The 2023 GRSG EIS and 2023 Solar PEIS each have five different alternatives and differing planning areas, and it is not known which alternative (or combination of alternatives) either process will ultimately select. Because of this, the GRSG EIS solar RFD is a qualitative analysis that builds off the RFD from the Solar PEIS RFD. The allocations associated with solar energy ROW development in the GRSG EIS are shown in **Table 40** below, organized by each state within the GRSG planning area and by GRSG habitat management area.

Table 40: Solar ROW Management based on Greater Sage-Grouse Habitat Management Area

State	GRSG Alternative 1		GRSG Alternative 2		GRSG Alternative 3	GRSG Alternative 4		GRSG Alternatives 5 and 6		Proposed RMP Amendment.	
	PHMA[1]	GHMA	PHMA[1]	GHMA	PHMA[1]	PHMA[1]	GHMA	PHMA[1]	GHMA	PHMA	GHMA
North Dakota[2]	Exclusion	Avoidance	Exclusion	Avoidance	Exclusion	Exclusion	Avoidance	Avoidance	Open	Exclusion[7]	Avoidance
Idaho	Exclusion[2]	Open	Exclusion[2]	Open	Exclusion	Exclusion	Avoidance	Avoidance	Open	Exclusion[7]	Open[6]
Montana[2]	Exclusion	Avoidance	Exclusion	Avoidance	Exclusion	Exclusion	Avoidance	Avoidance	Open	Exclusion[7]	Avoidance
Nevada / Northeastern California	Exclusion[2]	Exclusion[4]	Exclusion[2]	Exclusion[4]	Exclusion	Exclusion	Avoidance	Avoidance	Open	Exclusion[7]	Avoidance
Colorado	Exclusion[3]	Avoidance	Exclusion[3]	Avoidance	Exclusion	Exclusion	Avoidance	Avoidance	Open	Exclusion[7]	Avoidance
Oregon	Exclusion[5]	Avoidance	Exclusion[5]	Avoidance	Exclusion	Exclusion	Avoidance	Avoidance	Open	Exclusion[7]	Avoidance
South Dakota[2]	Exclusion	Avoidance	Exclusion	Avoidance	Exclusion	Exclusion	Avoidance	Avoidance	Open	Exclusion[7]	Avoidance
Utah	Exclusion[4]	Exclusion[4]	Exclusion[4]	Open	Exclusion	Exclusion	Avoidance	Avoidance	Open	Exclusion[7]	Avoidance in connectivity areas
Wyoming	Open[3]	Open	Open[3]	Open	Exclusion	Exclusion	Avoidance	Avoidance	Open	Exclusion[7]	Open

[1] – IHMA in Idaho, [2] – Greater than 20 Megawatt facilities, [3] – Based on Major ROW for Utility Corridors, [4] – Based on 2012 Solar EIS, [5] – Avoidance for solar in Lake, Harney, and Malheur Counties outside of SFAs, [6] – Avoidance in IHMA, [7] – Managed as exclusion without exception in areas designated as PHMA with limited exceptions.

The acres associated with these habitat management areas are shown in **Table 2-3** in **Chapter 2** of the GRSG EIS. Additional information on ROW management and criteria that define these management actions are in **Section 4.8**, Lands and Realty, of the EIS.

The basis for the Solar PEIS' state-level projections of solar energy development by 2045 in **Table 3-10** (**Appendix 9**) was the DOE's Solar Futures study (2021) and its companion report on environmental implications (Heath et al. 2022). The Solar PEIS concluded that in general, the lands available for solar energy development in each state, usually outside of GRSG PHMA, would be adequate to meet the RFD under each of the Solar PEIS alternatives. However, due to the uncertainties in estimating RFD values by state, both the Solar PEIS and GRSG EIS recommended that the total RFDs for BLM-administered lands across the planning area be considered the most likely development level across all alternatives and that the state-level breakdown of the RFDs be recognized as forecasted estimates that may shift among states. None of the management actions in the GRSG EIS alternatives would preclude achieving the RFD projections of acres needed to achieve the nation's renewable energy goals. The nature and type of effects of the GRSG RFDs are discussed in Section 4.8 of the GRSG EIS.

12.11 Air Pollutant and Greenhouse Gas Emission Calculation

Air pollutant and GHG emissions presented in **Chapter 4** of the Greater Sage-Grouse EIS focus on projected emissions from oil and gas development in Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. Oil and gas development represents the main source of change in emissions causing impacts in the planning area. Quantitative estimates were scaled according to development projections from the decision area in each state relative to the projected emissions from all existing and reasonably foreseeable federal and nonfederal oil and gas development anticipated for these states through 2032. This section provides a summary of methodology for estimating emissions from projected oil and gas development under each alternative in Colorado, Montana, North Dakota, South Dakota, Utah, and Wyoming. Quantitative analysis for California, Oregon, and Idaho was not conducted due to limited production in the planning area which is not anticipated to result in major differences in impacts under the alternative, and due to a lack of projected emissions for these areas.

Emissions from oil and gas development and production over the next 20 years were estimated by scaling annual emissions relative to circa 2032 modeled emissions. BLM developed a photochemical modeling platform to assess the impacts of oil and gas development and coal production and other cumulative sources on air quality and air quality related values in BLM-administered lands for circa 2032 in the seven Intermountain West states including Colorado, Montana, New Mexico, South Dakota, Utah, and Wyoming (except the Newcastle Field Office; Ramboll 2023). Modeling results are presented in the BLM Western US Photochemical Air Quality Modeling For 2032 Emissions report (Ramboll 2023). The emissions inventory that supports the modeling effort, summarized by state in Appendix A of the report (Ramboll 2023, Appendix A, Tables 4 through 10) is presented in **Table 41**.

Table 41: Modeled oil and gas activity by mineral designation for each state: circa 2032

State	Well and Spud Count	Gas Production (Thousand Cubic Feet per Year)	Oil Production (Barrels per Year)
Colorado	70,759	1,651,000,000	224,000,000
Montana	15,723	63,000,000	51,000,000
North Dakota	42,200	1,707,000,000	829,000,000
South Dakota	330	2,000,000	2,000,000
Utah	20,362	254,000,000	32,000,000
Wyoming	50,726	1,850,000,000	143,000,000

Source: Ramboll 2023, Appendix A, Table 1

State-specific scaling factors were calculated for each activity type (well development, gas production, and oil production) by dividing the projected average annual RFD scenario (**Table 42**), by the circa 2032 modeled oil and gas activity level (**Table 41**). **Table 42** includes estimated scaling factors under each alternative by activity type and state. Circa 2032 emissions from well development, oil production, and gas production are shown in **Table 43**, **Table 44**, and **Table 45**, respectively. Emissions are calculated by multiplying the scaling factors in **Table 42** by the circa 2032 emissions (**Table 43**, **Table 44**, and **Table 45**) for each activity type (Ramboll 2023). Emissions from well development, oil production, and gas production are summed to provide total emissions from oil and gas activity under the Greater Sage-grouse LUPA in each state.

Table 42: Average Annual Oil and Gas Development and Scaling Factor by State

State	Average Annual Development based on RFD Scenario			Scaling Factor		
	Well Development	Gas Production (Thousand Cubic Feet per Year)	Oil Production (Barrels per Year)	Well Development	Gas Production	Oils Production
Alternative 1						
Colorado	848	1,270,300,000	17,822,000	0.0120	0.7694	0.0796
Montana	109	28,297,193	6,505,217	0.0069	0.4492	0.1276
North Dakota	13	6,698,568	3,255,723	0.0003	0.0039	0.0039
South Dakota	3	1,295,637	107,795	0.0094	0.6478	0.0539
Utah	156	179,149	6,760,116	0.0076	0.0007	0.2113
Wyoming	245	993,100,000	73,180,273	0.0048	0.5368	0.5118
Alternative 2						
Colorado	854	1,279,550,000	17,952,000	0.0121	0.7750	0.0801
Montana	109	28,297,193	6,505,217	0.0069	0.4492	0.1276
North Dakota	13	6,698,568	3,255,723	0.0003	0.0039	0.0039
South Dakota	3	1,295,637	107,795	0.0094	0.6478	0.0539
Utah	156	179,149	6,760,116	0.0076	0.0007	0.2113
Wyoming	245	993,100,000	73,180,273	0.0048	0.5368	0.5118
Alternative 3						
Colorado	636	942,100,000	10,074,500	0.0090	0.5706	0.0450
Montana	64	15,093,155	6,287,165	0.0040	0.2396	0.1233
North Dakota	11	5,668,204	2,754,932	0.0003	0.0033	0.0033
South Dakota	3	1,281,554	106,624	0.0086	0.6408	0.0533
Utah	139	158,777	6,159,397	0.0068	0.0006	0.1925
Wyoming	73	640,350,000	40,058,139	0.0014	0.3461	0.2801
Alternative 4						
Colorado	877	1,314,400,000	19,497,500	0.0124	0.7961	0.0870
Montana	109	28,297,193	6,505,217	0.0069	0.4492	0.1276
North Dakota	13	6,698,568	3,255,723	0.0003	0.0039	0.0039
South Dakota	3	1,295,637	107,795	0.0094	0.6478	0.0539
Utah	156	179,149	6,760,116	0.0076	0.0007	0.2113
Wyoming	155	807,350,000	55,952,411	0.0031	0.4364	0.3913

State	Average Annual Development based on RFD Scenario			Scaling Factor		
	Well Development	Gas Production (Thousand Cubic Feet per Year)	Oil Production (Barrels per Year)	Well Development	Gas Production	Oils Production
Alternative 5						
Colorado	877	1,314,400,000	19,497,500	0.0124	0.7961	0.0870
Montana	109	28,297,193	6,505,217	0.0069	0.4492	0.1276
North Dakota	13	6,698,568	3,255,723	0.0003	0.0039	0.0039
South Dakota	3	1,295,637	107,795	0.0094	0.6478	0.0539
Utah	156	179,149	6,760,116	0.0076	0.0007	0.2113
Wyoming	230	962,700,000	70,262,609	0.0045	0.5204	0.4913
Alternative 6						
Colorado	877	1,314,400,000	19,497,500	0.0124	0.7961	0.0870
Montana	109	28,297,193	6,505,217	0.0069	0.4492	0.1276
North Dakota	13	6,698,568	3,255,723	0.0003	0.0039	0.0039
South Dakota	3	1,295,637	107,795	0.0094	0.6478	0.0539
Utah	156	179,149	6,760,116	0.0076	0.0007	0.2113
Wyoming	227	957,250,000	69,623,452	0.0045	0.5174	0.4869
Proposed RMP Amendment						
Colorado	877	1,314,400,000	19,497,500	0.0124	0.7961	0.0870
Montana	109	28,297,193	6,505,217	0.0069	0.4492	0.1276
North Dakota	13	6,698,568	3,255,723	0.0003	0.0039	0.0039
South Dakota	3	1,295,637	107,795	0.0094	0.6478	0.0539
Utah	156	179,149	6,760,116	0.0076	0.0007	0.2113
Wyoming	227	957,250,000	69,623,452	0.0045	0.5174	0.4869

Table 43: Circa 2032 Criteria Air Pollutant and HAP Emissions from Well Development (tons per year)

State	Carbon Monoxide	Nitrogen Oxides	PM_{10}	$PM_{2.5}$	Sulfur Dioxide	VOCs	HAPs	Carbon Dioxide	Methane	Nitrous Oxide
Colorado	18,248	25,643	597	587	21	6,719	513	2,785,319	732,161	620
Montana	9,714	7,724	161	161	366	27,320	1,188	1,581,834	80,567	27
North Dakota	74,510	75,276	996	998	15,845	137,054	6,600	46,354,886	361,866	192
South Dakota	240	240	7	7	0	1,226	52	96,057	2,425	1
Utah	2,019	1,926	78	78	22	8,949	307	540,600	109,755	9
Wyoming	11,054	25,083	1,093	1,093	486	131,998	3,909	9,330,768	161,887	196
Total	**115,784**	**135,892**	**2,932**	**2,923**	**16,740**	**313,265**	**12,569**	**60,689,465**	**1,448,661**	**1,047**

Source: Ramboll 2032

Table 44: Circa 2032 Criteria Air Pollutant and HAP Emissions from Oil Production (tons per year)

State	Carbon Monoxide	Nitrogen Oxides	PM_{10}	$PM_{2.5}$	Sulfur Dioxide	VOCs	HAPs	Carbon Dioxide	Methane	Nitrous Oxide
Colorado	13,725	6,532	117	117	6	86,959	4,359	2,049,366	50,888	29
Montana	752	142	0	0	238	9,457	744	230,751	29,522	3
North Dakota	29,125	5,510	0	0	9,237	38,834	3,019	8,892,703	35,314	107
South Dakota	40	8	0	0	14	1,514	130	13	213	0
Utah	174	32	0	0	10	12,217	769	50,665	3,405	1
Wyoming	328	1,314	0	0	1,257	46,047	1,999	687	7,184	0
Total	**44,143**	**13,538**	**117**	**117**	**10,762**	**195,029**	**11,020**	**11,224,185**	**126,527**	**139**

Source: Ramboll 2032

Table 45: Circa 2032 Criteria Air Pollutant and HAP Emissions from Gas Production (tons per year)

State	Carbon Monoxide	Nitrogen Oxides	PM_{10}	$PM_{2.5}$	Sulfur Dioxide	VOCs	HAPs	Carbon Dioxide	Methane	Nitrous Oxide
Colorado	11,961	14,676	486	460	477	12,248	2,881	2,949,852	19,435	45
Montana	1,766	1,616	39	39	107	7,250	845	422,228	65,196	6
North Dakota	61,496	26,708	3,251	2,927	19,712	309,024	33,058	17,931,244	355,259	218
South Dakota	202	447	69	69	3	326	264	513,200	1,106	11
Utah	307	687	87	87	538	1,046	439	468,878	11,067	12
Wyoming	7,752	10,698	466	466	4,738	18,759	3,148	3,449,108	62,846	63
Total	**83,485**	**54,833**	**4,397**	**4,048**	**25,575**	**348,652**	**40,635**	**25,734,509**	**514,909**	**354**

Source: Ramboll 2032

12.12 REFERENCES

Argonne National Laboratory. 2016. Wind Energy Development Exclusions and Resource Sensitivities. West-Wide Wind Mapping Project, Maps and Data. BLM Wind Energy. Internet website: https://wwmp.anl.gov/maps-data/.

BLM (Bureau of Land Management). 2024. Programmatic environmental impact statement for solar energy development in western states and resource management plan amendments (in Draft). Solar Energy Permitting and Program Resources. Internet website: https://blmsolar.anl.gov/solar-peis-2023/

BLM GIS (Bureau of Land Management Geographic Information System). 2023. Geographic data. BLM National Operations Center.

DOE (United States Department of Energy). 2021. Solar Futures Study. Office of Energy Efficiency & Renewable Energy. September 2021. Internet website: https://www.energy.gov/sites/default/files/2021-09/Solar%20Futures%20Study.pdf.

Heath, G., D. Ravikumar, S. Ovaitt, L. Walston, T. Curtis, D. Millstein, H. Mirletz, H. Hartmann, and J. McCall. 2022. Environmental and Circular Economy Implications of Solar Energy in a Decarbonized U.S. Grid. National Renewable Energy Laboratory. NREL/TP-6A20-80818. Internet website: https://www.nrel.gov/docs/fy22osti/80818.pdf.

National Renewable Energy Laboratory. 2017. United States Wind Speed at 80-Meter above Surface Level. Internet website: https://www.nrel.gov/gis/wind-resource-maps.html.

Ramboll. 2023. BLM Western US Photochemcial Air Quality Modeling for 2032. Intended for US Bureau of Management and Environemtnal Managmend and Planning Solutions, Inc. October 2023.

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Appendix 13

Socioeconomic Baseline Report

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APPENDIX

A Supplementary Tables and Figures

ACRONYMS AND ABBREVIATIONS

	Full Phrase
AML	appropriate management level
APD	application for permit to drill
AUMs	animal unit months
bbl	barrels
BLM	United States Department of the Interior, Bureau of Land Management
CEQ	Council on Environmental Quality
EIS	environmental impact statement
EO	executive order
FO	field office
GRSG	greater sage-grouse
HMA	habitat management area
IRA	Inflation Reduction Act of 2022
kWh	kilowatt-hours
mcf	thousand cubic feet
MW	megawatt
ONRR	Office of Natural Resources Revenue
PHMA	priority habitat management area
PILTs	payments in lieu of taxes
RMP	resource management plan
ROW	right-of-way
US	United States
WHB HMA	wild horse and burro herd management area

Chapter 1. Introduction

The United States (US) Department of the Interior, Bureau of Land Management (BLM) revised land use plans in 2014 and 2015 in the states of California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming (2015 Sage-Grouse Plan Amendments) to provide for greater sage-grouse (GRSG) conservation on public lands. These amendments were accompanied by environmental impact statements (EISs) that included analyses of the impacts on social and economic conditions as a result of proposed management.

Subsequently, the BLM amended several of those revised plans in 2019 in California, Colorado, Idaho, Nevada, Oregon, Utah, and Wyoming (2019 Sage-Grouse Plan Amendments). On October 16, 2019, the US District Court for the District of Idaho preliminarily enjoined the BLM from implementing the 2019 Sage-Grouse Plan Amendments (Case No. 1:16-CV-83-BLW).

Since the completion of these 2019 Sage-Grouse Plan Amendments, the BLM has found that the 2019 Sage-Grouse Plan Amendments (and for Montana, North Dakota, and South Dakota, the 2015 Sage-Grouse Plan Amendments) are potentially inconsistent with new science and rapid changes affecting the BLM's management of the public lands, including the effects of climate change (such as drought, loss of habitat, more frequent wildland fires, and less riparian areas).

This socioeconomic baseline report serves as an update to the social and economic baseline conditions discussed in the 2015 Sage-Grouse Plan Amendment EISs. The report provides a discussion on updates and changes to key social and economic factors for the relevant states and counties, including population, employment, and income data and trends. In addition, updated information is provided for BLM resources and resource uses. An overview of nonmarket values associated with BLM resources and resources uses is also included, pulling from the 2015 discussion with updates for more recent literature. In addition, screening of environmental justice populations at the county level throughout the planning area has been updated based on 2022 BLM guidance (BLM 2022a). The economic data presented in this discussion include annual averages for the most recent reporting periods. These include the widespread economic effects of the recession brought about by the 2020 global COVID-19 pandemic, which might have impacted local and regional economies through short-term reductions in employment and industry output. The effects may be ongoing and may not be evenly distributed across industries.

The planning area includes portions of California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming, regardless of jurisdiction. Due to the nature of social, economic, and environmental justice conditions, the social and economic analysis utilizes a different study area than is used for other resources. Socioeconomic analysis areas and environmental justice analysis areas have been determined for each state to include counties that contain GRSG habitat on BLM-administered lands or minerals and within which social and economic conditions might reasonably be expected to change based on alternative management actions.

In the previous analysis associated with the 2015 GRSG planning effort, some subregions included additional "secondary" analysis areas to capture counties with important economic or social linkages to counties that do not contain habitat. For the current analysis, these "secondary" counties are not included in the analysis area; this is because these counties are generally more populous, and demographic data from these counties, if included, could overemphasize certain characteristics that are not necessarily representative of the area that would be most impacted by changes in BLM management decisions related to GRSG. An overview of counties included in each state analysis area is included in **Appendix A**, **Table A-1**.

Chapter 2. Demographic and Economic Baseline Conditions

Historical and projected population growth are important socioeconomic indicators because they aid in estimating future demand for public lands and potential shifts in demand for various land uses as well as they provide context for how land use planning changes could affect the local population, further informing associated economic analyses. Population changes since 2010 and anticipated population growth within the analysis area are described below.

This chapter also provides a summary of economic data, including trends and current conditions for per capita income and unemployment. The unemployment rate is a key indicator that measures the percentage of unemployed people to the number of people in the labor force, and it is often used as an indicator of economic health and conditions. A high unemployment rate is a concern for the general economy and likely indicates that many individuals in the labor force are unable to find employment, which could lead to in economic distress due to the lack of work and associated income (Bondarenko 2024). Changes in the unemployment rate from year to year provide a good picture of the relative health of the economy over time.

In addition, this chapter identifies and describes major economic sectors in the socioeconomic study area that can be affected by public land management actions. Those economic activities that rely on or could rely on BLM-administered lands, such as livestock grazing or energy development, are the most likely affected. Differences in major sectors since the publication of the 2015 Sage-Grouse Plan Amendment EISs are highlighted below; for all other sectors, please refer to the respective 2015 Sage-Grouse Plan Amendment EIS.

2.1 CALIFORNIA

The California analysis area includes two counties, Lassen County and Modoc County, which are in the northeast corner of California (see **Figure A-1** in **Appendix A**). These two counties were included in the analysis area because they include a large percentage of BLM-administered land in GRSG habitat management areas (HMAs). About 32 percent of all acres in Lassen County and 9 percent of all acres in Modoc County are in HMAs on BLM-administered surface acres. Of the BLM surface acres in Lassen County and Modoc County, over 90 percent are in HMAs for both counties.

California's population and economic growth have slowed in recent years, which is expected to continue in the near future. From 2010 to 2021, the population in California increased by about 2.8 million—a growth rate of about 7.7 percent, which was slightly less than the population growth rate for the US (8.5 percent; US Department of Commerce 2022). Over the next 20 years, the population in California is projected to remain stagnant, with a slight increase of about 1.7 percent (see **Table 2-1**; California Department of Finance 2023).

Table 2-1. California Analysis Area Population

Geographic Area	2010	2021	2040	% Change 2010–21	% Change 2021–2040 (estimated)
Lassen County, California	35,081	32,949	21,772	-6.1	-33.9
Modoc County, California	9,605	8,723	7,463	-9.2	-14.4
California	36,637,290	39,455,353	40,106,449	7.7	1.7

Sources: California Department of Finance 2023; US Department of Commerce 2022

Employment within California from 2010 to 2021 grew by almost 4.3 million jobs, which was an increase of about 22 percent. The largest magnitude of employment increases occurred in the health care and social assistance; transportation and warehousing; and professional, scientific, and technical services industries (see **Table A-2** in **Appendix A**). The historical increase in employment is consistent with the steady reduction in the unemployment rate in California from 6.3 percent in 2015 to 4.1 percent in 2019. However, the unemployment rate across California more than doubled in 2020 due to large number of layoffs that occurred during the global COVID-19 pandemic (see **Table 2-2**; BLS 2023). This increase in the unemployment rate could contribute to the projected population stagnation in California, as workers move to other locations in search of employment. On the other hand, per capita income in 2021 was higher than the US average per capita income; also, the real total earnings in California increased from 2010 to 2021 by about 42 percent (BEA 2021a, 2021b).

Table 2-2. California Analysis Area Unemployment Rate

Geographic Area	2015	2016	2017	2018	2019	2020	2021
Lassen County	7.3	7.0	5.5	4.9	4.7	7.4	5.9
Modoc County	8.6	7.8	8.2	7.6	7.2	8.9	7.1
California	6.3	5.5	4.8	4.3	4.1	10.2	7.3

Source: BLS 2023

In contrast to the state of California, the population in the California analysis area where the HMAs largely exist decreased, with Lassen County experiencing a population loss of 6.1 percent and Modoc County a loss of 9.2 percent between 2010 and 2021 (see **Table 2-1**; US Department of Commerce 2022). Population in the California analysis area counties is anticipated to continue to decline through 2040 with a loss of 33.9 percent in Lassen County and 14.4 percent in Modoc County, compared with a 1.7 percent population gain in the state of California (see **Table 2-1**; California Department of Finance 2023).

Lassen County is the most populus county in the California analysis area, with a population of 32,949 people. Modoc County has a population of 8,723, representing the lowest populus county in the California analysis area. This suggests that Lassen County has a larger economy than Modoc County, and more residents and employment are in Lassen County. Lassen County also has more BLM-administered surface and subsurface acres in GRSG HMAs, which means the population in this county could face more impacts from BLM decisions related to GRSG.

The population reduction in the California analysis area could be due to limited or decreasing employment opportunities, which could influence residents to move to more populated areas in California or out of state. This is especially true in Lassen County. For example, in 2023, a prison closed in Lassen County, which caused many people employed at the prison to lose their jobs and search for employment elsewhere

(Castleman 2023). From 2010 to 2021, total employment in Lassen County decreased by 8 percent (a reduction in over 1,000 jobs). Total employment in Modoc County was largely stagnant, with a slight increase of about 1 percent (about 60 jobs). Government and government enterprises represented the industry with the highest employment in both Lassen and Modoc Counties, with 49.8 percent and 27.5 percent of total jobs, respectively, in 2021. However, from 2010 to 2021, employment in the government and government enterprises industry decreased by almost 800 jobs in Lassen County and 120 jobs in Modoc County. This was the largest magnitude reduction in employment across all industries (see **Table A-2** in **Appendix A;** BEA 2021a, 2021b). From 2015 to 2019, the average annual unemployment rates in Lassen County and Modoc County were greater than the average annual unemployment rate in California, which highlights the more limited employment opportunities in these counties compared with other areas of California. During the 2020 COVID-19 pandemic, the unemployment rates in Lassen County and Modoc County increased to similar, but slightly lower, rates than the state of California (see **Table 2-2**; BLS 2023).

The average labor income in Lassen and Modoc Counties could also play a role in encouraging workers to seek jobs elsewhere. In 2021, the average earnings per employee were about $71,000 in Lassen County and $57,000 in Modoc County, which were lower than per capita income across California by about $17,000 and $31,000, respectively. This is partially due to the concentration of employment in three industries in Lassen and Modoc Counties that had lower earnings per employee than the same industries in California (government and government enterprises, retail trade, and other services). From 2010 to 2021, real per capital income increased in both Lassen County and Modoc County, by over $5,000 and almost $11,000, respectively, accounting for inflation (which was a 15 percent and 24 percent increase for Lassen County and Modoc County, respectively); however, the increases in magnitude and percentage of per capita income were less than the increase in per capita income for the state of California, which increased by over $22,000 (an increase of about 41 percent over the decade; see **Table A-2** and **Table A-3** in **Appendix A**; BEA 2021a, 2021b).

In 2021, farming in California only represented 1 percent of total employment and less than 1 percent of total earnings.[1] However, in the California analysis area, farming plays a more important role in the local economies. In Modoc County, farming was the second-largest industry for employment and labor earnings (only falling below the government and government enterprises industry), with about 12.8 percent of total jobs and 19.4 percent of total earnings coming from the farming industry. In Lassen County, farming was the fourth-largest industry for employment (falling below government and government enterprises, retail trade, and other services), with 4.5 percent of total employment coming from the farming industry. The farming industry was the third-largest contributor of total labor earnings in Lassen County (only falling below government and government enterprises and retail trade industries), with about 3.9 percent of total labor earnings coming from farming (see **Table A-2** and **Table A-3** in **Appendix A**; BEA 2021a, 2021b). This suggests that the local economies in the California analysis area could be susceptible to impacts on farming, including potential changes to livestock grazing and ranching (see EIS **Section 3.1.7**, Livestock Grazing, for more details on grazing and ranching use on BLM-administered lands in the California analysis area).

Employment in the mining industry (including quarrying and oil and gas extraction) remained low from 2010 to 2021 in both Lassen and Modoc Counties, as did labor income from the mining industry, with less than 1 percent of the total jobs and labor income coming from this industry (see **Table A-2** and **Table**

[1] Farming employment includes the labor of farm proprietors, but not unpaid family labor; therefore, the statistics presented in this report do not include the total value of farming through employment.

A-3 in **Appendix A**; BEA 2021a, 2021b). This suggests that the economies in these two counties do not depend on the mining industry, and these economies would likely not be sensitive to changes in mineral development.

The retail trade industry is another important industry within the California analysis area. In Lassen County, in 2021, the retail trade industry contributed about 9.4 percent of total employment and about 5.3 of nonfarm earnings. In Modoc County, retail trade contributed 8.4 percent of total employment as well as 5.8 percent of nonfarm earnings in 2021(see **Table A-2** and **Table A-3** in **Appendix A**; BEA 2021a, 2021b).

Statistics included in the 2015 Sage-Grouse Plan Amendment EIS, which included data from 2010, showed similar trends in employment and labor income across industries. This suggests that the economic significance of major industries in the California analysis area have remained fairly consistent over the past decade.

2.2 COLORADO

The Colorado analysis area includes eight counties clustered in the northwest corner of Colorado (see **Figure A-2** in **Appendix A**). The counties with the largest amount of BLM-administered surface acres in GRSG HMAs include Moffat County, Rio Blanco County, and Jackson County, with about 1.1 million acres, 206,000 acres, and 141,000 acres of BLM-administered surface lands in GRSG HMAs, respectively. Additionally, the acres in GRSG HMAs made up over 70 percent of BLM-administered surface lands in Moffat County and Jackson County.

From 2010 to 2021, the population in Colorado increased by about 765,000 people, which is an increase of about 15.1 percent (see **Table 2-3**). This increase is projected to continue over the next 20 years, with the population increase estimated to be about 21.6 percent. One reason for the increase in population is that Colorado has shown steady economic growth and has numerous job opportunities (Grand Park Colorado 2019). From 2010 to 2021, employment in Colorado grew by about 800,000 jobs, which was an increase of about 25.5 percent. The largest magnitude of employment increases occurred in the professional, scientific, and technical services; transportation and warehousing; and construction industries (see **Table A-4 (Part 1)** and **Table A-4 (Part 2)** in **Appendix A**).

Table 2-3. Colorado Analysis Area Population

Geographic Area	2010	2021	2040	% Change 2010–2021	% Change 2021–2040
Eagle County	52,057	55,701	69,698	7.0	25.1
Garfield County	56,150	62,150	86,470	10.7	39.1
Grand County	14,790	15,838	18,427	7.1	16.3
Jackson County	1,387	1,357	1,244	-2.2	-8.3
Mesa County	147,155	157,323	202,388	6.9	28.6
Moffat County	13,806	13,160	12,621	-4.7	-4.1
Rio Blanco County	6,617	6,461	5,908	-2.4	-8.6
Routt County	23,439	25,098	33,472	7.1	33.4
Colorado	5,050,332	5,814,707	7,073,418	15.1	21.6

Sources: Colorado State Demography Office 2022; US Department of Commerce 2022

The unemployment rate in Colorado was stable through 2019, with a slight decrease from 3.7 percent in 2015 to 2.6 percent in 2019. Consistent with the rest of the country, the unemployment rate across Colorado increased sharply in 2020 due to a large number of layoffs that occurred during the global COVID-

19 pandemic (see **Table 2-4**; BLS 2023). In addition to the stability and increase in the job market in Colorado, per capita income in 2021 was higher than the US average per capita income. Real total earnings in Colorado increased from 2010 to 2021 by about 38 percent, which could have factored into individuals' decisions to move to Colorado (BEA 2021a, 2021b).

Table 2-4. Colorado Analysis Area Unemployment Rate

Geographic Area	2015	2016	2017	2018	2019	2020	2021
Eagle County	3.0	2.6	2.2	2.5	2.1	9.0	4.4
Garfield County	4.0	3.3	2.7	2.9	2.6	6.5	4.7
Grand County	3.1	2.6	2.1	2.5	2.0	8.0	4.2
Jackson County	3.6	2.6	1.7	2.5	2.2	4.0	3.3
Mesa County	5.3	5.1	3.0	3.7	3.2	7.1	5.7
Moffatt County	4.4	3.8	3.1	3.4	3.2	5.8	4.8
Rio Blanco County	5.1	4.8	3.6	3.9	3.5	5.2	5.5
Routt County	3.1	2.5	2.2	2.5	2.1	7.5	4.2
State of Colorado	**3.7**	**3.1**	**2.6**	**3.0**	**2.6**	**6.9**	**5.4**

Source: BLS 2023

Across the Colorado analysis area, the population increased by about 22,000 people from 2010 to 2021, which is an increase of about 6.9 percent; this is a slightly smaller growth rate than for the whole state of Colorado. However, the historical population growth in the Colorado analysis area varied by county. The county with the largest increase in population in the Colorado analysis area was Mesa County, with an increase of about 10,000 people (Mesa County is also the most populous county in the Colorado analysis area, with a population of 157,323 people; see **Table 2-3**). The county with the largest magnitude decrease in population from 2010 to 2021 in the Colorado analysis area was Moffat County, with a decrease of about 600 people (see **Table 2-3**; US Department of Commerce 2022). The population growth rates in the Colorado analysis area counties are anticipated to continue through 2040, with an increase in population in the counties that saw historical growth and a decrease in population in the counties that saw historical population decline (see **Table 2-3**; Colorado State Demography Office 2022).

Similar to the state of Colorado as a whole, the change in population in the Colorado analysis area counties is likely correlated with the number of job opportunities. From 2010 to 2021, Mesa County, which had the largest increase in population, had the largest increase in employment across the analysis area, with almost 10,000 additional jobs. This increase in total employment was largely driven by an increase in employment in the health care and social assistance industry, which accounts for the largest percentage of total employees in Mesa County at 13.7 percent. Moffatt County, which had the largest percentage decrease in population, had the largest decrease in employment, with a decrease of almost 600 jobs (see **Table A-4 (Part 1)** and **Table A-4 (Part 2)** in **Appendix A**). The decrease in total employment in Moffatt County was largely due to a decrease in employment in the government and government enterprises industry and the mining industry (including quarrying and oil and gas extraction); these industries represent two important industries in the county, with about 15.1 percent and 5.7 percent of total employment, respectively.

In contrast to total employment trends, which followed the population for most of the analysis area, the average annual unemployment rates followed similar trends across counties in the analysis area (see **Table 2-4**; BLS 2023). All counties in the analysis area had lower unemployment rates in 2019 than in 2015. The unemployment rates in the Colorado analysis area increased in 2020 during the COVID-19 pandemic. In all counties in the Colorado analysis area, except for Rio Blanco County, the unemployment rates decreased from 2020 to 2021 (in Rio Blanco County, the unemployment rate did not increase as much as other counties

from 2019 to 2020; therefore, the increase in the unemployment rate from 2020 to 2021 could have been due to delayed impacts from COVID-19). This difference in trends between the total employment and average annual unemployment rate is likely due to an increase in the number of individuals returning to the work force as the number of jobs increase.

In addition to the number of job opportunities attracting people to move to the Colorado analysis area, higher per capita income could also encourage population growth in the Colorado analysis area counties, and lower per capita income could lead to population decline. In 2021, Moffat County, which saw the highest decrease in population and employment from 2010 to 2021, had the lowest reported per capita income across all industries at about $49,000. Routt County and Eagle County had the highest per capita income across all counties in the analysis area, with per capita income amounts of about $98,000 and $97,000, respectively. Both counties saw growth in population, employment, and real per capita income from 2010 to 2021.

The per capita income for Routt County and Eagle County was higher than the per capita income for the state of Colorado, which had a per capita income of about $71,000 in 2021. In Routt County, the key industries with the highest average earnings per employee (which is calculated by dividing total earnings by the total number of employees; see **Table A-4 (Part 1)**, **Table A-4 (Part 2)**, **Table A-5 (Part 1)**, and **Table A-5 (Part 2)** in **Appendix A**; BEA 2021a, 2021b) were utilities, mining, and wholesale trade. In Eagle County, the industries with the highest average earnings per employee were utilities, wholesale trade, and health care and social assistance.

In 2021, the farming industry in Colorado only represented about 1 percent of total employment and less than 1 percent of total earnings.[2] However, in the Colorado analysis area, farming plays a more important role, especially in Jackson, Rio Blanco, and Moffatt Counties. In Jackson County, farming was the second-largest industry for employment (only falling below the government and government enterprises industry) and the largest industry for labor earnings, with about 15.1 percent of total jobs and 16.4 percent of total earnings coming from the farming industry. In Rio Blanco County, farming was the third-largest industry for employment, representing about 9.8 percent of total employment (behind government and government enterprises and mining); however, farming only accounted for about 2 percent of total earnings in the county. In Moffatt County, farming was the fourth-largest industry for employment, representing about 8.4 percent of total jobs (behind government and government enterprises, retail trade, and health care and social assistance); however, similar to Rio Blanco County, farming only accounted for about 2.1 percent of total earnings (see **Table A-4 (Part 1)**, **Table A-4 (Part 2)**, **Table A-5 (Part 1)**, and **Table A-5 (Part 2)** in **Appendix A**; BEA 2021a, 2021b).

These three counties have a high percentage of BLM-administered lands in GRSG HMAs. Therefore, these counties could be susceptible to impacts on farming, including potential changes to livestock grazing and ranching from BLM decisions on GRSG HMAs (see **Section 3.1.7**, Livestock Grazing, for more details on grazing and ranching use on BLM-administered lands in the Colorado analysis area). Additionally, from 2010 to 2021, there were declines in total population for all three counties as well as declines in total employment for Moffat County and Rio Blanco County. This suggests that these counties are more sensitive to changes in economic conditions than the rest of the Colorado analysis area.

[2] Farming employment includes the labor of farm proprietors, but not unpaid family labor; therefore, the statistics presented in this report do not include the total value of farming through employment.

In 2021, the mining industry (including quarrying and oil and gas extraction) accounted for less than 5 percent of total employment and less than 5 percent of labor earnings in each county in the Colorado analysis area, except for Rio Blanco and Moffatt Counties. In Rio Blanco County, mining was the second-largest industry for employment and labor earnings, representing about 12.3 percent of total jobs and 28.2 percent of total earnings (behind government and government enterprises). In Moffat County, mining was the eighth-largest industry for employment and represented about 5.7 percent of total jobs in the county. However, mining accounted for 13.4 percent total labor earnings, which was the second-largest industry in Moffat County (see **Table A-4 (Part 1)**, **Table A-4 (Part 2)**, **Table A-5 (Part 1)**, and **Table A-5 (Part 2)** in **Appendix A**; BEA 2021a, 2021b). As mentioned above, Moffat and Rio Blanco Counties had a decline in population and employment. This suggests that the economies rely on the mining industry, and they are likely sensitive to changes in mineral development that could impact economic conditions.

Other top industries within the Colorado analysis area include the government and government enterprises industry, recreation and tourism-related industries (such as the accommodation and food industry and retail trade industry), construction industry, healthcare and social assistance industry, and real estate and rental and leasing industry. The percentages of total employment from these industries across the Colorado analysis area have not changed substantially from the data included in the 2015 Sage-Grouse Plan Amendment EIS, which included data from 2010. This suggests that the economic significance of major industries in the Colorado analysis area have remained consistent over the past decade.

2.3 IDAHO

The Idaho analysis area includes 27 counties spread across most of southern and eastern Idaho (see **Figure A-3** in **Appendix A**). Owyhee County and Custer County have the largest amount of BLM-administered surface acres in GRSG HMAs, with about 3.1 million acres and 769,000 acres of BLM-administered surface lands in GRSG HMAs, respectively. Owyhee County is on Idaho's southwest border, and Custer County is in the center of Idaho.

From 2010 to 2021, the population in Idaho increased by 18.7 percent, or 284,820 people (**Table 2-5**). This population increase is largely due to Idaho's strong economy, low unemployment rate, and job growth, in addition to the lower cost of living and social considerations of living in Idaho (Callison 2023). Idaho is forecasted to grow from 2021 to 2032 by about 23.2 percent (Idaho Department of Labor 2023). From 2010 to 2021, employment in Idaho grew by about 256,000 jobs, which was an increase of about 30 percent. The largest magnitude of employment increases occurred in the construction, health care and social assistance, accommodation and food services, and construction industries (see **Table A-6** in **Appendix A**).

Table 2-5. Idaho Analysis Area Population

Geographic Area	2010	2021	2032[1]	% Change 2010–2021	% Change 2021–2032
Adams County	3,924	4,321	5,480	9.6	26.8
Bear Lake County	6,026	6,327	7,432	5.0	17.5
Bingham County	44,496	47,540	53,968	6.8	13.5
Blaine County	21,329	23,868	27,077	11.9	13.4
Bonneville County	100,213	121,771	150,622	8.5	23.7
Butte County	2,842	2,573	2,543	-9.5	-1.2
Camas County	1,216	1,044	1,179	-14.1	12.9
Caribou County	6,900	7,003	7,577	1.5	8.2
Cassia County	22,109	24,469	27,732	10.7	13.3
Clark County	857	839	729	-2.1	-13.1

Geographic Area	2010	2021	2032[1]	% Change 2010–2021	% Change 2021–2032
Custer County	4,277	4,273	4,475	-0.1	4.7
Elmore County	26,669	28,396	31,170	6.5	9.8
Fremont County	13,062	13,370	14,631	2.4	9.4
Gem County	16,778	18,692	23,538	11.4	25.9
Gooding County	15,140	15,422	15,981	1.9	3.6
Jefferson County	24,523	30,427	39,671	24.1	30.4
Jerome County	21,282	24,081	27,639	13.2	14.8
Lemhi County	7,861	7,948	8,442	1.1	6.2
Lincoln County	5,021	5,184	5,360	3.2	3.4
Madison County	36,413	50,979	75,961	40.0	49.0
Minidoka County	19,524	21,393	24,229	9.6	13.3
Oneida County	4,212	4,514	5,140	7.2	13.9
Owyhee County	11,389	11,815	13,600	3.7	15.1
Payette County	22,451	24,928	30,493	11.0	22.3
Power County	7,633	7,854	8,169	2.9	4.0
Twin Falls County	74,929	89,128	107,446	18.9	20.6
Washington County	10,105	10,425	11,904	3.2	14.2
State of Idaho	1,526,797	1,811,617	2,232,538	18.7	23.2

Sources: Idaho Department of Labor 2023; US Department of Commerce 2022
Forecasted population data were only forecasted through 2032 for Idaho.
The total for all counties in southwestern Idaho also includes data for Ada, Boise, Canyon, and Valley Counties, which are not included in the Idaho analysis area.
All counties in south-central Idaho are in the Idaho analysis area.
The total for all counties in southeastern Idaho also includes data for Bannock and Franklin Counties, which are not included in the Idaho analysis area.
The total for all counties in eastern Idaho also includes data for Teton County, which is not included in the Idaho analysis area.

The unemployment rate in Idaho was stable through 2019, with a slight decrease from 3.9 percent in 2015 to 3.0 percent in 2019. Consistent with the rest of the country, the unemployment rate across Idaho increased sharply in 2020 due to a large number of layoffs that occurred during the global COVID-19 pandemic (see **Table 2-6**; BLS 2023). Real total earnings in Idaho increased from 2010 to 2021 by about 48 percent; however, per capita income in 2021 was slightly lower than the US average per capita income, which suggests that Idaho's population increase was not largely motivated by higher incomes (BEA 2021a, 2021b).

Table 2-6. Idaho Analysis Area Unemployment Rate

Geographic Area	2015	2016	2017	2018	2019	2020	2021
Adams County	7.1	6.7	5.7	5.5	6.9	9.6	6.6
Bear Lake County	4.2	4.4	3.2	2.9	3.0	4.3	3.0
Bingham County	3.8	3.4	3.0	2.8	2.7	3.9	3.2
Blaine County	3.3	3.0	2.6	2.4	2.6	7.9	3.5
Bonneville County	3.2	3.1	2.7	2.5	2.4	4.1	2.9
Butte County	4.2	4.0	3.0	3.3	2.7	3.7	3.8
Camas County	3.2	3.5	2.8	2.3	2.9	4.9	3.4
Caribou County	3.8	3.5	3.1	2.8	2.7	3.7	3.1
Cassia County	3.1	2.9	2.5	2.3	2.5	3.7	2.9
Clark County	3.5	3.1	3.0	3.1	3.9	4.0	3.2
Custer County	6.2	4.9	4.3	4.1	4.2	5.1	4.7
Elmore County	4.4	4.0	3.7	3.3	3.3	4.9	3.7
Fremont County	3.4	3.3	2.7	2.5	2.4	3.7	2.9

Geographic Area	2015	2016	2017	2018	2019	2020	2021
Gem County	4.9	4.5	4.0	3.5	3.4	6.0	4.1
Gooding County	3.2	3.0	2.5	2.4	2.7	3.9	3.1
Jefferson County	3.2	3.0	2.6	2.3	2.4	3.5	2.7
Jerome County	3.1	3.1	2.8	2.6	2.6	4.1	3.3
Lemhi County	6.5	5.9	5.2	4.5	4.8	6.8	5.3
Lincoln County	4.2	4.3	3.2	3.5	3.6	6.1	4.4
Madison County	2.5	2.3	1.9	1.7	1.9	2.8	2.2
Minidoka County	3.4	3.1	2.7	2.5	2.6	3.9	3.1
Oneida County	3.3	3.5	2.9	2.2	2.3	4.3	2.5
Owyhee County	4.4	4.4	4.0	3,7	3.5	6.0	4.3
Payette County	4.6	4.5	4.0	3.6	3.6	5.4	4.0
Power County	4.3	3.9	3.4	2.9	3.1	4.1	3.8
Twin Falls County	3.4	3.3	3.0	2.7	2.8	5.3	3.6
Washington County	5.4	5.3	4.7	4.2	4.2	5.5	4.4
State of Idaho	**3.9**	**3.7**	**3.2**	**2.9**	**3.0**	**5.5**	**3.6**

Source: BLS 2023

Across the Idaho analysis area, the population increased by about 77,000 people from 2010 to 2021, which is an increase of about 15 percent; this is a smaller growth rate than for the whole state of Idaho. However, the historical population growth in the Idaho analysis area varied by county. The county with the largest increase in population in the Idaho analysis area was Bonneville County, with an increase of about 22,000 people (Bonneville County is also the most populous county in the Idaho analysis area, with a population of about 122,000 people; see **Table 2-5**). The population in Bonneville County is expected to continue to increase, with a projected population growth of about 23.7 percent from 2021 to 2032 (Idaho Department of Labor 2023; see **Table 2-5**). The county with the largest decrease in population from 2010 to 2021 in the Idaho analysis area was Butte County, with a decrease of about 300 people (see **Table 2-5**; US Department of Commerce 2022). The population in Butte County is expected decrease slightly through 2032, with a forecasted population decline of about 1.2 percent (Idaho Department of Labor 2023; see **Table 2-5**).

Similar to the state of Idaho as a whole, the change in population in the Idaho analysis area counties is likely correlated with the number of job opportunities. From 2010 to 2021, Bonneville County, which had the largest increase in population, had the largest increase in employment across the analysis area, with almost 21,000 additional jobs. This increase in total employment was largely driven by an increase in employment in the health care and social assistance industry, which accounts for the largest percentage of total employees in Bonneville County at 15.6 percent.

The only county in the Idaho analysis area that experienced a decrease in employment was Clark County, with a decrease of 26 jobs (5 percent; see **Table A-6** in **Appendix A**). Clark County also experienced a decrease in population over the same time period. This decrease in total employment was largely due to a decrease in employment in the government and government enterprises industry, which currently represents the largest percentage of total employment in the county at 25.3 percent. Clark County was also the only county in the analysis area to have an increase in the unemployment rate from 2015 to 2019 (see **Table 2-6**; BLS 2023); all other counties in the analysis area had lower unemployment rates in 2019 than in 2015. The unemployment rates in all counties in the Idaho analysis area increased in 2020 during the COVID-19 pandemic. In all counties in the analysis area, with the exception of Butte County, the unemployment rates decreased from 2020 to 2021.

In addition to the number of job opportunities attracting people to move to the Idaho analysis area, labor income plays a part in encouraging population growth or decline. In 2021, Blaine County reported the highest per capita income across the Idaho analysis area at almost $135,000 (over $82,000 more than the per capita income for the state of Idaho and almost $71,000 more than the per capita income for the US; BEA 2021a, 2021b). Blaine County also reported a high population growth rate of 11.9 percent from 2010 to 2019.

The county that had the lowest per capita income in the Idaho analysis area was Madison County, with per capita income of $26,000. Madison County had the largest percentage increase in population from 2010 to 2021. This suggests that there were other factors that drove people to move to Madison County besides higher income. For example, Madison County is home to Brigham Young University-Idaho, which attracts students and young professionals to the area.

In 2021, the farming industry played a key role in the economy across Idaho, especially in the analysis area counties. In Idaho, farming represented about 3.5 percent of total employment and 2.7 percent of total earnings.[3] In the Idaho analysis area, the farming industry made up over 9 percent of employment in 21 of the 27 counties in the Idaho analysis area. Farming was the largest industry for employment in Camas, Gooding, Lincoln, and Owyhee Counties, with about 22.7 percent, 22.6 percent, 24.1 percent, and 23.9 percent of total jobs coming from farming, respectively. Farm earnings made up less of a percentage of the total earnings in most of the counties in the analysis area, but they still made up over 8 percent in 11 counties in the analysis area.

Owyhee County is one of the counties with the most BLM-administered lands in GRSG HMAs; therefore, it could be more susceptible to impacts on farming, including potential changes to livestock grazing and ranching from BLM decisions on GRSG HMAs (see **Section 3.1.7**, Livestock Grazing, for more details on grazing and ranching use on BLM-administered lands in the Idaho analysis area).

In 2021, the mining industry (including quarrying and oil and gas extraction) accounted for less than 1 percent of total employment for each county in the Idaho analysis area, except for Caribou County. In Caribou County, mining was the third-largest industry for employment and second-largest industry for labor earnings, representing about 12.3 percent of total jobs and 20.9 percent of total earnings (see **Table A-7** in **Appendix A**; BEA 2021a, 2021b). Furthermore, mining employment in Caribou County increased slightly from 2010 to 2021 by about 300 jobs.

Recreation and tourism-related industries, such as the accommodation and food industry and retail trade industry, are other important industries within the Idaho analysis area, especially in Bear Lake, Bonneville, Cassia, Gem, Lemhi, Madison, Oneida, and Twin Falls Counties, where they made up 10 percent or more of the total employment in each county. The percentages of total employment and earnings from these key industries across the Idaho analysis area have not changed substantially from the data included in the 2015 Sage-Grouse Plan Amendment EIS, which included data from 2010. This suggests that the economic significance of major industries in the Idaho analysis area have remained consistent over the past decade.

2.4 MONTANA

The 26 counties included in the Montana analysis area are mostly clustered in the eastern and central portions of the state. Madison and Beaverhead Counties (which were previously included in the 2015 Sage-Grouse Plan Amendment EIS for Idaho) are in Montana's southwest corner (see **Figure A-4** in

[3] Farming employment includes the labor of farm proprietors, but not unpaid family labor; therefore, the statistics presented in this report do not include the total value of farming through employment.

Appendix A). The counties with the largest amount of BLM-administered surface acres in GRSG HMAs are Valley County and Phillips County in northern Montana and Carter County in Montana's southeast corner, with about 965,000 acres, 855,000 acres, and 486,000 acres of BLM-administered surface lands in GRSG HMAs, respectively.

From 2010 to 2021, the population in Montana increased by 10.3 percent, or 101,727 people (**Table 2-7**). The state population is projected to increase by another 12.5 percent by 2040. Statewide, government and government-based enterprises, health care and social assistance, and retail trade represent the largest employment industries, with 13.5 percent, 11.2 percent, and 10.9 percent, respectively. Both the health care and social assistance and retail trade industries increased in the number of jobs from 2010 to 2021, which could have contributed to the statewide population growth. Trends indicate an economic expansion is occurring through the state due to increased levels of available employment opportunities, higher population numbers, and a growing service-based economy.

Table 2-7. Montana Analysis Area Population

Geographic Area	2010	2021	2040	% Change 2010–2021	% Change 2021–2040
Beaverhead County*	9,252	9,515	10,295	2.8	8.2
Big Horn County	12,911	12,967	11,178	0.4	-13.8
Blaine County	6,512	6,503	5,806	-0.1	-10.7
Carbon County	10,066	11,103	13,425	10.3	20.9
Carter County	1,158	1,245	1,464	7.5	17.6
Chouteau County	5,818	5,617	5,253	-3.5	-6.5
Custer County	11,687	11,106	10,923	-5.0	-1.6
Dawson County	8,951	8,313	8,067	-7.1	-3.0
Fallon County	2,884	2,800	2,910	-2.9	3.9
Fergus County	11,582	11,073	11,296	-4.4	2.0
Garfield County	1,193	1,273	1,481	6.7	16.3
Madison County*	7,692	9,297	13,582	20.9	46.1
McCone County	1,742	1,636	1,562	-6.1	-4.5
Musselshell County	4,552	4,503	3,970	-1.1	-11.8
Petroleum County	489	497	448	1.6	-9.9
Phillips County	4,252	3,816	3,833	-10.3	0.4
Powder River County	1,737	1,716	2,381	-1.2	38.8
Prairie County	1,185	1,062	1,145	-10.4	7.8
Roosevelt County	10,444	10,817	8,790	3.6	-18.7
Rosebud County	9,250	8,593	6,323	-7.1	-26.4
Stillwater County	9,107	9,966	12,873	9.4	29.2
Sweet Grass County	3,616	3,600	3,707	-0.4	3.0
Treasure County	711	704	1,007	-1.0	43.0
Valley County	7,372	7,372	8,346	0.0	13.2
Wibaux County	1,007	948	1,090	-5.9	15.0
Yellowstone County	148,408	164,700	178,358	11.0	8.3
State of Montana	990,742	1,092,469	1,229,024	10.3	12.5

Sources: Montana Department of Commerce 2022; US Department of Commerce 2022

* Beaverhead and Madison Counties are managed under Idaho plans but are included in the Montana analysis area population table.

Within the Montana analysis area, the counties with the largest percentage increase in population between 2010 and 2021 were Madison, Yellowstone, and Carbon Counties, with increases of 20.9 percent, 11.0 percent, and 10.3 percent, respectively. These counties are also expected to see large percentage increases

in population going forward, with increases of 46.1 percent, 8.3 percent, and 20.9 percent by 2040 for Madison, Yellowstone, and Carbon Counties, respectively. The rapid population growth in these counties may be due in part to the development of the area's recreation and tourism industries and the presence of the Billings Metropolitan Statistical Area, which is an expanding urban area that spans Yellowstone and Carbon Counties (Madison County 2015; City of Billings 2023; **Table A-8** in **Appendix A**). Additionally, unemployment rates for Madison, Yellowstone, and Carbon Counties have been consistently below or similar to the state average, and total employment increased from 2010 to 2021 in all three counties (**Table 2-8**).

Table 2-8. Montana Analysis Area Unemployment Rate

Geographic Area	2015	2016	2017	2018	2019	2020	2021
Beaverhead County	3.5	3.4	3.2	3.1	2.9	4.0	2.8
Big Horn County	6.8	7.5	13.6	9.6	7.5	7.2	7.8
Blaine County	5.1	4.7	4.2	4.4	4.0	4.7	3.8
Carbon County	3.8	4.1	3.7	3.5	3.6	5.8	3.4
Carter County	3.4	2.9	2.6	2.5	2.9	2.8	2.6
Chouteau County	3.4	3.9	3.4	3.0	2.8	3.8	2.7
Custer County	3.4	3.7	3.2	3.1	2.9	4.7	3.1
Dawson County	3.2	4.0	3.1	2.7	2.5	5.4	3.1
Fallon County	2.4	3.8	2.7	1.8	1.7	3.9	2.6
Fergus County	4.2	4.1	4.1	3.7	3.2	4.5	3.3
Garfield County	2.9	3.0	2.9	2.7	2.4	2.7	2.6
Madison County	3.7	3.9	4.0	3.6	3.2	5.0	3.2
McCone County	2.3	2.0	2.1	1.8	2.0	2.8	1.8
Musselshell County	4.4	5.3	4.6	4.3	3.9	6.0	4.2
Petroleum County	5.3	4.7	4.4	4.2	3.7	3.3	2.6
Phillips County	5.2	5.5	4.6	4.5	3.8	4.8	3.8
Powder River County	2.7	2.4	2.6	2.9	2.4	3.1	2.7
Prairie County	4.2	3.4	3.7	3.7	3.8	6.6	3.6
Roosevelt County	5.4	5.5	4.7	4.6	4.4	5.9	4.2
Rosebud County	5.5	5.7	5.2	5.3	5.1	5.5	4.0
Stillwater County	3.9	4.1	3.9	3.4	3.2	4.9	2.9
Sweet Grass County	2.9	3.2	3.2	3.1	2.8	3.5	2.4
Treasure County	5.0	4.5	3.8	3.0	2.9	3.5	3.2
Valley County	3.2	3.5	3.3	3.1	3.2	4.2	3.1
Wibaux County	3.3	4.1	3.3	3.6	3.0	4.9	3.8
Yellowstone County	3.4	3.7	3.6	3.3	3.3	5.3	3.2
State of Montana	**4.3**	**4.3**	**4.1**	**3.7**	**3.6**	**5.8**	**3.4**

Source: BEA 2023

Fifteen counties within the Montana analysis area decreased in population, with the most substantial decreases in Prairie and Phillips Counties, which decreased 10.4 percent and 10.3 percent, respectively (**Table 2-7**). Both counties are sparsely populated and rural. Phillips County had a consistently above-average unemployment rate, which may be contributing to this population decline and future stagnation as individuals move to other areas in search of employment (**Table 2-8**). On the other hand, unemployment rates in Prairie County have been similar to the state average, which could be a contributor to the forecasted population increase in the county of 7.8 percent by 2040 (Montana Department of Commerce 2022; see **Table 2-7** and **Table 2-8**). Across the Montana analysis area, Rosebud, Roosevelt, and Big Horn Counties are projected to see the largest percent decrease in population by 2040, with a decrease of about 26.4 percent, 18.7 percent, and 13.8 percent, respectively. Similar to Phillips County, all three counties have

experienced consistently high unemployment rates since 2015, indicating that population declines may be related to stagnant economic conditions.

Since 2010, many counties in the analysis areas have seen an increase in the number of available jobs for multiple industry sectors. Across almost all counties, industries with a relatively high concentration of employment include retail trade, accommodation and food services, and wholesale trade. This is consistent with statewide trends for these industries. Average labor earnings for retail trade and accommodation and food services are relatively low compared with the state average of $53,000, while the average labor earnings for wholesale trade are higher at $80,000. Healthcare is a significant source of employment for counties like Yellowstone County, where it represents 13.7 percent of employment. Most counties also hold high concentrations of government and construction jobs, both of which pay above-average labor wages relative to the statewide all-industry labor earnings (**Table A-9** in **Appendix A**).

Real labor income has increased since 2010 in Montana and all counties in the Montana analysis area, except Fallon and Petroleum Counties. Government and government enterprises represent a key industry for labor income, with over 8 percent of labor income coming from this sector in all counties across the Montana analysis area. The mining (including quarrying and oil and gas extraction), construction, and transportation and warehousing industries represent a large portion of incomes for certain counties, such as Fallon; however, most of the other counties in the Montana analysis area have high labor income in the retail trade and health care and social assistance industries. Manufacturing, utilities, forestry, educational services, and management of companies continue to represent the lower portion of labor incomes in the Montana analysis area. Although the total share of income from these industries is, as a whole, relatively low, professions in certain sectors, such as utilities, yield above-average labor wages while employing fewer people.

The mining industry (including quarrying and oil and gas extraction) is not a significant source of employment at the state level, constituting 1.4 percent of all employment in 2021 and 1.8 percent in 2010; however, for certain counties in the Montana analysis area, mining plays a key role. Big Horn and Fallon Counties are characterized by a particularly high proportion of jobs in mining and oil and gas extraction, and both have undergone declines over the past decade. In 2010, mining represented 10.1 percent and 16.2 percent of employment in Big Horn and Fallon Counties, respectively; however, by 2021, these numbers had fallen to 8.1 percent and 11.4 percent. In 2010, Musselshell and Rosebud Counties also held a relatively large proportion of employment in this sector, with 13.2 percent and 9.1 percent, respectively; however, 2021 numbers are not available.[4]

Statewide, the average mining labor wages ($97,000) are higher than the average across all employment sectors. This trend is also reflected in Big Horn and Fallon Counties. In Big Horn County, the average mining labor wage is $96,000 as compared with a county average wage of $54,000. In Fallon County, the average mining labor wage is $105,000, which is higher than the county average of $49,000. This suggests these counties that rely on mining could be more sensitive to BLM decisions on mining in GRSG HMAs.

At 4.1 percent, farm employment is also a relatively minor source of employment in Montana. However, numerous counties in the analysis area are largely dependent on farming, with this sector comprising greater than 20 percent of county employment in nine counties in the analysis area; these are Carter,

[4] The BEA excludes employment and labor data for industries in certain locations to avoid disclosure of confidential information, as is the case for 2021 employment data in Musselshell and Rosebud Counties in Montana.

Chouteau, Garfield, McCone, Petroleum, Powder River, Prairie, Treasure, and Yellowstone Counties. Average labor wages for farming are relatively low at both the county and state level, ranging from approximately $8,000 in Prairie County to approximately $26,000 in Chouteau County. Although the farming industry does not represent high labor earnings, the high employment in the farming industry highlights the sensitivity of these counties to changes in BLM decisions that could impact farming, livestock grazing, and ranching.

2.5 NEVADA

The Nevada analysis area includes 10 counties, encompassing almost the entire state of Nevada. The analysis area only excludes some counties on Nevada's southern border (see **Figure A-5** in **Appendix A**). Seven of the 10 counties in the Nevada analysis area contain over 1 million acres of BLM-administered lands in GRSG HMAs: Elko, Eureka, Humboldt, Lander, Nye, Washoe, and White Pine Counties. Elko, White Pine, Humboldt, and Washoe Counties have the largest amount in BLM-administered surface lands in GRSG HMAs, with about 4.9 million acres, 2.9 million acres, 2.8 million acres, and 2.3 million acres, respectively.

From 2010 to 2021, the population in Nevada increased by 16.2 percent. From 2010 to 2021, overall employment increased in Nevada while real labor wages largely remained stagnant, with a slight increase from $61,000 to $62,000. As of 2021, the largest employment industries are the accommodation and food services; forestry, fishing, and related activities; retail trade; and government and government-related enterprises, with 14.8 percent, 13.4 percent, 9.9 percent, and 9.4 percent, respectively. At the state level, sectors that pay notably higher than the state average labor wage of $62,000 across all sectors include mining (including quarrying and oil and gas extraction), utilities, management, and information. These industries might not contribute to a large number of employees; however, due to the higher incomes, they play an important role in the local economies.

With a population of 479,758 people, Washoe County is the most populous county in the Nevada analysis area. It had the highest growth rate between 2010 and 2021, with a 16.2 percent increase, which was the same as the entire state of Nevada. The growth of Washoe County is likely due in part to an influx of people to the county's urban areas in the last 10 years, with this trend continuing through 2040. Nye County closely followed, with a population increase of around 14.2 percent. The continuous rapid growth of Nye County may also be related to urban expansion of Nevada's largest cities and spillover from Clark County, the fastest-growing county in Nevada (Nevada Department of Taxation 2021).

Counties with declining or stagnant populations tend to be more rural and sparsely populated, both historically and at present. Lincoln County had the greatest population decrease between 2010 and 2021, at about 9.1 percent, followed by a 7.0 percent decrease in Eureka County (see **Table 2-9**). While the population of Lincoln County is projected to decrease further, a 19.4 percent increase is anticipated in Eureka County. This contrast in population growth trends may be related to the volatility of the county's mining and energy industries, and the consequent fluctuations in worker migration patterns (Eureka County 2018). The estimated population change by county between 2021 and 2040 indicates a range of population changes throughout the analysis area, with the largest projected increase in Nye and Washoe Counties and a continued decrease in Lincoln County (Nevada Department of Taxation 2021).

Table 2-9. Nevada Analysis Area Population

Geographic Area	2010	2021	2040	% Change 2010–2021	% Change 2021–2040 (estimated)
Churchill County	24,946	25,077	28,597	0.5	14.0
Elko County	47,707	53,420	58,521	12.0	9.5
Eureka County	1,603	1,724	2,058	-7.0	19.4
Humboldt County	15,986	17,218	17,908	7.7	4.0
Lander County	5,545	5,729	5,946	3.3	3.8
Lincoln County	5,060	4,600	4,481	-9.1	-2.6
Nye County	43,878	50,096	67.656	14.2	35.1
Pershing County	6,703	6,668	6,753	-0.5	1.3
Washoe County	412,844	479,758	590,280	16.2	23.0
White Pine County	9,765	9,192	10,517	-5.9	14.4
State of Nevada	2,633,331	3,059,238	3,785,099	16.2	23.7

Sources: Nevada Department of Taxation 2021; US Department of Commerce 2022

The mining industry (including quarrying and oil and gas extraction) represents a larger percentage of employment in Humboldt, Pershing, and White Pine Counties (greater than 20 percent; **Table A-10** in **Appendix A**). The average labor income for this industry (over $110,000 in each of the three counties) is almost double the average state income across all employment sectors; it is also comparable to the state average for mining labor wages. From 2010 to 2021, total employment declined in Eureka, Humboldt, and White Pine Counties, suggesting a contraction of the workforce, which could impact available jobs in the mining industry. These trends parallel the stagnant or declining population levels in Eureka and White Pine Counties (**Table 2-9**). This suggests these counties that rely on mining could be more sensitive to BLM decisions on mining in GRSG HMAs, especially as external pressures lead to a decline in available mining jobs.

Farming employment decreased statewide and across all analysis area counties between 2010 and 2021. Lincoln and Pershing Counties hold the highest rate of farm employment, at 9.5 percent and 8.1 percent, respectively. Both counties have experienced declines in farm employment since 2010, from 10.1 percent and 10.6 percent, respectively. The average labor wage for farm employment was $65,000 in Lincoln County and $58,000 in Pershing County. These wages are similar to the state labor wage across all employment sectors, and higher than the statewide average for farming labor wages of $36,000 (see **Table A-11** in **Appendix A**). Similar to the counties that depend on the mining industry, these counties that rely on farming for economic conditions could be more sensitive to BLM decisions on livestock grazing in GRSG HMAs.

In terms of labor income, the trends and key sectors are similar to those for employment. Statewide, labor income is concentrated in mining, as well as in utilities, information, and management. The data show that since 2010, industry earnings have increased for most employment sectors in Nevada. However, mining, farming, forestry, and service-based industries have had a decline in their overall percentage of earnings. Government-based wages continue to be responsible for a large proportion of income for many counties, particularly Churchill County (37.7 percent), Pershing County (32.7 percent), and White Pine County (30.2 percent).

Income in the mining industry (including quarrying and oil and gas extraction) accounts for the largest percentage of income for Humboldt County (37.8 percent), Pershing County (55 percent), and White Pine County (41.7 percent), further indicating their reliance on mineral extraction, as discussed above. Moreover, across these mining-dependent counties, the average labor wages for the mining industry (including quarrying

and oil and gas extraction) in these counties—at over $110,000—are disproportionately high relative to the county averages for all employment sectors (approximately $70,000; **Table A-11** in **Appendix A**). However, the reliance on the mining industry for labor income in these three counties means the economies in these areas are likely susceptible to boom-and-bust cycles and would be more sensitive to changes in BLM management decisions that could affect mineral extraction (Vega 2022).

Unemployment rates across the Nevada analysis area had similar trends from 2015 to 2021. The counties had a decrease in unemployment rates in 2019 from 2015 levels. In 2020, the unemployment rates increased in all counties in the Nevada analysis due to restrictions during the 2020 COVID-19 pandemic. In 2021, unemployment rates decreased as businesses and economies opened back up (**Table 2-10**). Most counties in the Nevada analysis area had lower unemployment rates than the state of Nevada; however, from 2015 to 2019, Nye County experienced higher unemployment rates than the state of Nevada. Unemployment rates were also higher than the state rate in Churchill County in 2015, Lander County in 2016, and Pershing County in 2015 and 2016.

Table 2-10. Nevada Analysis Area Unemployment Rate

Geographic Area	2015	2016	2017	2018	2019	2020	2021
Churchill County	7.1	5.6	4.5	3.8	3.6	5.7	3.5
Elko County	5.2	4.5	3.7	3.1	3.0	5.9	3.3
Eureka County	5.9	4.6	3.0	2.5	2.5	3.5	2.6
Humboldt County	6.1	5.6	4.2	3.3	3.0	5.0	3.4
Lander County	6.8	6.3	4.5	3.5	3.2	4.9	3.6
Lincoln County	6.1	5.4	4.8	4.3	4.0	5.1	3.4
Nye County	8.9	7.4	6.4	5.6	5.3	10.2	6.1
Pershing County	7.0	6.0	4.6	4.0	4.0	4.8	3.6
Washoe County	6.3	5.1	4.1	3.5	3.3	8.2	4.3
White Pine County	5.5	4.7	4.1	3.5	3.0	4.2	3.0
State of Nevada	6.8	5.8	5.0	4.4	4.0	13.5	7.2

Source: BLS 2023

2.6 NORTH DAKOTA

The North Dakota analysis area lies in the state's southwestern corner and consists of Bowman and Slope Counties (see **Figure A-6** in **Appendix A**). Of the BLM-administered surface acreage in Bowman County, 100 percent falls within GRSG HMAs. In Slope County, 82,000 acres of non-surface mineral estate, or approximately 11 percent of total acres in the county, falls within HMAs.

From 2010 to 2021, the population of North Dakota increased by 17.2 percent, or 113,486 people (**Table 2-11**). The statewide population growth between 2010 and 2021 was likely fueled by the Bakken oil boom, which began in 2008 and drew workers to counties outside the analysis area, such as McKenzie and Williams Counties. Oil production peaked in 2012 and experienced intermittent declines due to a variety of factors. including international competition, reserve exhaustion, and the COVID-19 pandemic (Smith 2021; Williams-Derry and Kunkel 2021). Small-scale shifts in production patterns throughout the oil boom may have contributed to the diverging population growth trends at the county level between 2010 and 2021. Overall, the statewide population growth between 2010 and 2021 aligns with an increase in employment in the mining industry (including quarrying and oil and gas extraction), which grew from 2.8 percent of overall state employment in 2010 to 3.2 percent of state employment in 2021. Although mining constitutes a relatively small portion of employment in North Dakota, it is higher than the national average of less than 1 percent.

Table 2-11. North Dakota Analysis Area Population

Geographic Area	2010	2021	2040	% Change 2010–2021	% Change 2021–2040
Bowman County	3,102	3,024	N/A	-2.5	N/A
Slope County	727	775	N/A	6.6	N/A
State of North Dakota	659,858	773,344	N/A	17.2	N/A

Source: US Department of Commerce 2022
N/A = Not available

The state unemployment rate steadily declined from 2016 through 2019. In 2020, unemployment in North Dakota more than doubled, when the COVID-19 pandemic triggered mass layoffs and disrupted the economy. The economy began to recover in 2021, as signified by a decline in the unemployment rate across the state (**Table 2-12**). In North Dakota, the largest nonfarm employment sectors include government, healthcare, and retail, representing 15.8 percent, 12.2 percent, and 10 percent, respectively. Government and government-based enterprises also represent the largest portion of personal wage income in North Dakota.

Table 2-12. North Dakota Analysis Area Unemployment

Geographic Area	2015	2016	2017	2018	2019	2020	2021
Bowman County	1.8	2.2	1.7	1.7	1,5	3.4	2,5
Slope County	2.6	2.5	1.9	2.0	2.0	3.0	2.8
State of North Dakota	2.8	3.1	2.6	2.4	2.1	5.1	3.7

Source BLS 2023

Bowman County has the largest population within the North Dakota analysis area, while Slope County has the lowest population. With a 2021 population of 775 people, Slope County observed a 6.6 percent population increase between 2010 and 2021, whereas Bowman County, which had a 2021 population of 3,024 people, saw a population decrease of 2.5 percent during the same period. Both counties' population changes between 2010 and 2021 did not follow overall North Dakota state trends (US Department of Commerce 2022; **Table 2-11**). The difference in populations trends could be related to the role the mining industry played in each county compared to North Dakota, as the impact of the Bakken oil boom and the general importance of mining in local economies becomes more apparent at the county level.

In 2010, mining was a key industry for Slope County, with approximately 13.8 percent of total employment and 38.9 percent of labor income coming from the mining industry, compared to 2.8 percent of employment and 5.1 percent of nonfarming earnings in North Dakota (2021 employment and income data were not disclosed; see **Table A-12** in **Appendix A**). In Bowman County, jobs in mining and extraction sharply decreased by more than half (from 5.3 to 2.2 percent of employment), as did income for this industry. This decline in the mining industry in Bowman County may reflect a shifting nexus of oil and mining jobs to other counties, as well as short-term trends in oil industry patterns that depend on fluctuations in production and impacts from broader economic or geopolitical trends. Additionally, except for government, education, healthcare, and miscellaneous service sectors, all employment numbers in Bowman County decreased; this trend aligns with its declining population and suggests the dependence of the county's non-mining industries on its mining industries (**Table A-12** in **Appendix A**).

Table 2-12 shows that the North Dakota analysis area experienced rates of unemployment that are lower than the statewide rate for each year from 2015 to 2021. At the county level, Bowman County experienced a slight uptick in the unemployment rate in 2019, which coincides with the brief decline in the Bakken oil

boom that was caused by a drop in oil prices; then, the unemployment rate decreased until reaching its lowest unemployment rate in 2019 (1.5 percent; Scheyder 2016). From 2015 to 2021, Slope County experienced its lowest unemployment rate in 2017, after which the unemployment rate stagnated through 2019. The decline in unemployment could have attracted more people to the county, which would contribute to the population growth seen from 2010 to 2021. Both counties in the North Dakota analysis area experienced their highest unemployment rate in 2020 over the 7-year period due to restrictions and layoffs during the 2020 COVID-19; this was consistent with the state's unemployment trends but still lower than the overall state unemployment level.

Farming represents an important economic component of both analysis area counties. At 15.7 percent of all employment, farm employment in Bowman County measures over three times greater than the state statistic of 5 percent. Farm earnings comprise approximately 14 percent of Bowman County earnings, and the average farming labor income of $86,000 is higher than the county average of $58,000. Farming is also a major component of the economy in Slope County, representing 47.2 percent of all jobs and 29.3 percent of county income. Additionally, the average labor income for farming employment in Slope County is relatively high, at approximately $73,000, compared to the county average of $67,000. In both counties, farm employment declined at lower rates than overall private nonfarm employment (**Table A-12** in **Appendix A**). Farm employment remained roughly constant from 2010 to 2021 in both counties in the analysis area, while private, nonfarm employment declined by roughly 10 percent. This reflects the counties' continued reliance on agriculture and suggests that Bowman and Slope Counties could be sensitive to BLM decisions on livestock grazing in GRSG HMAs.

The largest nonfarm employment sectors in Slope County include government, real estate, and transportation, which represent 8.7 percent, 3.2 percent, and 3.0 percent of all employment (**Table A-12** in **Appendix A**). In Bowman County, government and government enterprises also constituted a relatively large proportion of employment and labor income, followed by several service sectors, including retail trade, wholesale trade, and healthcare (**Table A-13** in **Appendix A**). In both counties, labor income from retail trade is slightly low relative to its share of employment, indicating slightly lower labor wages. The average labor income in Slope County ($67,000) is slightly higher than the state average of $64,000, while in Bowman County it is lower, at $58,000. The differences in labor income could have been a factor contributing to the historical population growth in Slope County and population decline in Bowman County (**Table A-13** in **Appendix A**).

2.7 OREGON

The Oregon analysis area includes eight counties clustered in the southeast to central region of Oregon (see **Figure A-7** in **Appendix A**). The counties with the largest amount of BLM-administered surface acres in GRSG HMAs are Malheur, Harney, and Lake Counties, with about 4.3 million acres, 3.7 million acres, and 2.1 million acres of BLM-administered surface lands in GRSG HMAs, respectively. Additionally, the acres in GRSG HMAs make up over 80 percent of BLM-administered surface lands in all three counties. In Malheur County, GRSG HMAs acres represent about 76 percent of the total acres in the county (federal and nonfederal).

Oregon's population grew by about 445,000 people between 2010 and 2021, which is an increase of about 11.8 percent (see **Table 2-13**). This increase is projected to continue over the next 20 years, with the population increase estimated to be about 22.7 percent. Oregon's population increase was largely due to migration by residents from other states who were attracted by Oregon's economic expansion (Cunningham

Table 2-13. Oregon Analysis Area Population

Geographic Area	2010	2021	2040	% Change 2010–2021	% Change 2021–2040
Baker County	16,150	16,539	15,156	2.4	-8.4
Crook County	21,515	24,300	31,410	12.9	29.3
Grant County	7,349	7,225	6,566	-1.7	-9.1
Harney County	7,364	7,454	7,537	1.2	1.1
Lake County	7,882	8,119	8,177	3.0	0.7
Malheur County	31,326	31,313	30,514	0.0	-2.6
Union County	25,373	26,255	27,482	3.5	4.7
Deschutes County	154,568	194,964	203,390	26.1	4.3
State of Oregon	3,761,925	4,207,177	5,164,041	11.8	22.7

Sources: Portland State University Population Research Center 2022; University of Virginia Weldon Cooper Center, Demographics Research Group 2018; US Department of Commerce 2022

2021). From 2010 to 2021, employment in Oregon grew by about 385,000 jobs; this was an increase of about 17.7 percent, larger than population growth. The largest percentage in employment increases occurred in the transportation and warehousing, health care and social assistance, and construction industries (see **Table A-14** in **Appendix A**).

The unemployment rate in Oregon steadily declined from 5.5 percent in 2015 to 3.7 percent in 2019. Consistent with the rest of the country, the unemployment rate across Oregon increased sharply in 2020 due to a large number of layoffs that occurred during the global COVID-19 pandemic; however, it decreased to below the 2015 unemployment rate in 2021 (see **Table 2-14**; BLS 2023). Real total earnings in the state increased from 2010 to 2021 by about 43 percent; however, per capita income in 2021 was slightly lower than the US average per capita income, which suggests that Oregon's population increase was not largely motivated by higher incomes (BEA 2021a, 2021b).

Table 2-14. Oregon Analysis Area Unemployment Rate

Geographic Area	2015	2016	2017	2018	2019	2020	2021
Baker County	6.6	6.2	5.4	5.2	4.5	7.2	5.1
Crook County	8.2	6.8	6.2	5.8	5.1	8.8	6.7
Grant County	8.5	7.5	6.8	6.8	6.8	8.4	6.7
Harney County	7.0	6.1	6.2	5.8	5.2	5.9	5.1
Lake County	7.5	6.2	5.6	5.4	5.3	5.6	5.5
Malheur County	6.2	5.4	4.6	4.4	4.0	5.2	4.4
Union County	6.0	5.8	5.2	5.2	4.8	7.8	5.6
Deschutes County	5.7	4.8	4.2	4.1	3.9	8.0	5.3
State of Oregon	5.5	4.7	4.1	4.01	3.7	7.6	5.2

Source: BLS 2023

Across the Oregon analysis area, the population increased by about 45,000 people from 2010 to 2021, which is an increase of about 16.4 percent; this is a slightly larger growth rate than for the whole state of Oregon. Over the 11 years, the population in all Oregon analysis area counties increased or remained stagnant, except for Grant County. Grant County, which is the smallest county in the analysis area with a population of 7,225, had a very small decrease of over 100 people (a decrease of about 1.7 percent). The county with the largest percentage increase in population in the Oregon analysis area was Deschutes County, which had an increase of over 40,000 people (Deschutes County is also the most populous county in the Oregon analysis area, with a population of almost 195,000 people in 2021; see **Table 2-13**; US Department of Commerce 2022). Some counties in the Oregon analysis area are expected to see growth rates going

forward through 2040; however, the population growth is projected to slow in Deschutes County, with a forecasted change of 4.3 percent from 2021 to 2040. The population is expected to decline in Grant, Baker, and Malheur Counties by 9.1 percent, 8.4 percent, and 2.6 percent, respectively (see **Table 2-13**; Portland State University Population Research Center 2022).

The increase in population in the Oregon analysis area is likely correlated with employment, which increased by a similar amount to the populations from 2010 to 2021 (about 44,000 jobs), which was an increase of about 29 percent. All counties in the Oregon analysis area saw an increase in employment over the 11-year period. Deschutes County, which had the largest increase in magnitude of population, had the largest increase in employment across the analysis area, with over 40,000 additional jobs (a similar increase as the population). This increase in total employment was largely driven by an increase in employment in the health care and social assistance industry, which accounts for the largest percentage of total employees in Deschutes County at 12.5 percent. Grant County, which had the only population decline from 2010 to 2021, had the smallest increase in employment, with an increase of about 85 jobs (see **Table A-14** in **Appendix A**).

Unemployment rates across the Oregon analysis area generally decreased or were stagnant from 2015 to 2019. The unemployment rate in Deschutes County was similar to the unemployment rate across the state of Oregon; it steadily decreased from 5.7 percent in 2015 to 3.9 percent in 2019. The unemployment rate in Grant County was higher than the state of Oregon's, but it also decreased from 8.5 percent in 2015 to 6.8 percent in 2017 and remained stagnant through 2019. All the counties experienced an increase in the unemployment rate in 2020 during the COVID-19 pandemic (**Table 2-14**). However, in some counties, such as Harney, Lake, and Malheur Counties, the increase in unemployment rate in 2020 was small; this could be due to the reliance on the farm industry in these three counties and because farm workers were considered essential workers during the COVID-19 pandemic. All counties in the Oregon analysis area had a decrease in the unemployment rates from 2020 to 2021 as the local economies and businesses opened back up.

In addition to the number of job opportunities attracting people to move to the Oregon analysis area, labor income plays a part in encouraging population growth or decline. In 2021, Deschutes County, which had the highest increase in population and employment from 2010 to 2021, had the highest reported per capita income across all industries in the Oregon analysis area of almost $68,000 (over $6,000 more than the per capita income for the state of Oregon and over $3,000 more than the per capita income for the US; BEA 2021a, 2021b). Malheur County, which had a stagnant population from 2010 to 2021, had the lowest per capita income across all counties in the Oregon analysis area, with per capita income of almost $39,000 (about 33 percent less than the per capita income across the state of Oregon).

In Deschutes County, the key industries with the highest average earnings per employee (which is calculated by dividing total earnings by the total number of employees; see **Table A-15** in **Appendix A**; BEA 2021a, 2021b) were utilities, information, and construction. In Malheur County, the industries with the highest reported average earnings per employee were utilities, government and government enterprises, and manufacturing.

In 2021, the farming industry in Oregon represented about 2.7 percent of total employment and less than 1 percent of total earnings.[5] However, in the Oregon analysis area, which is on Oregon's eastern side,

[5] Farming employment includes the labor of farm proprietors, but not unpaid family labor; therefore, the statistics presented in this report do not include the total value of farming through employment.

farming plays an important role in the local economies. Farming employment makes up over 7 percent of total employment in all counties except Deschutes County. Farming was the second-largest industry for employment in Harney, Lake, and Grant Counties, with about 19.6 percent, 16.0 percent, and 13.0 percent of total jobs coming from farming, respectively (only falling below the government and government enterprises industry). Farming was the third-largest industry for employment in Malheur and Baker Counties, with 12.8 percent and 10.9 percent of total employment, respectively. In Union and Crook Counties, the farming industry was the fourth largest in terms of employment percentage, with 7.5 percent and 7.0 percent of total employment, respectively.

Farm earnings make up less of a percentage of the total earnings in most counties in the analysis area, but they still make up over 6 percent in Harney, Lake, and Malheur Counties. These three counties have a high percentage of BLM-administered lands in GRSG HMAs; therefore, these counties could be susceptible to impacts on farming, including potential changes to livestock grazing and ranching, from BLM decisions on GRSG HMAs (see **Chapter 3**, Livestock Grazing, in the EIS for more details on grazing and ranching use on BLM-administered lands in the Oregon analysis area).

Employment and earnings in the mining industry (including quarrying and oil and gas extraction) were either not disclosed, or they comprised a very small percentage (less than 1 percent) of total employment and earnings across the Oregon analysis area as well as the state of Oregon (see **Table A-15** in **Appendix A**; BEA 2021a, 2021b). This suggests that the economies in these two counties do not depend on the mining industry, and these economies would likely not be sensitive to changes in mineral development.

Recreation and tourism-related industries, such as the accommodation and food industry and retail trade industry, are other important industries within the Oregon analysis area. In Malheur, Baker, and Deschutes Counties, retail trade was the second-largest industry for employment, with 14.6 percent, 12.6 percent, and 11.4 percent, respectively, of total jobs coming from this industry. The percentages of total employment and earnings from these key industries across the Oregon analysis area have not changed substantially from the data included in the 2015 Sage-Grouse Plan Amendment EIS, which included data from 2010. This suggests that the economic significance of major industries in the Oregon analysis area have remained consistent over the past decade.

2.8 SOUTH DAKOTA

The South Dakota analysis area consists of Butte and Harding Counties, which lie in the state's northwestern corner (see **Figure A-8** in **Appendix A**). Including subsurface acreage, 10 percent of Butte County and 3 percent of Harding County fall within HMAs.

From 2010 to 2021, the population in South Dakota increased by 10.3 percent, or 82,785 people (**Table 2-15**). Total employment in South Dakota increased by a slightly smaller magnitude—about 64,000 jobs—which suggests there may be some correlation between the increase in population and the increase in employment (**Table A-16** in **Appendix A**). The employment increase was largely driven by the real estate and rental and leasing industry, which increased by about 10,000 jobs, and the health care and social assistance industry, which increased by over 9,000 jobs. In South Dakota, the percentages of employment by industry have remained relatively constant over the last decade, with a majority of employment occurring in government and government enterprises, health care and social assistance, and retail trade (**Table A-16** in **Appendix A**).

Table 2-15. South Dakota Analysis Area Population

Geographic Area	2010	2021	2040	% Change 2010–2021	% Change 2021–2040
Butte County	9,888	10,167	N/A	2.8	N/A
Harding County	1,250	1,179	N/A	-5.7	N/A
State of South Dakota	799,462	881,785	N/A	10.3	N/A

Source: US Department of Commerce 2022
N/A = Not available

Butte County has the largest population within the South Dakota analysis area, while Harding County has the lowest population. Butte County, consisting of 10,167 people, observed a small population increase of about 2.8 percent between 2010 and 2021, whereas Harding County, with a population of 1,179 people, had a population decrease of 5.7 percent during the same period. The population changes in both counties in the South Dakota analysis area differed from the high population growth rate at the state level. This difference in population trends may be due to the rural character of the counties in the analysis area, as the state's population growth is concentrated in counties that contain or adjoin major urban centers, such as Sioux Falls and Rapid City (US Department of Commerce 2022).

Employment in both counties in the analysis area increased from 2010 to 2021. In Butte County, employment increased by about 200 jobs; in Harding County, employment increased by about 100 jobs (**Table A-16** in **Appendix A**). For both counties, the increase in employment was largely due to the retail trade industry, which accounted for an increase in about 100 jobs and 40 jobs in Butte and Harding Counties, respectively. In Butte County, the retail trade industry represented the largest nonfarm industry for employment, with about 14.7 percent of total employment. This was followed by government and government enterprises, with about 12.7 percent of jobs, and construction, accommodation, and other services, with about 7.2 percent for each of the three industries. In Harding County, the retail trade industry was the second-largest nonfarming industry for employment, with 9.2 percent of total jobs (only behind government and government enterprises with 10.3 percent of employment; see **Table A-16** in **Appendix A**).

Historical unemployment rates vary across the South Dakota analysis area. In Butte County, from 2015 to 2021, the unemployment rates were higher than they were for the state of South Dakota. In Harding County, the unemployment rates were lower than the unemployment rates for the state of South Dakota. Consistent with the rest of the US, the South Dakota analysis area and the state of South Dakota saw unemployment rates increase in 2020 during the COVID-19 pandemic. Unemployment rates in 2021 show that South Dakota's economy continues to recover from the economic effects of the COVID pandemic, with unemployment rates returning to similar levels to those experienced in 2015 (**Table 2-16**).

Table 2-16. South Dakota Analysis Area Unemployment

Geographic Area	2015	2016	2017	2018	2019	2020	2021
Butte County	3.3	3.5	3.3	3.0	2.9	5.0	3.4
Harding County	2.4	2.9	2.8	2.2	2.3	3.4	2.8
State of South Dakota	3.0	3.0	3.1	2.8	2.8	4.3	3.1

Source: BLS 2023

The farming industry has played a key role in the economies across South Dakota, especially in the South Dakota analysis area. In Butte County, farm employment comprised 11 percent of all employment in 2021; this is a slight decrease from 12 percent in 2010 but more than double the state statistic in 2021 of 5 percent (**Table A-16** in **Appendix A**). Earnings from the farm industry represent about 6.2 percent of total earnings

in Butte County. In Harding County, the farm industry was the largest industry for employment, with 26.4 percent of the jobs in this industry. This percentage of employment in the farm industry was only a slight decrease from the percentage of farm employment in 2010 of 27.5 percent (**Table A-16** in **Appendix A**). Earnings from the farm industry represent about 32.3 percent of total earnings in Harding County, which is the largest sector for labor income in the county. The reliance on farming as a key industry for employment suggests that the South Dakota analysis area could be susceptible to BLM management decisions that impact farming, ranching, or livestock grazing.

In Butte County, the industries with the largest percentage of labor income were government and government enterprises, retail trade, and construction. In Harding County, the industries with the largest percentage of labor income were farming, government and government enterprises, and construction. This is due to the importance of these industries for the number of jobs in the area. In Butte County, the average earnings per employee in these sectors were about $49,000, $30,000, and $51,000 for government and government enterprises, retail trade, and construction jobs, respectively. The earnings per employee in the top sectors in Harding County were about $55,000, $53,000, and $67,000 for farming, government and government enterprises, and construction jobs, respectively. On the other hand, the industries with the highest earnings per employee were information in Butte County, with $79,000 per job, and mining (including quarrying and oil and gas extraction) in Harding County, with $109,000 per job (**Table A-17** in **Appendix A**).

2.9 UTAH

Nearly all of Utah, or 23 out of 29 of its counties, lies within the analysis area (see **Figure A-9** in **Appendix A**). Those counties not in the analysis area lie at the southeastern, southwestern, and northern-central areas of the state. Seven counties (Daggett, Morgan, Rich, Carbon, Beaver, Box Elder, and Piute Counties) contain BLM-administered lands that qualify as at least 33 percent GRSG HMAs. In Daggett, Morgan, and Rich Counties, which are in Utah's northeastern corner, nearly 100 percent of all BLM-administered surface acreage falls within HMAs, holding implications for BLM management decisions in these counties. In Carbon County, as well as the western counties of Beaver, Box Elder, and Piute, approximately one-third to half of BLM-administered surface acreage falls within GRSG HMAs. For all seven counties, close to one-quarter of the total county acreage consists of GRSG HMAs, holding implications for future land management decisions. Expanding development that typically accompanies population growth may be an important factor in planning for GRSG management in the near future.

Utah's population grew by 20.6 percent between 2010 and 2021 (**Table 2-17**). The most populous county within the Utah analysis area in 2021 was Cache County, with 137,255 people. Other counties with relatively large populations within this analysis area include Toole County (76,165 people), Box Elder County (59,220 people), Iron County (61,232 people), and Summit County (42,843 people). At 51.4 percent, Wasatch County had the largest percentage increase in population between 2010 and 2021; this was followed by Morgan County (33.2 percent), Iron County (32.4), Tooele County (30.5 percent), percent), and Cache County (21.1 percent). Population growth in Wasatch County was driven by migration, tourism, and the presence of the Wasatch Campus of Utah Valley University. By 2040, Wasatch County is predicted to have a population increase of almost 60 percent, while Morgan and Tooele Counties will experience similarly rapid population growth (University of Utah, Kem C. Gardner Policy Institute 2022; see **Table 2-17**).

Table 2-17. Utah Analysis Area Population

Geographic Area	2010	2021	2040	% Change 2010–2021	% Change 2021–2040
Beaver County	6,645	7,156	8,777	7.7	22.7
Box Elder County	50,084	59,220	75,494	18.2	27.5
Cache County	113,307	137,255	185,948	21.1	35.5
Carbon County	21,390	20,488	20,689	-4.2	1.0
Daggett County	1,076	962	910	-10.6	-5.4
Duchesne County	18,689	19,738	19,351	5.6	-2.0
Emery County	10,991	9,885	9,674	-10.1	-2.1
Garfield County	5,167	5,079	5,294	-1.7	4.2
Grand County	9,227	9,705	11,375	5.2	17.2
Iron County	46,240	61,232	85,248	32.4	39.2
Juab County	10,260	12,049	17,586	17.4	46.0
Kane County	7,113	7,924	9,769	11.4	23.3
Millard County	12,513	13,214	12,777	5.6	-3.3
Morgan County	9,516	12,679	18,184	33.2	43.4
Piute County	1,548	1,479	1,625	-4.5	9.9
Rich County	2,280	2,559	3,059	12.2	19.5
Sanpete County	27,834	28,948	34,693	4.0	19.8
Sevier County	20,793	21,799	23,044	4.8	5.7
Summit County	36,573	42,843	52,303	17.1	22.1
Tooele County	58,369	76,156	115,253	30.5	51.3
Uintah County	32,722	35,975	39,112	9.9	8.7
Wasatch County	23,689	35,872	57,112	51.4	59.2
Wayne County	2,775	2,504	2,712	-9.8	8.3
State of Utah	2,772,667	3,343,552	4,440,560	20.6	32.8

Source: University of Utah, Kem C. Gardner Policy Institute 2022; US Department of Commerce 2022

More broadly, the three fastest-growing counties are all part of the Greater Salt Lake Region, a 12-county region that functions largely as a single consumption and labor market. The Greater Salt Lake Region is one of the urban areas driving Utah's population increase (**Table 2-17**; University of Utah, Kem C. Gardner Policy Institute 2022). Approximately 25 percent of the acreage in steadily growing Beaver, Box Elder, and Rich Counties falls within HMAs; an increasing population will have implications for future management decisions for GRSG.

The county that experienced the most population loss between 2010 and 2021 was Daggett County (10.6 percent), followed by Emery County (10.1 percent), Wayne County (9.8 percent), and Carbon County (4.2 percent) (**Table 2-17**). Except for Wayne County, all these counties are expected to either continue decreasing, or stagnate, in population through 2040. This may be due to their more rural nature or a higher-than-average unemployment rate encouraging residents to seek work elsewhere, or both. In Carbon and Emery Counties, declines in population and overall employment may be tied to unpredictable fluctuations in their coal-based economies amid changes in energy markets and growing competition from alternative sources of energy, including both renewables and fossil fuels (Gruenspecht 2019; Schott 2017; **Table 2-17**; **Table 2-18**; **Table A-18** in **Appendix A**). The economies in these counties could be sensitive to changes in industries, such as the mining industry, that might impact job availability and further encourage the population to move elsewhere for employment.

Table 2-18. Utah Analysis Area Unemployment Rate

Geographic Area	2015	2016	2017	2018	2019	2020	2021
Beaver County	3.7	4.8	3.9	3.3	3.0	4.0	2.8
Box Elder County	3.6	3.4	3.2	2.8	2.6	4.4	2.4
Cache County	3.0	3.0	2.7	2.5	2.1	3.0	2.0
Carbon County	5.6	5.8	4.9	4.2	3.6	5.3	3.9
Dagget County	4.5	5.0	4.9	4.2	3.8	4.6	3.6
Duchesne County	7.4	8.6	5.5	4.3	3.9	7.8	4.9
Emery County	5.9	6.1	4.9	4.5	3.9	4.8	3.9
Garfield County	8.7	8.1	7.3	7.3	6.1	10.4	6.5
Grand County	6.0	5.7	5.2	4.5	3.9	9.5	4.4
Iron County	4.4	4.2	4.0	3.3	2.9	4.5	2.8
Juab County	3.9	3.5	3.3	2.8	2.5	3.0	2.0
Kane County	4.3	3.7	3.3	3.0	2.9	5.3	2.9
Millard County	3.4	3.2	3.2	3.1	2.6	3.3	2.4
Morgan County	3.1	2.9	2.8	2.6	2.4	3.4	2.1
Piute County	6.3	5.7	4.7	5.0	4.5	6.2	4.4
Rich County	3.6	3.1	3.1	3.0	3.0	3.5	2.3
Sanpete County	4.1	3.9	3.8	3.5	3.1	3.8	2.8
Sevier County	4.4	4.3	3.7	3.4	3.0	4.3	3.3
Summit County	3.2	3.0	3.0	2.8	2.4	7.2	2.9
Tooele County	4.1	3.7	3.5	3.2	2.8	4.7	2.9
Uintah County	6.7	9.1	5.9	4.4	4.2	9.3	5.6
Wasatch County	3.4	3.3	3.2	3.0	2.7	6.5	2.9
Wayne County	8.9	7.5	7.1	5.7	5.4	7.7	4.7
State of Utah	3.5	3.3	3.1	2.9	2.6	4.7	2.7

Source: BLS 2023

Although most analysis area counties experienced population growth (and will continue to expand through 2040), many experienced much higher rates of unemployment; others had unemployment rates about equal to or greater than those of Utah from 2015 to 2021 (**Table 2-18**). Cache, Morgan, and Summit Counties (besides anomalously high unemployment rates in 2020–2021 that were related to the COVID-19 pandemic). The data show that 12 counties in Utah experienced their lowest rates of unemployment in 2021, which were slightly greater than Utah's overall unemployment rate for 2021. Lower employment rates in 2021 could have been driven by an increase in the available workforce, similar to state trends.

Eleven counties experienced their lowest rate of unemployment in 2019, which were slightly greater than Utah's overall unemployment rate for 2019. During 2015, 2016, and 2020, 22 counties experienced their highest rates of unemployment, which were greater than Utah's unemployment averages for these years. At the county level, the lowest unemployment rate was in 2021 in both Cache County (2.0 percent) and Juab County (2.0 percent) and ranged to a high of 10.4 percent in Garfield County (**Table 2-18**). It should be noted that in all counties that experienced population growth, the total number of jobs increased, but unemployment remained above the state average (**Table 2-18**; **Table A-18 [Parts 1–4]** in **Appendix A**).

Service-based industries continue to represent a large portion of Utah's overall employment and labor income; these trends also exist at the county level. Since 2010, total employment has increased for almost all the counties in the analysis area (except for Carbon and Emery Counties), indicating that there has been somewhat of an economic expansion (**Table A-18 [Parts 1–4]** in **Appendix A**). The increase in total employment across the analysis area was largely due to increases in jobs in the manufacturing,

accommodation and food services, and construction industries, which grew by about 10,000 jobs, 9,000 jobs, and 8,500 jobs, respectively.

Declines in employment in Carbon and Emery Counties may be tied to changes in the potentially unpredictable coal economy (Schott 2017). Carbon County experienced a slight loss of jobs in mining (from 7.7 percent in 2010 to 7.0 percent in 2021), administrative and waste management services (5.4 percent to 3.1 percent), and wholesale trade (4.2 to 2.7 percent). Employment in Emery County decreased in the construction; manufacturing; transportation and warehousing; professional, scientific, and technical services; other services; and government and governmental enterprises industries (**Table A-18 [Parts 1–4]** in **Appendix A**).

Employment in the mining industry (including quarrying and oil and gas extraction) continues to represent a low portion of total employment. The exceptions are Sevier (5.0 percent), Duchesne (11.7 percent), Carbon (7.0 percent), Emery (6.2 percent), and Uintah (8.2 percent) Counties; in these counties, the employment in the mining industry was greater than Utah's state average (**Table A-18 [Parts 1–4]** in **Appendix A**). It is worth noting that in all counties where data are available, all underwent declines in mining employment. This is particularly apparent in Uintah County, where mining declined from 17.7 percent of employment in 2010 to 8.2 percent in 2021. The average labor income for mining in these counties ranges from $83,000 in Uintah County to $108,000 in Emery County; all fall below the average statewide labor income for mining (**Table A-18 [Parts 1–4]** in **Appendix A**). These counties that rely on mining for employment and labor income could be sensitive to BLM management decisions that limit mining in GRSG HMAs. Counties with the highest proportion of farm employment include Piute (23.5 percent), Beaver (14.6 percent), and Millard (14.3 percent) Counties. These numbers represent slight declines of approximately 1–2 percent from 2010 (**Table A-18** in **Appendix A**). In Morgan, Tooele, and Wasatch Counties, which are the three fastest-growing counties, farm employment represents a relatively low share of total employment, with 5.2 percent, 2.0 percent, and 2.3 percent, respectively. Farm employment has declined since 2010 in these counties. However, numbers for all three counties remain higher than the state average of less than 1 percent (**Table A-18** in **Appendix A**).

Growing employment sectors for these three counties include service industries like finance, professional services, and real estate, in addition to the non-service industry of construction (**Table A-18** in **Appendix A**). The decline in farm employment and simultaneous shift toward service industries may reflect diversifying and expanding economies as county populations continue to expand. However, farming plays an important role for Beaver, Iron, Piute, Rich, and Sanpete Counties, where the average earnings per employee for the farming industry are higher than the average earnings per employee across all industries, with about $70,000, $46,000, $117,000, $57,000, and $44,000 in earnings, respectively. Additional changes in the farming industry through BLM management decisions that impact livestock grazing would result in large impacts on these counties that have relied on farming for employment and labor income.

Government-based employment continues to represent a large portion of total employment on both the state and county level, with some counties, such as Piute (19.5 percent) and Sanpete (22.8 percent), having high percentages of government-based employment (**Table A-18** in **Appendix A**). Government-based employment is also responsible for a large percentage of total employment in Daggett (26.2 percent), Duchesne (21.1 percent), and Carbon Counties (19.0 percent). These percentages are greater than Utah's government employment average. In Daggett and Carbon Counties, the average wages for government employment ($69,000 and $56,000, respectively) fall below the state average of $75,000 for this sector (**Table A-19** in **Appendix A**).

2.10 WYOMING

The Wyoming analysis area encompasses 21 counties, spanning almost the entire state of Wyoming; the only excluded counties are Teton County on Wyoming's western border and Goshen County on Wyoming's eastern border. All analysis area counties contain BLM-administered acreages classified as at least 89 percent GRSG HMAs, except for Laramie and Platte Counties, where BLM-administered acreage classified as GRSG HMAs is closer to 50 percent. Counties with the highest percentage of GRSG HMAs overall include Big Horn, which is 65 percent HMAs, and Sweetwater and Washakie, which are both classified as 72 percent GRSG HMAs. Carbon, Fremont, Hot Springs, Lincoln, Natrona, and Sublette Counties are also significant counties for GRSG HMAs, having been classified as between 40 to 50 percent HMAs (see **Figure A-10** in **Appendix A**).

Between 2010 and 2021, the population in Wyoming grew by 3 percent. Statewide population is expected to increase from 580,390 to 614,820 people by 2040, which is a rate of 5.9 percent (**Table 2-19**). The county with the largest population in 2021 within the Wyoming analysis area was Laramie County with 100,900 people. Other counties with relatively high populations include Natrona County (78,810 people), Campbell County (45,450 people), Sweetwater County (42,440 people), and Albany County (39,250 people). Laramie and Lincoln Counties both experienced population growth of 10 percent between 2010 and 2021, and both counties are expected to continue increasing at slightly higher rates through 2040. Between 2015 and 2021, unemployment rates in both counties were consistently lower than or comparable to the state average, which may signal relatively stable economic conditions that are drawing workers (**Table 2-20**).

Table 2-19. Wyoming Analysis Area Population

Geographic Area	2010	2021	2040	% Change 2010–2021	% Change 2021–2040
Albany County	36,299	39,250	42,600	8.1	8.5
Big Horn County	11,668	11,900	12,230	2.0	2.8
Campbell County	46,133	45,450	47,710	-1.5	5.0
Carbon County	15,885	14,770	14,100	-7.0	-4.5
Converse County	13,833	13,840	14,650	0.1	5.9
Crook County	7,083	7,590	8,420	7.2	10.9
Fremont County	40,123	39,380	40,180	-1.9	2.0
Hot Springs County	4,812	4,510	4,370	-6.3	-3.1
Johnson County	8,569	8,550	9,270	-0.2	8.4
Laramie County	91,738	100,900	112,580	10.0	11.6
Lincoln County	18,106	19,940	22,490	10.1	12.8
Natrona County	75,450	78,810	83,090	4.5	5.4
Niobrara County	2,484	2,350	2,240	-5.4	-4.7
Park County	28,205	29,640	31,780	5.1	7.2
Platte County	8,667	8,660	8,990	-0.1	3.8
Sheridan County	-	-	-	-	-
Sublette County	10,247	9,730	10,470	-5.0	7.6
Sweetwater County	43,806	42,440	41,780	-3.1	-1.6
Uinta County	21,118	20,160	19,790	-4.5	-1.8
Washakie County	8,533	7,780	7,440	-8.8	-4.4
Weston County	7,208	6,940	6,840	-3.7	-1.4
State of Wyoming	**563,626**	**580,390**	**614,820**	**3.0**	**5.9**

Sources: Wyoming Department of Administration and Information, Economic Analysis Division 2019; US Department of Commerce 2022

Table 2-20. Wyoming Analysis Area Unemployment Rate

Geographic Area	2015	2016	2017	2018	2019	2020	2021
Albany County	3.1	3.2	3.0	3.3	3.2	3.7	3.3
Big Horn County	4.4	5.0	4.4	4.7	4.4	5.0	4.6
Campbell County	3,9	7.2	5.0	4.1	3.8	6.8	5.3
Carbon County	3.7	4.7	4.1	3.7	3.5	4.6	3.9
Converse County	3.6	6.3	4.6	3.7	2.9	5.9	4.9
Crook County	3.5	4.6	3.6	3.2	3.3	3.9	3.4
Fremont County	5.5	7.2	5.7	5.2	4.6	6.2	4.7
Hot Springs County	4.1	4.8	4.0	3.7	3.5	5.0	4.0
Johnson County	4.8	5.4	4.3	4.0	3.8	5.6	4.3
Laramie County	3.9	4.2	3.8	3.9	3.6	5.1	4.0
Lincoln County	4.7	4.7	3.8	3.8	3.5	5.0	3.8
Natrona County	4.8	7.2	5.4	4.6	4.0	7.7	6.1
Niobrara County	3.0	3.3	2.8	2.8	2.9	3.6	3.6
Park County	4.2	4.8	4.4	4.4	4.2	5.4	4.1
Platte County	3.9	4.8	3.8	3.7	3.6	5.0	4.0
Sheridan County	4.2	4.7	4.0	4.1	3.6	5.0	4.4
Sublette County	5.1	6.5	4.6	4.3	4.7	7.2	5.6
Sweetwater County	4.6	6.1	4.7	4.2	4.0	7.3	5.6
Uinta County	4.9	5.8	4.7	4.3	4.0	6.3	5.0
Washakie County	4.1	4.8	4.1	4.2	4.1	5.3	4.1
Weston County	3.4	5.0	4.1	3.5	3.0	3.8	3.2
State of Wyoming	**4.2**	**5.4**	**4.3**	**4.1**	**3.7**	**5.8**	**4.5**

Source: BLS 2023

Several counties declined in population between 2010 and 2021, with Washakie County undergoing the highest decline by 8.8 percent. Other counties that declined in population include Carbon, Hot Springs, and Niobrara Counties, which declined by 7.0 percent, 6.3 percent, and 5.4 percent, respectively. All three counties are expected to decline in population through 2040 (**Table 2-19**).

Key employment service sectors in Wyoming analysis area counties include retail trade, healthcare, and accommodation and food services. The retail and accommodation sectors, which yield average labor incomes of $37,000 and $32,000, respectively, tend to pay a below-average labor income compared to the overall state average of $59,000. Meanwhile, the average labor income for healthcare ($58,000) is more comparable to the state average. None of these three sectors experienced notable changes with respect to employment between 2010 and 2021. Among these three service sectors, employment tended to be concentrated in retail trade as well as accommodation and food services across all counties.

Mining (including quarrying and oil and gas extraction) is also a key industry for employment across Wyoming. Wyoming is one of the top coal and oil and gas producers, and it plays an important role in locatable mineral extraction. However, mining employment decreased from 8.0 percent in 2010 to 4.6 percent in 2021. Mining is especially important for employment in Campbell, Converse, Sublette, and Sweetwater Counties; mining holds the greatest proportions of private employment in these counties (**Table A-20** in **Appendix A**). However, the mining industry is susceptible to boom-and-bust cycles, and since 2010, employment has been decreasing in many counties across Wyoming. Notably, the proportion of mining jobs in Sweetwater County plummeted from 23.4 percent in 2010 to 9.3 percent in 2021, which aligns with its trend of above-average unemployment rates since 2015. This decrease is more drastic than the state-level trend.

Even with the decline in employment, mining still plays an important role in the regional economies. This is highlighted by the average labor wages for mining in these counties, which surpassed county averages across all industries. Moreover, mining represented over 20 percent of labor income in these counties, compared with the state average of 8.7 percent (**Table A-20** in **Appendix A**). This suggests that these counties that rely on mining could be impacted by BLM management decisions that restrict mining in GRSG HMAs.

Farming comprises 3.5 percent of employment at the state level. County-level numbers are roughly comparable, except for Niobrara County, which has the highest concentration of farming employment at 16.3 percent. In Big Horn, Crook, Niobrara, and Platte Counties, farming employment equals approximately 11 to 12 percent. Among these relatively farming-dependent counties, none experienced a meaningful change in employment between 2010 and 2021. The average farming labor income is relatively low, and it did not constitute a major proportion of total labor income for these counties. These counties with high reliance on farming for employment could be sensitive to BLM management decisions that impact livestock grazing.

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Chapter 3. BLM Land and Resource Use and Revenue

Resources and resources use data levels based on data from recent fiscal years are provided in the sections below for key resources with a potential to be impacted by proposed management, including mineral and energy development and livestock grazing.

Mineral development under the BLM is managed under three main categories: leasable, locatable, and salable minerals/mineral materials. Each is subject to different federal laws and implementing regulations.

3.1 LEASABLE MINERALS

Leasable minerals are a category of mineral resources made available for exploration and development by mineral leasing. They are specific types of mineral resources described by the Mineral Leasing Act of 1920. They include fluid minerals (such as crude oil and natural gas), solid energy minerals (such as coal), and select nonenergy minerals (such as sodium, phosphate, and potassium).

3.1.1 Fluid Minerals (Oil and Gas)

As mentioned in **Chapter 2**, Demographic and Economic Baseline Conditions, the mining industry is important for supporting the local economies in many communities in the analysis area, especially in areas where a large percentage of employment comes from the mining industry, and a large portion of the mining that occurs on federal lands is for fluid minerals (oil and natural gas). These areas include northwestern Colorado, southeastern Idaho, southeastern Montana, northeastern Nevada, southwestern North Dakota, central to eastern Utah, and northeastern and southwestern Wyoming In addition to these regions, oil and gas extraction is important throughout the states for providing funding for public services through royalties and taxes that are distributed to the states where the extraction occurred. Additionally, the jobs associated with mining, including oil and gas extraction and production, tend to be high paying compared with other types of employment in these rural communities (see **Chapter 2**, Demographic and Economic Baseline Conditions, for more details on employment and labor income by industry in each state).

Oil and Gas Production and Activity

In 2022, the two biggest producers of natural gas on federal land were Wyoming and Colorado, with about 999 million thousand cubic feet (mcf) and 504 million mcf of gas for Wyoming and Colorado, respectively (see **Table A-22** in **Appendix A**, which shows oil and gas production from 2018 to 2022 on federal lands in the planning area as well as statewide totals, and **Figure 1** and **Figure 2**, which show the trends of gas production from 2018 to 2022 for the statewide total and the socioeconomic analysis, respectively). More than half of the federal natural gas production in Colorado occurs outside the Colorado socioeconomic analysis area, with a large portion of natural gas production occurring in Colorado's southwest, north, or northwest regions. However, there is still a large amount of federal natural gas production in the Colorado socioeconomic analysis area, especially in counties in the west-central region of Colorado, which includes Garfield and Mesa Counties.

More than half of the federal natural gas production in Wyoming occurs in Sublette, Sweetwater, and Fremont Counties, which are in the Green River Basin and the Wind River Basin, in Wyoming's southwestern region. These three counties in Wyoming have a large percentage of the BLM-administered

surface acres in GRSG HMAs, which suggests that these counties might be impacted by changes in BLM management decisions on GRSG.

From 2018 to 2022, there was no federal natural gas production in Oregon. Although there was federal natural gas production in California, none of it occurred in the socioeconomic analysis area.

From 2018 to 2022, total gas production increased in North Dakota and Nevada by about 51 million mcf and 1,700 mcf, respectively (which was about a 76.3 percent and 87.2 percent increase, respectively). However, most of the increase in federal natural gas in North Dakota occurred outside the socioeconomic analysis area; all counties in the North Dakota analysis area saw a decrease in natural gas production. Total statewide federal natural gas production decreased in the rest of the states, with the biggest decrease occurring in Wyoming and Colorado, with a decrease of about 426 million mcf and 142 million mcf, respectively (which was a decrease of about 29.9 percent and 22.0 percent, respectively). The county with the largest reduction in magnitude of gas production from 2018 to 2022 was Sublette County in Wyoming, with a reduction of about 334 million mcf (a decrease of about 35.8 percent). The county with the largest increase in magnitude of gas production was Campbell County in Wyoming, with an increase of about 13.6 million mcf (an increase of about 31.3 percent; see **Figure 1** and **Figure 2**, below, and **Table A-22** in **Appendix A**).

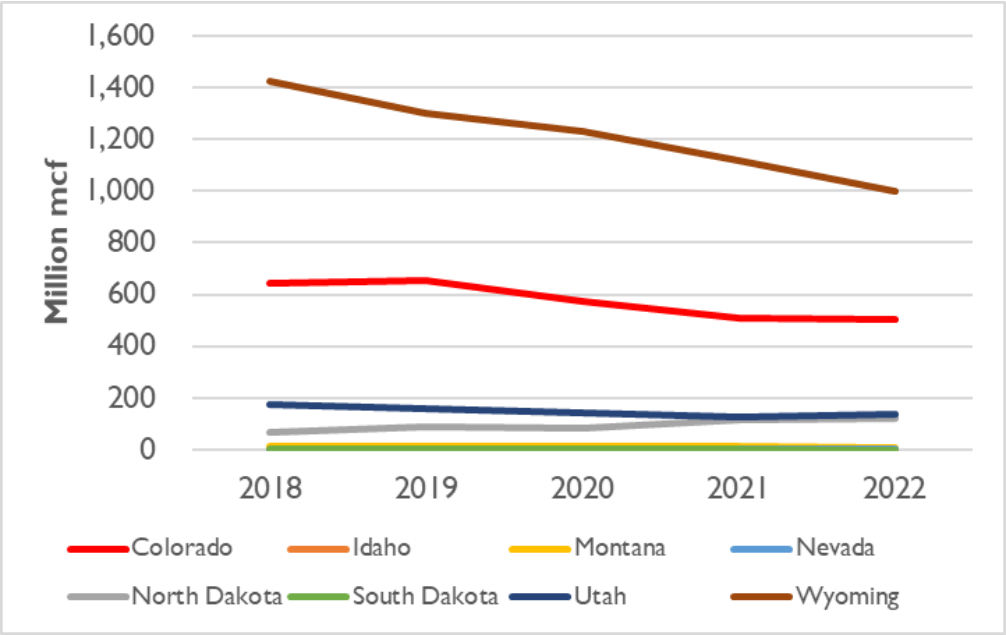
In 2022, the two biggest oil producers on federal land were Wyoming and North Dakota, with about 48 million barrels (bbl) and 43 million bbl of oil, respectively (see **Table A-22** in **Appendix A** and **Figure 3** and **Figure 4**, below). However, most of the federal oil in North Dakota is produced outside the North Dakota socioeconomic analysis area, in the west-central region of North Dakota. The North Dakota socioeconomic analysis area, which is in the southwest corner of North Dakota, produces only about 1 percent of the total federal oil for the state. In contrast, most oil produced in Wyoming occurred in the Wyoming socioeconomic analysis area, largely concentrated in the Powder River Basin, Bighorn Basin, and Green River Basin.

From 2018 to 2022, there was no federal oil production in Oregon. Although there was federal oil production in California, none of it occurred in the socioeconomic analysis area.

From 2018 to 2022, total oil production increased in Colorado, Montana, North Dakota, South Dakota, and Wyoming. The biggest increase in magnitude occurred in North Dakota and Wyoming, with 8.4 million bbl and 5.5 million bbl, respectively. However, except for the increase in oil production in Wyoming, almost all of the increase in federal oil occurred outside the socioeconomic analysis area (all counties in the Colorado, North Dakota, and South Dakota socioeconomic analysis areas and most of the counties in the Montana socioeconomic analysis area saw a decrease in oil production).

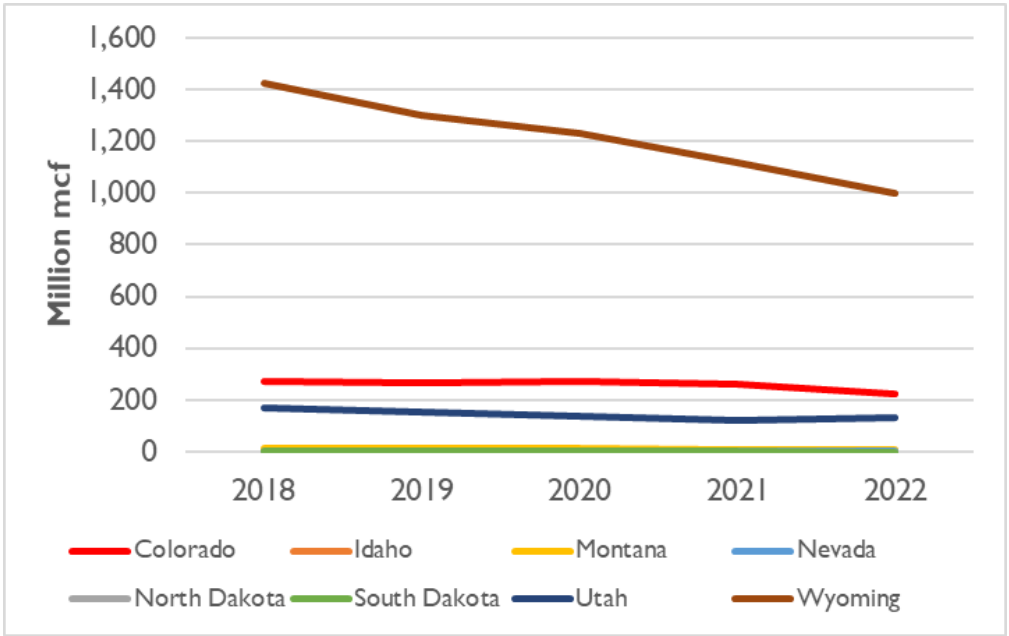
Total statewide federal oil production decreased in the remainder of the states (Idaho, Nevada, and Utah). The biggest decrease in magnitude of federal oil occurred in Utah, with a reduction of about 1.9 million bbl (a decrease of about 22.5 percent from 2018 levels). The county with the largest reduction in magnitude of oil production was Sublette County in Wyoming, with a reduction of about 2.9 million bbl (a decrease of about 49.0 percent). The county with the largest increase in magnitude of oil production was Converse County in Wyoming, with an increase of about 7.7 million bbl (an increase of about 70.1 percent; see **Figure 3** and **Figure 4**, below, and **Table A-22** in **Appendix A**).

Figure 1. Total Statewide Federal Natural Gas Production, 2018–2022



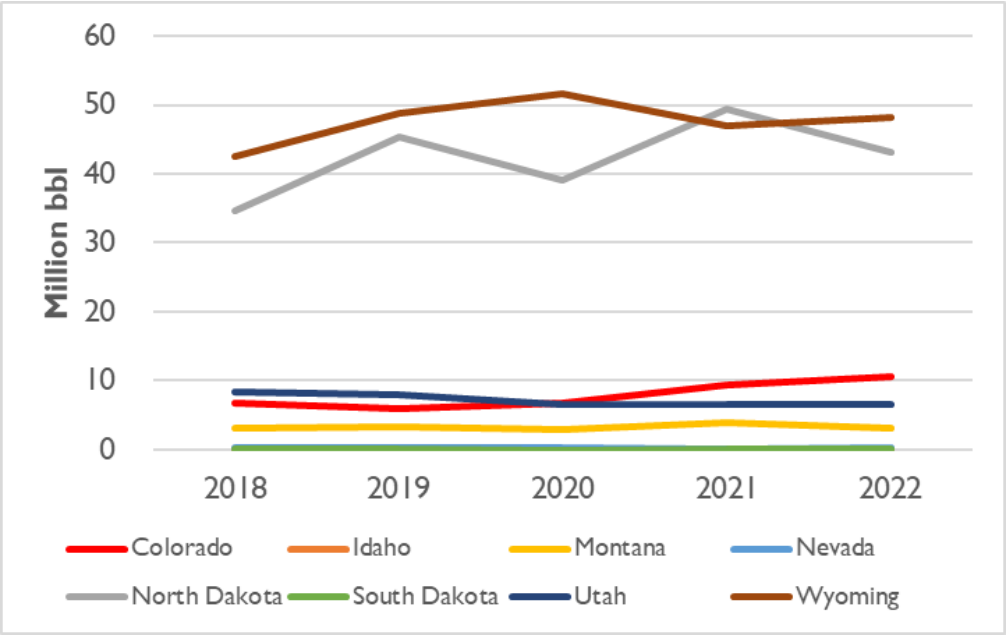
Note: From 2018 to 2022, there was no federal gas production in Oregon. Although there was federal gas production in California, none of it occurred in the socioeconomic analysis area. Therefore, Oregon and California are not included in the figure above.

Figure 2. Federal Natural Gas Production in the Socioeconomic Analysis Area for Each State, 2018–2022



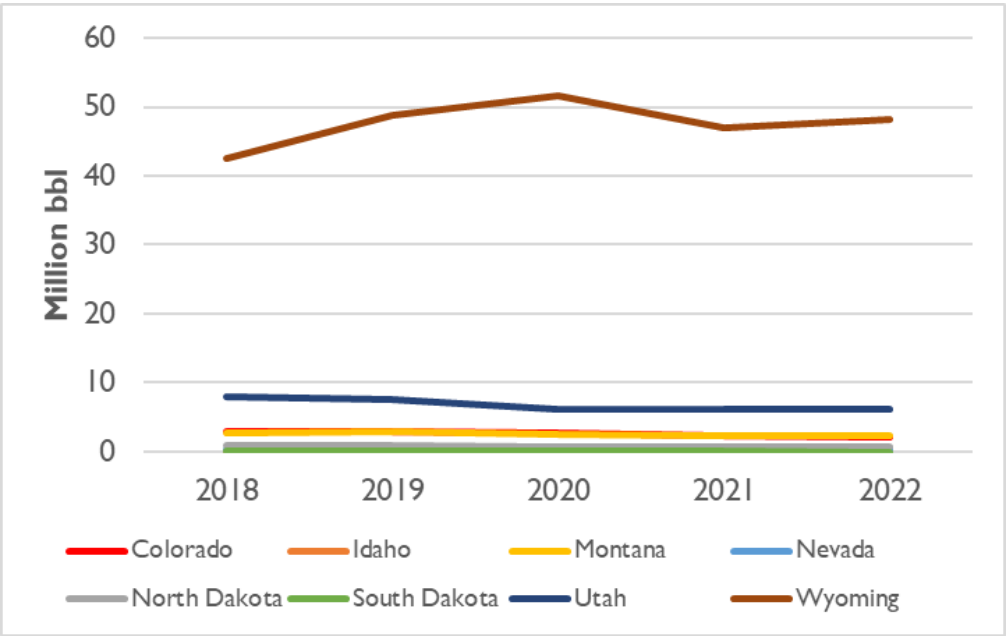
Note: From 2018 to 2022, there was no federal gas production in Oregon. Although there was federal gas production in California, none of it occurred in the socioeconomic analysis area. Therefore, Oregon and California are not included in the figure above.

Figure 3. Total Statewide Federal Oil Production, 2018–2022



Note: From 2018 to 2022, there was no federal oil production in Oregon. Although there was federal oil production in California, none of it occurred in the socioeconomic analysis area. Therefore, Oregon and California are not included in the figure above.

Figure 4. Federal Oil Production in the Socioeconomic Analysis Area for Each State, 2018–2022



Note: From 2018 to 2022, there was no federal oil production in Oregon. Although there was federal oil production in California, none of it occurred in the socioeconomic analysis area. Therefore, Oregon and California are not included in the figure above.

Table 3-1 shows federal oil and gas activity, including cumulative producing leases and acres in producing status, as well as applications for permits to drill (APDs) received and approved in fiscal year 2021 and wells started and completed in fiscal year 2021. In 2021, Wyoming had the most activities on federal land overall, including the most acres in producing status (3.9 million acres), APDs approved (1,432 APDs), wells started (233 wells), and wells completed (1,069 wells). **Table 3-2** shows the historical average annual new federal wells spud[6] by state and area, broken out separately by oil and gas. The annual wells spud is averaged over two time periods: 2013–2014, which is prior to GRSG management changes from the previous 2015 Record of Decisions, and 2015–2022, which includes wells spud after GRSG management changes. On the total federal land in the planning area (on and off GRSG HMAs), the average annual spud rate decreased over the two time periods in every state, except oil wells in Idaho and gas wells in North Dakota.

Many factors not directly related to GRSG management changes contribute to the difference in annual spud rates, such as changes in demand and the price for oil and gas. For example, the crude oil market crash of 2016 and other external constraints, such as fluctuating litigation activities, have significantly affected federal oil and gas production. From 2015 to 2022, average annual spud rates for oil wells over the planning area ranged from less than 1 well per year in Idaho, Nevada, and Utah to about 881 wells per year in Colorado. Gas wells ranged from less than 1 well per year in Colorado to about 245 wells in Wyoming. Additionally, well spud rates on GRSG HMAs were lower than total spud rates; however, this is likely due to the difference in the size of the area.

Table 3-1. Oil and Gas Activity on Federal Land in the Planning Area (Fiscal Year 2021)

State	Cumulative Producible and Service Completions	Cumulative Producing Leases	Cumulative Acres in Producing Status	APDs Received in Fiscal Year 2021	APDs Approved in Fiscal Year 2021	Wells Started in Fiscal Year 2021	Wells Completed in Fiscal Year 2021
California	6,327	318	91,446	200	61	47	116
Colorado	7,397	2,159	1,476,291	82	282	161	133
Idaho	0	2	2,333	0	0	0	0
Montana	2,472	1,356	647,280	3	2	1	10
Nevada	97	37	25,281	3	1	0	1
North Dakota	2,814	1,403	607,676	261	301	109	71
Oregon	0	0	0	0	0	0	0
South Dakota	69	76	36,752	1	1	2	0
Utah	8,306	1,467	1,067,945	275	295	62	16
Wyoming	28,081	7,315	3,861,590	1,078	1,432	233	1,069

Sources: BLM 2022b, 2022c
Note: Data provided are state-level data for all BLM-administered lands and minerals.

[6] Well spud means wells that have begun drilling operations.

Table 3-2. Average Annual New Federal Wells Spud by State, Commodity, and Area

State	Area	Oil		Gas	
		2013–2014 Average	2015–2022 Average	2013–2014 Average	2015–2022 Average
Idaho	GRSG HMAs	0	0	0	0
	Total	0	0.1	2	1.4
Colorado	GRSG HMAs	1.5	1.1	2	0.4
	Total	1,053	881.4	392	281.5
Nevada	GRSG HMAs	0.5	0.4	0	0
	Total	1.5	0.4	0	0
South Dakota	GRSG HMAs	0	0	0	0
	Total	7.5	1.1	0	0
North Dakota	GRSG HMAs	0	0	0	0
	Total	1,970	954	1	1.3
Utah	GRSG HMAs	4.5	0.9	14	4.6
	Total	590	202.3	201.5	60.5
Wyoming	GRSG HMAs	96.5	45.6	297	186.8
	Total	494	317.3	458	245

Sources: BLM 2023a, 2023b, 2023c, 2023d, 2023e, 2023f, 2023g, 2023h, 2023i

Federal Oil and Gas Disbursement Payments

The government collects revenues from leasable mineral extraction on public lands through bonuses, royalties, and rents paid by producers. These funds are collected and subsequently distributed to the federal and state government. The Department of the Interior, through the Office of Natural Resources Revenue (ONRR), collects a set percentage of the sales value of federal leasable minerals; this is known as a royalty. In August 2022, the US Congress passed H.R. 5376–Inflation Reduction Act of 2022 (the IRA), which updated federal oil and gas leasing terms, including the royalty rate, rental rate, and minimum bonus bid rate. The IRA increased federal royalty rates for new oil and natural gas leases from 12.5 percent to 16.67 percent.

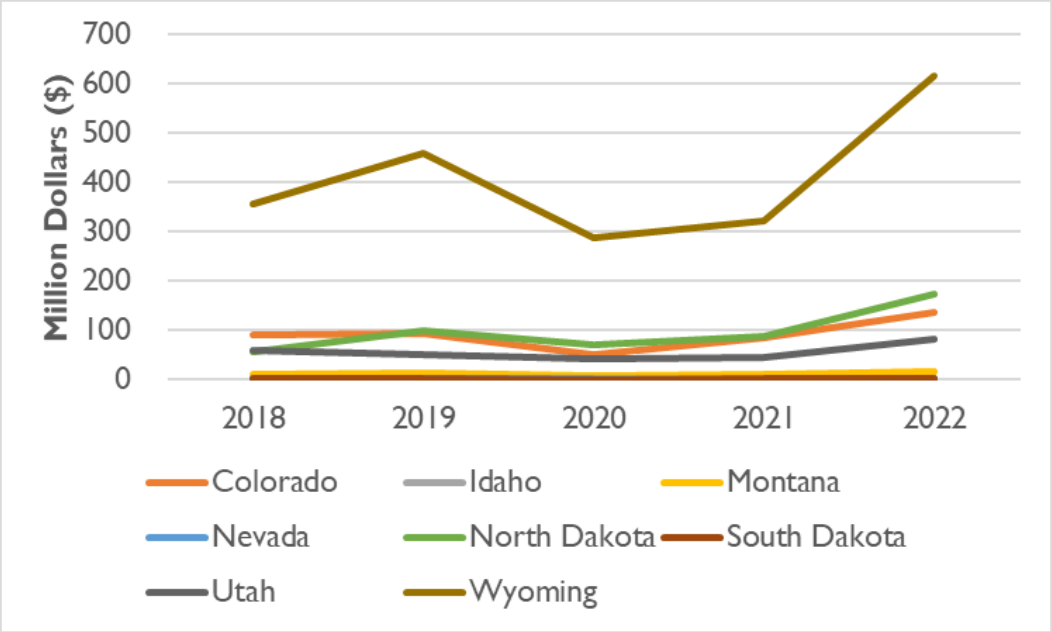
Leaseholders can competitively bid, pay an initial bonus (that is, higher than the minimum bonus bids), and subsequently pay rent for the right to develop the resources on public lands (the IRA eliminated the option for noncompetitive lease sales). The IRA increased the annual rental rates for new competitive oil and gas leases from $1.50 per acre (or fraction thereof) in the first 5 years and $2.00 per acre each year thereafter to $3 per acre from the first 2 years, $5 per acre for years 3 through 8, and $15 per acre for years 9 and 10. After 10 years, those set rental rates will be the minimum. The IRA also increased the minimum bonus bid from $2 per acre to $10 per acre for 10 years; after 10 years, $10 per acre is the statutory minimum.

Other revenues that are not included in the royalty, rent, or bonus categories include settlement agreements and expression of interest fees. Approximately 50 percent of revenues collected from the leasing and production of federal minerals go to the US Treasury, and 49 percent of these mineral revenues are transferred to the state in which they were generated. The portion of revenue allocated to the state, in turn, is distributed to counties, cities, and school districts based on the state's own laws and policies (see **Table A-28** in **Appendix A**, which lists the policies for expenditures at the state level and distributions to local governments and school districts).

Lease revenues and royalties distributed to the state and county provide an additional economic contribution from mineral resource extraction. **Figure 5** shows the disbursement payments made to the states from federal oil and gas extraction from 2018 to 2022 (see **Table A-23** in **Appendix A** for the data).[7] Wyoming had the highest disbursement from oil and gas extractions, in 2022, with about $615 million. From 2018 to 2019, oil and gas disbursements made to the states increased in California, Colorado, Montana, North Dakota, and Wyoming, but decreased in Idaho, Nevada, South Dakota, and Utah. From 2019 to 2021, oil and gas disbursements declined for all states in the planning area. In 2022, disbursements increased and returned to 2019 levels or higher; however, disbursements in 2022 were lower than 2018 levels in Idaho, Nevada, and South Dakota.

Over the 5-year time period, Wyoming and North Dakota saw the largest magnitude increase in oil and gas disbursements, with an increase of about $260 million and $117 million, respectively. Nevada and South Dakota saw the largest magnitude decrease in disbursements of about $123,000 and $98,000, respectively. These decreases in disbursements could impact the local economies and public services such as education. If oil and gas disbursements continue to decline in Nevada and South Dakota, public services that are funded through oil and gas disbursements could be impacted.

Figure 5. Federal Disbursements to States from Oil and Gas Extraction, Fiscal Years 2018–2022



Note: From 2018 to 2022, there was no federal oil and gas production or disbursement made to Oregon. Although there was federal oil and gas production and disbursements made to California, none of the production occurred in the socioeconomic analysis area. Therefore, Oregon and California are not included in the figure above.

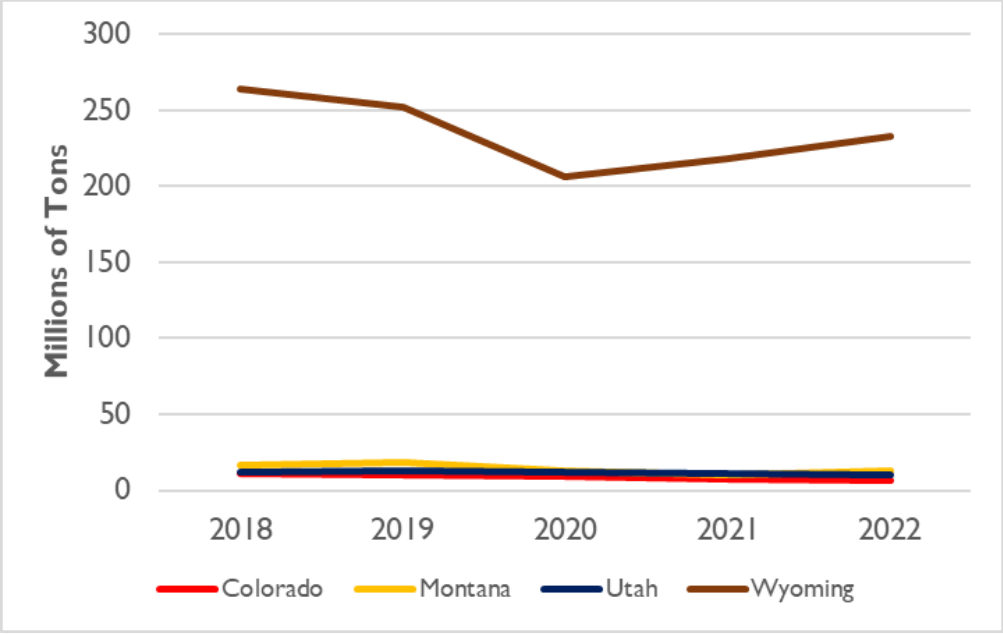
[7] The disbursements shown are from revenue prior to the passing and implementation of the IRA. While existing leasing will not be affected by the IRA, the new royalty rates, rental rates, and minimum bonus bids from the IRA will apply to new leases that are issued after the IRA passed. Revenue, production, and disbursements to states from new oil and gas leases are expected to change as a result of the IRA; however, the magnitude of this change is not yet known.

3.1.2 Coal

Coal Mines and Production

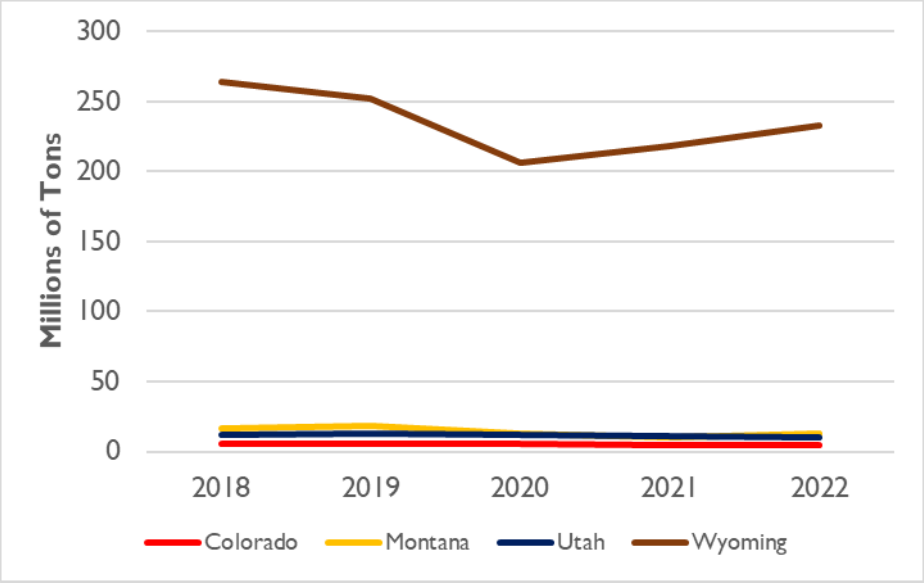
Coal is used primarily in the United States to generate electricity. Western coal-producing states with GRSG populations include Colorado, Montana, North Dakota, Utah, and Wyoming. In 2022, Wyoming and Montana were the largest producers of coal on federal lands across the socioeconomic analysis area (see **Table A-24** in **Appendix A**, which shows the coal production in counties included in each state's socioeconomic analysis area between 2018 and 2022, and see **Figure 6** and **Figure 7**, below, which show the total coal production for each state and each state's socioeconomic analysis area, respectively). From 2018 to 2022, there was no federal coal production in California, Idaho, Nevada, Oregon, and South Dakota; while there was federal coal production in North Dakota, none of it occurred in the socioeconomic analysis area.

Figure 6. Total Statewide Federal Coal Production, 2018–2022



Note: From 2018 to 2022, there was no federal coal production in California, Idaho, Nevada, Oregon, and South Dakota. Although there was federal coal production in North Dakota, none of it occurred in the socioeconomic analysis area. Therefore, these states are not included in the figure above.

Figure 7. Federal Coal Production in the Socioeconomic Analysis Area for Each State, 2018–2022



Note: From 2018 to 2022, there was no federal coal production in California, Idaho, Nevada, Oregon, and South Dakota. Although there was federal coal production in North Dakota, none of it occurred in the socioeconomic analysis area. Therefore, these states are not included in the figure above.

Coal production and development activities can be an important contributor to local jobs, labor income, and tax revenue, especially in rural communities. Additionally, the jobs associated with mining, including coal mining, tend to be high paying compared with other types of employment in these rural communities (see **Chapter 2**, Demographic and Economic Baseline Conditions, for more details on employment and labor income by industry in each state). However, due to a change in market conditions, there has been a recent decreasing trend in coal production. All states, except North Dakota, saw a decline in coal production from 2018 to 2022, with the largest percentage decline occurring in Colorado (with a reduction in production of about 77.9 percent over the 5-year period). This reduction of coal production was observed globally. The reduction was largely driven by the reduction in natural gas prices that increased the demand for natural gas and reduced the demand for coal (EIA 2021).[8]

In the coming decade, coal is expected to continue to decrease. The reduction in demand for coal is also expected to continue, and the US is expected to retire about half of its coal-fired capacity by 2026 (Institute for Energy Economics and Financial Analysis 2023).

Federal Coal Disbursement Payments

Due to the reduction in demand for coal-fired generation, many economies throughout the socioeconomic analysis area could face significant financial impacts from the loss of the associated coal mining jobs and tax revenue in the next decade. For example, Moffatt County, Colorado, received over $12 million in ad valorem taxes in 2018 from coal power plants and mines in the county (Mesa University, undated). In Wyoming, continued revenue decreases from coal production have spurred the review of funding mechanisms for state school systems and education services. The Wyoming School Capital Construction Account has been

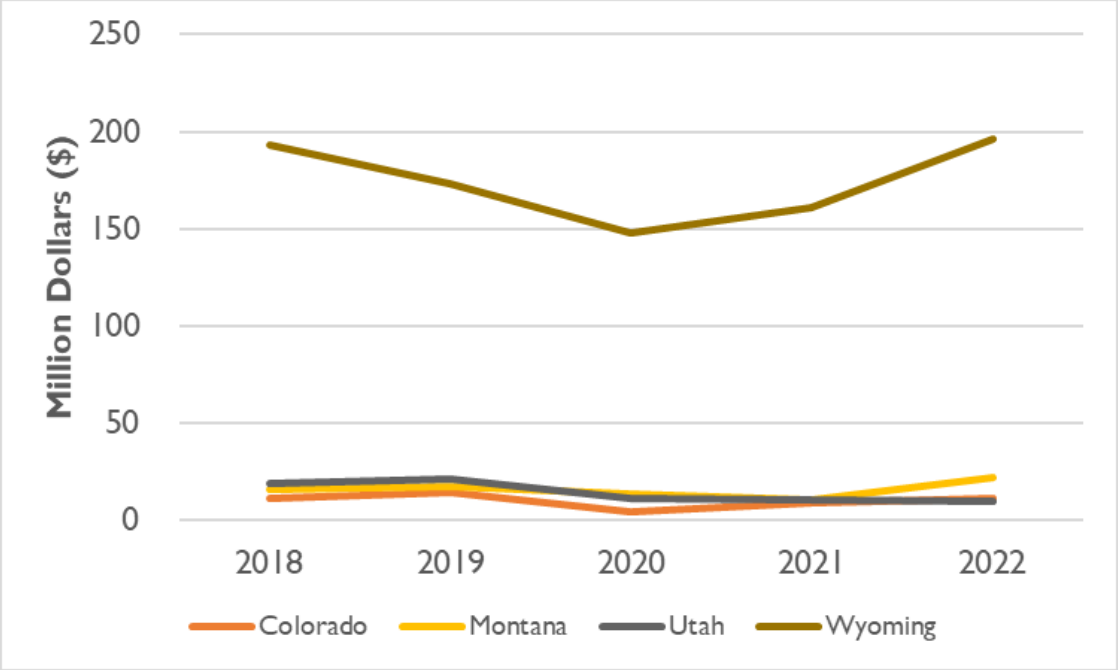
[8] Coal and natural gas are substitute goods and compete for the same demand for energy (Abraham 2018). This means that when the demand for one energy source increases (due to factors such as a decrease in price), the demand for the other energy source decreases.

historically funded through federal coal lease bonuses (see **Table A-25** in **Appendix A**). However, the federal coal lease bonuses in Wyoming peaked at $229.6 million in 2012–2013 and have declined since then, with no foreseeable return through at least 2026 (Wyoming Legislative Service Office 2022; Wyoming Consensus Revenue Estimating Group 2023).

Figure 8 shows the disbursements to the states in the planning area from federal coal extraction (see **Table A-25** in **Appendix A** for the data). Similar to oil and gas, the government collects royalties, rents, bonuses, and other revenues from coal production. Federal royalties for coal are set at a rate of 12.5 percent for surface coal and 8.0 percent for coal extracted from underground mines (US Department of the Treasury 2021). Federal coal leases require payment of an annual rental fee of not less than $3 per acre or fraction thereof (BLM 2022d). The revenues are disbursed to the states, and the states then allocate a portion of the disbursements to counties, local governments, municipalities, and school districts (see **Table A-28** in **Appendix A**, which lists the polices for expenditures at the state level and distributions to local governments and school districts).

All states in the planning area, except Montana and Utah, had stagnant disbursements from coal extraction over the last 5 years. Utah experienced a decline in disbursements of about 48 percent. Montana had a decline in disbursements from 2018 to 2021, but then disbursements increased from 2021 to 2022.

Figure 8. Federal Disbursements to States from Coal Extraction, Fiscal Years 2018–2022



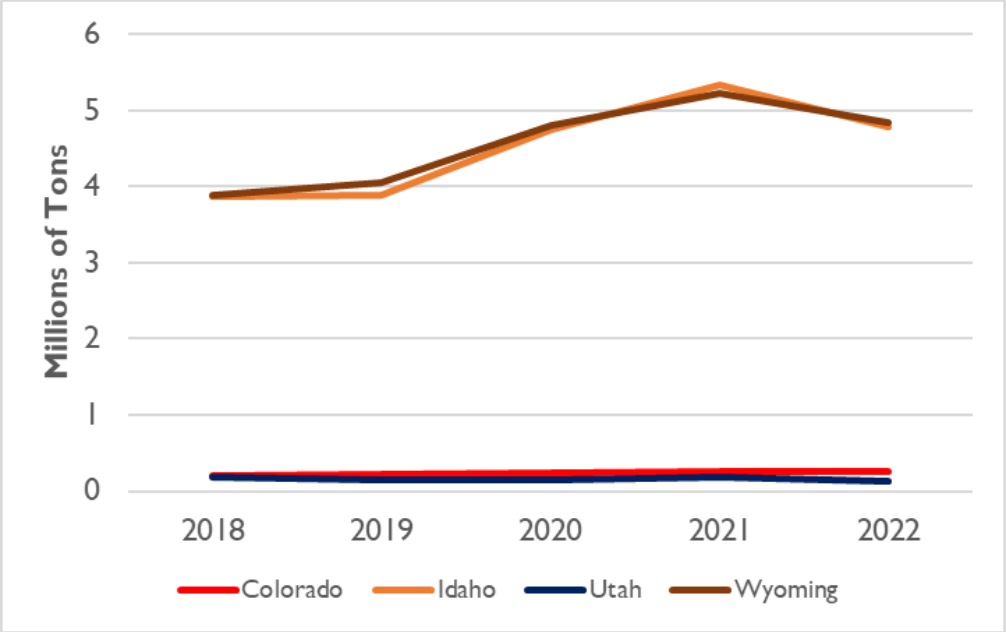
Note: From 2018 to 2022, there was no federal coal production in or disbursement made to California, Idaho, Nevada, Oregon, and South Dakota. Although there was federal coal production in and disbursements made to North Dakota, none of the production occurred in the socioeconomic analysis area. Therefore, these states are not included in the figure above.

3.1.3 Nonenergy Leasable Minerals

Nonenergy Mineral Extraction

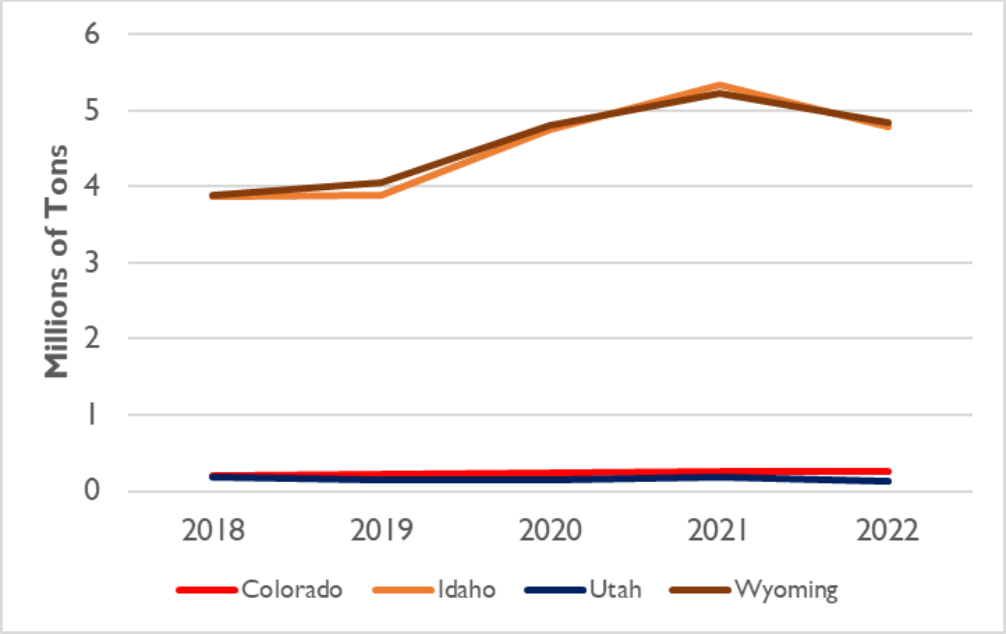
Figure 9 and **Figure 10**, below, show the total federal nonenergy mineral extraction for each state in the planning area and the nonenergy mineral extraction for the counties in each state's socioeconomic analysis area, respectively (see **Table A-26** in **Appendix A** for the data by county). In 2022, Wyoming and Idaho were the biggest producers of nonenergy minerals, with over 4.8 million tons of sodium bicarbonate, trona, soda ash, and sodium sesquicarbonate, as well as other by-products extracted in Wyoming and almost 4.8 million tons of phosphate extracted in Idaho. Nonenergy mineral extraction increased in both Wyoming and Idaho through 2021; it decreased slightly in 2022, but was still above 2018 levels by about 943,000 and 911,000 tons for Wyoming and Idaho, respectively. In Colorado, nonenergy mineral extraction, which is made up of sodium bicarbonate extractions, increased slightly (by about 60,000 tons) from 2018 to 2022. In the Utah, nonenergy mineral extraction, which is made up of clay and gilsonite extractions, decreased slightly from 2018 to 2022, with a reduction of about 54,000 tons.

Figure 9. Total Statewide Federal Nonenergy Mineral Extraction, 2018–2022



Note: Montana, Nevada, Oregon, and South Dakota did not have any federal nonenergy mineral extraction from 2018 to 2022. Although there was federal nonenergy mineral extraction in California and North Dakota, the extraction occurred outside the socioeconomic analysis area. Therefore, these states are not included in the figure above.

Figure 10. Federal Nonenergy Mineral Extraction in the Socioeconomic Analysis Area for Each State, 2018–2022



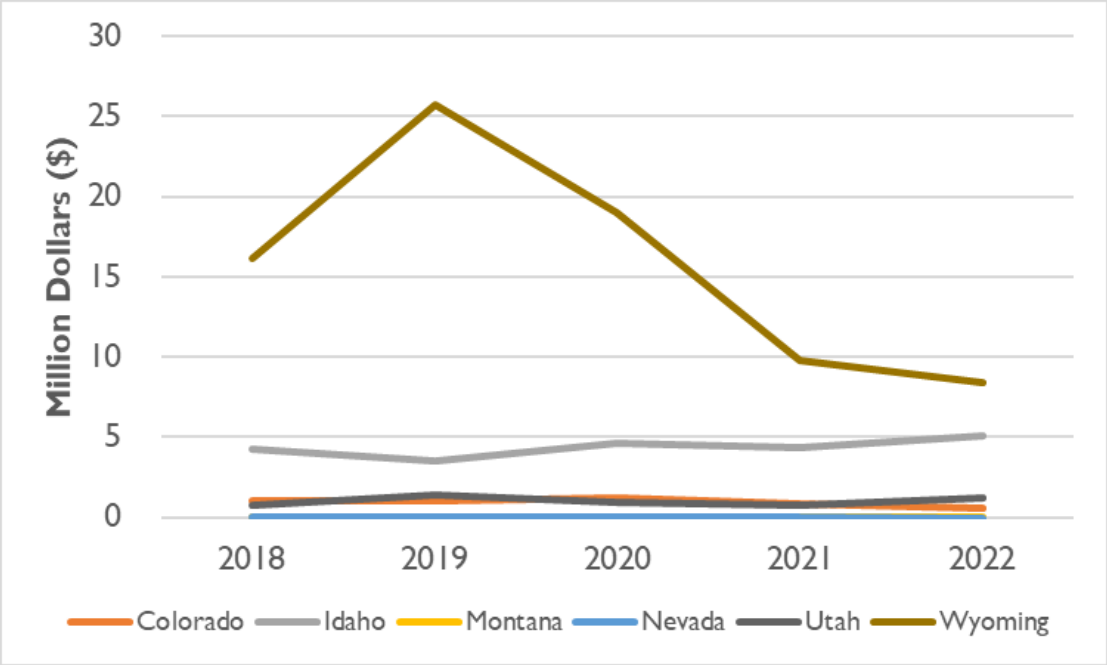
Note: Montana, Nevada, Oregon, and South Dakota did not have any federal nonenergy mineral extraction from 2018 to 2022. Although there was federal nonenergy mineral extraction in California and North Dakota, the extraction occurred outside the socioeconomic analysis area. Therefore, these states are not included in the figure above.

Federal Nonenergy Mineral Disbursement Payments

Similar to oil, gas, and coal, the government collects revenue from nonenergy minerals. The BLM determines and discloses the royalty rate for nonenergy minerals before the lease is offered; the minimum royalty rates are 5 percent of gross value of output for phosphate and sulfur 2 percent of quantity or gross value of output for sodium and potassium, and 25 cents per ton for asphalt. Gilsonite and hard-rock minerals have no minimum royalty rate. A portion of the revenues collected by the government are disbursed to the states, and the states then allocate a portion of the disbursements to counties, local governments, municipalities, and school districts (see **Table A-28** in **Appendix A**, which lists the polices for expenditures at the state level and distributions to local governments and school districts).

Figure 11 shows the disbursements to the states in the planning area from all federal nonenergy extraction, including sodium, potassium, phosphate, hard rock, and gilsonite (see **Table A-27** in **Appendix A** for the data). Wyoming had the highest disbursement from nonenergy mineral extractions, in 2022, with about $8.4 million (all of which came from sodium-based minerals such as trona). However, these disbursements in Wyoming declined from 2019 to 2022 by over $7.7 million, which was the largest decline in magnitude across the planning area. All states, except Idaho and Utah, had either a decline in disbursements or stagnation in disbursements over the 2019–2022 period. Idaho has large deposits of phosphate and disbursements to Idaho over the last five years ranged from about $3.5 million in 2019 to $5.1 million in 2022. Disbursements in Idaho decreased from 2018 to 2019 but increased from 2019 to 2022, which raised the disbursements above 2018 levels by $863,000. Utah disbursements, which are largely from potassium and gilsonite, fluctuated between a low of about $739,000 in 2018 and a high of about $1.4 million in 2019.

Figure 11. Federal Disbursements to States from Nonenergy Leasable Mineral Extraction, Fiscal Years 2018–2022



Note: North Dakota, Oregon, and South Dakota did not have any disbursements from nonenergy minerals from 2018 to 2022. California received disbursements for federal nonenergy minerals extracted in the state; however, the minerals were extracted outside the California socioeconomic analysis area. Montana and Nevada received small disbursements for rents, bonuses, and other distributions from nonenergy minerals, but there were no nonenergy minerals extracted from 2018 to 2022. Therefore, these states are not included in the figure above.

California receives disbursements for nonenergy minerals produced in the state; however, minerals are extracted outside the California socioeconomic analysis area; therefore, changes in BLM management decision on GRSG HMAs would likely not impact disbursements for nonenergy minerals in California. Therefore, the disbursements are not included in this report.

In addition to the public services that nonenergy leasable minerals help support, mining jobs, including jobs associated with nonenergy leasable mining, tend to be some of the highest paying jobs in rural communities, especially in Idaho (see **Chapter 2**, Demographic and Economic Baseline Conditions, for more information on employment and wages in the mining industry).

3.2 Locatable Minerals

Locatable minerals are minerals for which the right to explore or develop the mineral resource on federal land is established by the location (or staking) of lode or placer mining claims and is authorized under the General Mining Law of 1872. Locatable minerals include metallic minerals, such as gold, silver, copper, lead, zinc, molybdenum, and uranium, and nonmetallic minerals, such as fluorspar, asbestos, talc, and mica.

Acquisition of locatable minerals is executed by staking a mining claim over the deposit and acquiring the necessary permits to explore or mine. Within a mining claim located after the Surface Resources Act of July 23, 1955, the surface lands remain open to the public for other multiple uses that do not materially interfere with exploration, mining, and reasonably incident activities. Miners locate claims to acquire the right to develop the mineral values in a specified area. For operations other than casual use, the claimant is required

to submit a notice or a plan of operations. Regulations require the claimant to prevent unnecessary or undue degradation of the land. The BLM may petition the Secretary of the Interior through the process outlined in Section 204 of FLPMA to withdraw areas from further location of mining claims or sites.

Locatable mineral exploration and production occur throughout the planning area, on and off GRSG HMAs. **Table 3-3** shows locatable minerals found in the planning area by state.

Table 3-3. Locatable Mineral Types on Federal Lands in the Planning Area*

States	Precious and Base Metals	Industrial Minerals
Colorado	Gold, molybdenum, and uranium	Gypsum
Idaho	Gold, silver, copper, lead, iron, molybdenum, beryllium, uranium, and vanadium	Limestone, bentonite, high-alumina clay, and gypsum
Montana	Gold, silver, and mercury	Bentonite and diamonds
Nevada	Gold, silver, copper, lithium, galena, iron, zinc, cobalt, vanadium, tungsten, antimony, and molybdenum	Gypsum, limestone, diatomite, bentonite, silica sand, magnesium, and barite
Oregon	Gold, silver, lead-silver-zinc, copper, uranium, iron, and arsenic	Borax, dimension stone, mercury, limestone, diatomaceous earth, zeolites, kaolinite, perlite, gemstones, and bentonite
Utah	Gold, silver, copper, lead, iron, molybdenum, beryllium, uranium, and vanadium	Limestone, bentonite, high-alumina clay, and gypsum
Wyoming	Uranium, gold, titanium, and lithium	Limestone, marble, bentonite, and jade

Source: BLM and Forest Service 2015; Muntean et. al 2022; USGS 2016
*This list includes locatable minerals commonly known to exist in the planning area. It is not an exhaustive list of all locatable minerals in the planning area. Inclusion on this list does not imply that these metals and minerals are being developed or extracted.

Nevada is one of the top hard-rock mining states. The General Mining Law does not require mines to report production or subject these minerals to royalty payments; therefore, production data is not available for all BLM administered lands. however, data on open claims for locatable minerals are available throughout the planning area. Within GRSG priority habitat management areas (PHMAs), Nevada and California, combined, have about 147,160 existing open claims across 21,167,000 acres of BLM-administered locatable minerals.[9] This is the most open claims in GRSG habitat of all the states in the planning area. In Colorado, there are about 552 existing open claims across 3,600,000 acres of BLM-administered locatable minerals on PHMAs. In Idaho, there are about 7,219 existing open claims across 10,203,000 acres of BLM-administered locatable minerals on PHMAs. In Montana, South Dakota, and North Dakota, combined, there are about 2,315 existing open claims across 8,371,000 acres of BLM-administered locatable minerals on PHMAs. In Oregon, there are about 4,993 existing open claims across 12,126,000 acres of BLM-administered locatable minerals on PHMAs. In Utah, there are about 6,418 existing open claims across 3,952,000 acres of BLM-administered locatable minerals on PHMAs. Finally, in Wyoming, there are about 33,401 existing open claims across 26,012,000 acres of BLM-administered locatable minerals on PHMAs (BLM 2023).

Regions in Idaho, Oregon, and Nevada have had sharp increases in the average number of annual claims since 2016. There could be a number of reasons for the increase, including a potential increase in demand for critical minerals in the area, a potential increase in the price of locatable commodities, or operators looking to secure claims, in the event the Secretary decides to withdraw the areas proposed in the 2016 SFA Withdrawal process which is currently underway.. Claims that exist in a withdrawal area before the date of

[9] As of November 2023, there were over 250,000 active mining claims across all BLM-administered lands in Nevada, on and off-PHMAs.

a withdrawal are not subject to the withdrawal and could potentially be developed in the future, subject to a validity examination. However, validity examinations typically cost at least $50,000 per claim to complete and have the potential to delay the start of locatable mineral development on a valid claim, which could add risks and costs to the operators (BLM 2023).

Locatable mineral production data is available for some BLM field offices, including those in Nevada, where locatable mineral production represents an important use. **Table 3-4** shows locatable minerals production by state for states and field offices where data is available.

Table 3-4. Locatable Mineral Annual Production in the Planning Area (Fiscal Year 2022)

Locatable Minerals	Colorado	Nevada	Wyoming
Bentonite (tons)	—	—	1,200
Cement (ton)	—	24,208	—
Dolomite	—	23,393	—
Diatomite	—	1,654,736	—
Gold (troy oz)	—	1,021,455	—
Gypsum (ton)	1,698	—	—
Limestone	229,100	77,403	—
Lithium (lb)	—	2,054	—
Perlite (tons)	—	2,230,151	—
Pozzolan (ton)	—	92,836	—
Quartzite (ton)	—	3,340	—
Salt (ton)	—	5,050	—
Silver (Troy oz)	—	2,660,875	—
Turquoise (lb)	—	1,200	—

Source: BLM 2023

Note: Data provided are state-level data for all BLM-administered lands and minerals as available. Data are not reported for all states. No production data is available for California, Idaho, Montana, North Dakota, Oregon, South Dakota or Utah.

The value of minerals and their contribution to local and regional economies vary based on market conditions and the volume extracted. Within the planning area, all the states, except South Dakota and North Dakota, impose taxes on locatable hard-rock mining activities. The taxes in most states are collected regardless of landownership (see **Table A-29** in **Appendix A** for information on state taxes for hard-rock mining activities on all lands). The type of taxes and amount collected vary across states; however, the distributions of the taxes are important in supporting public services and infrastructure by providing funds for schools; local counties, cities, and towns; highways and road construction; and water infrastructure (State of Wyoming Legislature 2021). In addition to the public services that locatable minerals help support, mining jobs, including hard-rock mining jobs, tend to be some of the highest paying jobs in rural communities, especially in Nevada (see **Chapter 2**, Demographic and Economic Baseline Conditions, for more information on employment and wages in the mining industry).

Economic contributions from locatable mineral development for states in which production data on BLM administered lands is available are provided in **Table 3-5**, below.

Table 3-5. Locatable Mineral Annual Direct Economic Contributions in the Planning Area (Fiscal Year 2022)

Locatable Mineral	Impact	Colorado	Nevada	Wyoming
Bentonite	Direct Jobs	—	—	12
	Direct output ($)	—	—	4,147,821
Cement	Direct Jobs	—	140	—
	Direct output ($)	—	29,031,529	—
Dolomite	Direct Jobs	—	0	—
	Direct output ($)	—	12,277	—
Diatomite	Direct Jobs	—	210	—
	Direct output ($)	—	53,539,913	—
Gold (troy oz)	Direct Jobs	—	6,385	—
	Direct output ($)	—	3,705,631,299	—
Gypsum (ton)	Direct Jobs	0	—	—
	Direct output ($)	13,874	—	—
Limestone	Direct Jobs	1	23	—
	Direct output ($)	235,468	7,556,817	—
Lithium (lb)	Direct Jobs	—	38	—
	Direct output ($)	—	9,797,308	—
Perlite (tons)	Direct Jobs	—	0	—
	Direct output ($)	—	52,386	—
Pozzolan (ton)	Direct Jobs	—	12	—
	Direct output ($)	—	2,968,837	—
Salt (ton)	Direct Jobs	—	1	—
	Direct output ($)	—	289,240	—
Silver (Troy oz)	Direct Jobs	—	132	—
	Direct output ($)	—	70,434,335	—
Turquoise (lb)	Direct Jobs	—	43	—
	Direct output ($)	—	11,053,469	—

Source: BLM 2023

3.3 MINERAL MATERIALS

Salable minerals or mineral materials are common minerals sold or given away to local governments, other government entities, and nonprofit groups. Salable minerals are defined as lower-value, common-variety materials, such as rock, gravel, and soil. The term "salable minerals" is synonymous with "mineral materials" and can also be called "common-variety minerals." The BLM has discretion to manage the sale or removal of these materials, with the sale regulated by commercial permits. Salable minerals are also sometimes provided free of charge to local governments for public projects under free-use permits. The volume of material sold and used varies by state.

Table 3-6 shows the number of permits and quantity of federal salable minerals extracted in the 2021 fiscal year, separated out by free-use permits and exclusive and nonexclusive permits. Idaho had the largest number of existing free-use permits, with 93 permits and almost 78,000 cubic yards of extracted mineral materials. Nevada had the largest quantity of extracted mineral materials under free-use permits, with almost 95,000 cubic yards extracted across 78 permits. Wyoming had the largest number of new free-use permits issued in 2021, with 24 new permits and over 3,000 cubic yards of mineral materials extracted. Colorado had the largest quantity of extracted mineral materials under free-use permits, with over 2.1 million cubic yards of mineral materials across 9 permits.

Table 3-6. Disposition of Mineral Materials on Federal Land, Fiscal Year 2021

Method by Administrative State	Material[a]	New Contract Sales/Use Permits Issued during Fiscal Year[b]		Production Reports for All Existing Contracts/Permits[c]	
		Number	Quantity[d]	Number	Quantity[d]
Free-Use Permits					
Northeastern California	Sand and gravel	6	3,332	1	11,748
	State total	**6**	**3,332**	**1**	**11,748**
Colorado	Sand and gravel	7	219,681	20	16,603
	Stone	2	1,900,041	4	1,246
	State total	**9**	**2,119,722**	**24**	**17,849**
Idaho	Pumice	1	50	0	0
	Sand and gravel	6	89,074	66	6,207
	Soil - other	0	0	1	200
	Stone	0	0	26	10,513
	State total	**7**	**89,124**	**93**	**77,920**
Montana[e]	Sand and gravel	2	438,000	0	0
	State total	**2**	**438,000**	**0**	**0**
Nevada	Sand and gravel	6	66,600	68	93,635
	Soil	0	0	4	920
	Stone	0	0	6	432
	State total	**6**	**66,600**	**78**	**94,987**
Oregon[f]	Sand and gravel	2	355	5	2,845
	Stone	6	1,675	9	69,240
	State total	**8**	**2,030**	**14**	**72,085**
Utah	Sand and gravel	6	172,000	5	29,196
	Stone	2	95,000	1	570
	State total	**8**	**267,000**	**6**	**29,766**
Wyoming[g]	Sand and gravel	24	3,140	75	36,302
	Stone	0	0	1	18
	State total	**24**	**3,140**	**76**	**36,320**
Total Free-Use Permits		**70**	**2,988,948**	**292**	**340,675**
Exclusive and Nonexclusive Sales					
California	Pumice	1	30,534	0	0
	Sand and gravel	18	336,600	102	442,339
	Stone	0	0	11	31,882
	Soil - other	4	302	4	302
	State total	**23**	**367,436**	**117**	**474,523**
Colorado	Calcium	0	0	12	9,144
	Clay	5	174	17	4,414
	Sand and gravel	2	2	13	233,545
	Stone	70	33,369	144	274,001
	State total	**77**	**33,545**	**186**	**521,104**
Idaho	Clay	5	2,480	4	1,600
	Pumice	3	326	3	326
	Sand and gravel	68	26,334	67	25,404
	Soil - other	3	1,078	3	1,078
	Stone	94	743	94	1,296
	State total	**173**	**30,961**	**171**	**29,754**
Montana[f]	Sand and gravel	2	2	3	1202
	Stone	1	2	1	2
	State total	**3**	**4**	**4**	**1,204**

Method by Administrative State	Material[a]	New Contract Sales/Use Permits Issued during Fiscal Year[b]		Production Reports for All Existing Contracts/Permits[c]	
		Number	Quantity[d]	Number	Quantity[d]
Nevada	Clay	0	0	10	476
	Sand and gravel	134	7,658,858	380	3,099,250
	Soil - other	1	1	14	211
	Stone	11	3,216	34	81,433
	State total	**146**	**7,662,075**	**438**	**3,181,370**
Oregon[g]	Clay	1	1	1	1
	Pumice	12	907,865	15	38,751
	Sand and gravel	33	910,221	36	41,107
	Stone	29	12,144	29	12,144
	State total	**75**	**1,830,231**	**81**	**92,003**
Utah	Clay	2	1,551	2	1,551
	Pumice	68	25,382	83	76,017
	Sand and gravel	110	384,984	140	232,972
	Soil - other	5	581	6	610
	Stone	177	1,454,120	202	333,568
	State total	**362**	**1,866,618**	**433**	**644,718**
Wyoming[h]	Sand and gravel	46	444,565	187	228,847
	Soil	0	0	4	43,511
	Stone	17	1,804	97	320,536
	State total	**63**	**446,369**	**288**	**592,894**
Total Exclusive and Nonexclusive[i]		**922**	**12,237,239**	**1,718**	**5,537,570**

Source: BLM 2022

Note: Materials were disposed of under the Materials Act of 1947 (61 Statute 681; 30 US Code 601), as amended by the Multiple-Use Mining Act of 1955 (69 Statute 367).

[a] The data are aggregated into eight standard material groups.

[b] New disposals this year showing the total quantity and value over the full term of the authorization.

[c] Reports show the quantity and dollar values of production this year from all new and previously issued sale contracts and permits.

[d] Includes sales and permit data originally reported in both tons and cubic yards. For this table, all data have been converted automatically to cubic yards.

[e] Total exclusive and nonexclusive numbers are combined together.

[f] Includes North Dakota and South Dakota

[g] Includes Washington

[h] Includes Nebraska

[i] The sum of each state's exclusive and nonexclusive totals

Nevada had the largest number of existing exclusive and nonexclusive permits and the largest quantity of mineral materials extracted across these permits, with 438 existing permits and almost 3.2 million cubic yards of mineral materials. Nevada also had the largest quantity of mineral materials extracted under new existing exclusive and nonexclusive permits, with almost 7.7 million cubic yards. Utah had the largest number of new existing exclusive and nonexclusive permits, with 362 total permits.

Because mineral materials generally do not represent scare commodities, they can be found throughout the analysis areas, on and off GRSG HMAs. Sand and gravel, used often as construction aggregate, are an extremely important resource. The extraction of these resources varies directly with the amount of development—road building and maintenance, and urban development—nearby; this is because sand and gravel are necessary for the development of that infrastructure. The proximity of both transportation and markets are key elements in the potential for deposits to be developed, even more so than for other types of mineral deposits (Burgex Mining Consultants 2023).

Future demand for mineral materials will vary depending on market conditions, which differ according to economic conditions and construction activity. One major driver of construction activity is road and well pad construction for oil and gas exploration and development and residential and commercial construction projects. As new oil and gas development continues to occur, it is expected that mineral materials activity will continue. Another driver of demand for mineral materials is to improve road access for fire suppression activities. The construction, maintenance, and effectiveness of fuel breaks can be impacted by availability of mineral material pits.

Community pits are sites established by governmental agencies for the public to acquire mineral materials through sales contracts. Local government agencies and nonprofit organizations may obtain these materials free of cost for community purposes. County and state road construction divisions are the significant users of gravel and sand resources. A negotiated sale is an exclusive site proposed by a single party, often commercial, as the party must pay for the BLM to process the permit. The number of sales out of a community pit varies by site, from less than one to more than 50 per year. Most sales are for less than 1 ton. Free-use permit sites are used sporadically and may be scattered throughout a field office (FO) or district office; this way, when the county needs material, it has a nearby source, thereby reducing haul costs. A pit may be inactive for several years before it is needed for a road project in the area.

Mineral material extraction and mining is an important part of many local economies, and jobs associated with mining, including mineral materials extraction and mining, tend to be high paying compared with other types of employment in these rural communities (see **Chapter 2**, Demographic and Economic Baseline Conditions, for more details on employment and labor income by industry in each state).

3.4 RENEWABLE ENERGY

3.4.1 Geothermal Energy

Geothermal reservoirs are naturally occurring areas of hydrothermal resources, where the natural heat of the earth's interior heats groundwater in porous or fractured rock. This geothermal hot water and steam can be harnessed as a source of renewable energy when they are brought to the surface, either naturally or by drilling. The most active natural reservoirs tend to occur close to the boundaries of tectonic plates. The areas in the US with the highest potential for geothermal power are in western states where large areas have hydrothermal resources near the earth's surface and can be accessed more economically. More than 90 percent of all US geothermal power generation occurs in California and Nevada (NREL 2021). Other states in the planning area with geothermal production are Idaho, Oregon, and Utah. However, only Nevada and Utah had geothermal production with a federal stake that was in the counties within the socioeconomic analysis area; therefore, the focus of this discussion is on Nevada and Utah (see **Table 3-7**).

Geothermal resources exist in significant portions of the Nevada socioeconomic analysis area. Based on US Geological Survey data, the highest potential for geothermal development likely occurs along Nevada's western border, which is outside GRSG HMAs. However, there is also moderate to high potential for geothermal development in northeastern Nevada, which contains a high percentage of land in GRSG HMAs (Williams et al. 2008). Nevada currently has 25 operating geothermal power plant units in 18 locations (State of Nevada Commission on Mineral Resources 2023). Twenty-two of these operating geothermal units are in counties within the analysis area, and 10 of these plants are within or near GRSG PHMAs.

Table 3-7. Total Geothermal Electrical Generation with a Federal Stake, 2018–2022 (kWh)

State	County	2018	2019	2020	2021	2022
Nevada						
Nevada	Churchill	1,017,103,246	1,041,364,192	1,073,703,579	1,056,899,531	1,037,842,637
	Eureka	2,771,582	2,758,357	2,796,512	2,742,214	2,636,571
	Humboldt	89,658,929	87,726,220	85,401,613	87,067,771	83,626,740
	Lander	698,497,471	835,316,237	1,050,022,803	1,035,549,619	1,066,678,185
	Pershing	62,804,904	65,525,526	60,834,841	57,464,921	58,057,322
	Washoe	105,383,393	29,671,073	90,888,431	187,749,075	195,320,151
	State total	**2,305,046,455**	**2,350,760,180**	**2,631,932,422**	**2,682,374,360**	**2,680,263,182**
Utah						
Utah	Beaver	110,546,660	104,210,267	120,466,808	92,850,025	97,660,969
	Millard	24,536,466	34,897,548	4,925,961	27,208,578	27,968,671
	State total	**135,083,126**	**139,107,815**	**125,392,769**	**120,058,603**	**125,629,640**

Source: ONRR 2023

Note: The data include all planning area counties for which the ONRR reported data; while there was geothermal production in California, no geothermal production occurs in the California socioeconomic analysis areas.

Between 2015 and 2019, geothermal project development growth in Nevada surpassed growth in all other states; five new geothermal plants came online in Nevada during this period (NREL 2021) Nevada's geothermal electricity generation was the second highest in the US, after California. In 2021, geothermal power plants in Nevada collectively produced 825 megawatts (MW) of electricity (State of Nevada Commission on Mineral Resources 2021).

Table 3-7 shows the total electrical generation from geothermal resources administered by the BLM from 2018 to 2022. In Nevada, geothermal energy increased from 2018 to 2022 by about 375 million kilowatt-hours (kWh), which was an increase of about 16.3 percent. This increase in geothermal energy in Nevada is a trend that has continued since the 2015 Record of Decisions. Of the counties in the analysis area, Lander County in Nevada had the largest increase in the amount of generation, with an increase of about 368 million kWh (an increase of about 52.7 percent).

Table 3-8 shows the historical average annual new geothermal wells spud with a federal stake in Nevada, broken out by total land area and limited to only on GRSG HMAs. The annual wells spud is averaged over two time periods: 2013–2014, which is prior to GRSG management changes from the previous 2015 Record of Decisions, and 2015–2022, which includes wells spud after GRSG management changes. The average annual spud rate for geothermal wells in Nevada increased slightly over the two time periods across the total land in the analysis area (on and off GRSG HMAs), and the annual spud rate decreased over the two time periods on GRSG HMAs. However, the differences between spud rates across the two time periods were minimal, with changes of less than one well per year.

Table 3-8. Average Annual New Wells Spud with a Federal Stake in Nevada, by Area

Area	2013–2014 Average	2015–2022 Average
GRSG HMAs	2.00	1.37
Total	2.00	2.75

Source: BLM 2023

Over the next 20 years, there could be about 20 power plants developed on federal leases in the GRSG planning area, which would amount to about 589 MW of geothermal generation capacity (BLM 2023e).

Geothermal resources in Utah are plentiful in the middle and northern portions of the state, although a lack of transmission capacity may hinder development, especially in the northwest corner. Geothermal resources in Utah have been estimated to have the potential to supply 15,000 MW of electricity. There are currently three geothermal power plants in Utah with capacity of 72.5 MW (BLM 2023h). Two of the three geothermal power plants in Utah (Blundell and Cove Fort-Sulpherdale power plants) are partially on BLM-administered lands with federal geothermal leases.

Table 3-7 shows the total geothermal electrical generation with a federal stake, from 2018 to 2022, in counties in the Utah analysis area and the total for the state of Utah. Although generation has fluctuated from year to year, both counties in the analysis area that produced geothermal generation, as well as the state of Utah, saw a reduction in geothermal generation in 2022 from 2019 levels. Beaver County in Utah saw the largest reduction in magnitude of geothermal generation, with a decrease of nearly 13 million kWh from 2018 to 2022 (a reduction of about 11.7 percent over the 5-year period).

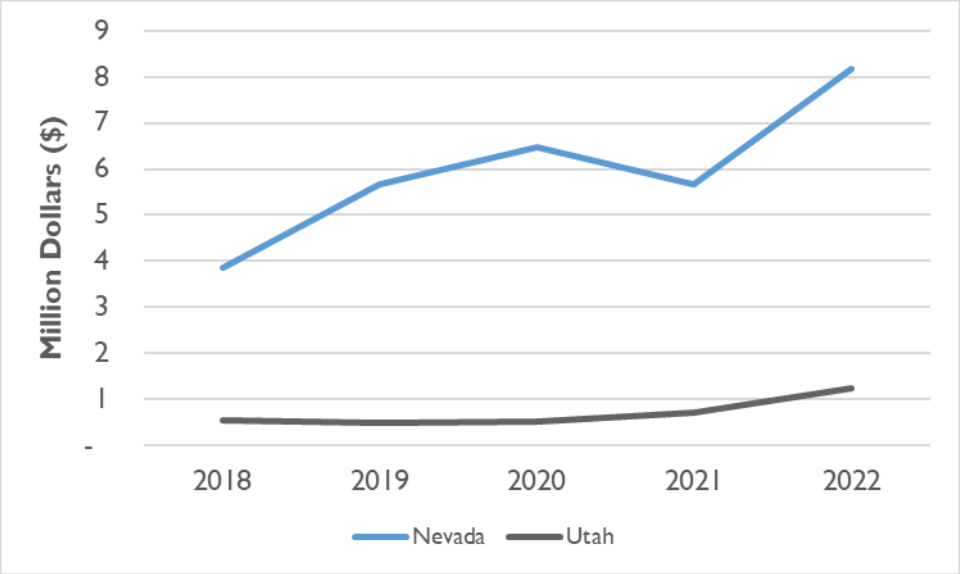
There are areas with moderate levels of geothermal energy development potential within the GRSG HMAs in Beaver and Iron Counties in southwestern Utah and Carbon, Uintah, Duchesne, and Grand Counties in the eastern region of the state. These overlapping areas are small, and there are other nearby areas that could have better potential for geothermal energy development that are not on GRSG HMAs; however, there could be up to one 30 MW geothermal power facility developed on BLM-administered lands in GRSG HMAs over the next 20 years (BLM 2015a, 2023h).

Industry surveys show geothermal power plants employ about 0.74–1.17 people per MW to maintain and operate a facility; an additional 0.96 secondary jobs per MW are generated for every power plant built. Additionally, there are temporary jobs in the manufacturing and construction sectors created by the construction of new power plants. Over the 17–33 months in which an average plant is constructed, about 3.1 people per MW of full-time employment are needed to construct the plant, and 3.3 people per MW are needed to manufacture the plant equipment (Geothermal Energy Association 2015).

Federal Geothermal Disbursement Payments

The government collects revenues from leasable mineral extraction and geothermal production on public lands, which are subsequently distributed to the federal, state, and local governments. These revenues that are distributed to the state and county provide important economic contributions that often support public services, like education. **Figure 12** shows the disbursement payments made to the states from geothermal with a federal stake from 2018 to 2022 (see **Table A-23** in **Appendix A** for the data). In 2022, Nevada and Utah saw disbursements of about $8.2 million and $1.2 million, respectively. Over the 5-year time period, the disbursements from geothermal with a federal stake in Nevada and Utah increased by over two times.

Figure 12. Disbursements to States from Geothermal with a Federal Stake, Fiscal Years 2018–2022



Note: From 2018 to 2022, there was no geothermal production with a federal stake in Colorado, Idaho, Montana, North Dakota, Oregon, South Dakota, and Wyoming. Although there was federal oil and gas production and disbursements made to California, none of the production occurred in the socioeconomic analysis area. Therefore, only Nevada and Utah are included in the figure above.

3.4.2 Wind and Solar

Wind and solar projects on BLM-administered lands are authorized under right-of-way (ROW) leases or grants. A ROW is a permit that authorizes the use of a specific parcel of BLM-administered land for projects, such as renewable (wind or solar) energy sites. A ROW authorizes the holder to construct, operate, maintain, and terminate a facility for the life of the project.

Table 3-9 shows the number of Federal Land Policy and Management Act of 1976 ROWs for energy only, which includes wind and solar projects. Northeastern California and Nevada reported the largest number of ROWs for energy projects, with 48 ROWs and 16 ROWs, respectively. As of 2021, five wind projects were operating on public lands in the analysis area (in Nevada, Oregon, Utah, and Wyoming), and one project (in Wyoming) was pending construction (BLM 2021). As of 2022, there were only two solar projects operating on public lands in the analysis area (in Nevada and Wyoming), and one project (in Utah) was pending construction (BLM 2022e).

Chapter 2, Demographic and Economic Baseline Conditions, discusses the jobs in key sectors for each state in the analysis area, and **Table A-2** through **Table A-21 (Part 3)** in **Appendix A** of this document show the number of jobs and labor income by sector county in each state of the analysis area, as reported by the US Bureau of Economic Analysis. Renewable energy, such as wind and solar development and operations and maintenance, support jobs in various industries, such as the construction industry, so the US Bureau of Economic Analysis includes the jobs that are supported through renewable energy in the employment numbers for these various industries rather than reporting jobs for renewable energy separately.

Table 3-9. Number of Federal ROWs for Energy (Solar and Wind), Fiscal Year 2021

Administrative State	Total ROWs for Energy	Solar ROWs in Analysis Area Counties (Operating and Pending Construction)	Wind ROWs in Analysis Area Counties (Operating and Pending Construction)
California	61	0	0
Colorado	1	0	0
Idaho	9	0	0
Montana	0	0	0
Nevada	28	1	1
North Dakota	0	0	0
Oregon	2	0	1
South Dakota	0	0	0
Utah	6	1	2
Wyoming	13	1	2

Sources: BLM 2021, 2022b, 2022e

3.5 LIVESTOCK GRAZING

The BLM administers public land grazing primarily in accordance with the 1934 Taylor Grazing Act, 1976 Federal Land Policy and Management Act, and 1978 Public Rangelands Improvement Act. Grazing use on public land is administered through grazing authorizations (leases or permits) issued by FOs to qualified applicants, who are assigned grazing preference. Preference is expressed in animal unit months (AUMs) or the amount of forage consumed by one cow and calf for 1 month.

Table 3-10 shows the 5-year average billed AUMs associated with the total permitted allotments and permitted allotments with greater than 15 percent PHMA land on BLM-administered lands in the planning area, by allotment type. Wyoming and Nevada had the most total billed AUMs on average, with about 1.4 million AUMs and 1.2 million AUMs, respectively. In Wyoming, 98 percent of the billed AUMs are on allotments with greater than 15 percent of PHMA land. In Nevada, about 87.6 percent of billed AUMs are on allotments with PHMA land. This suggests that BLM management decisions that affect livestock grazing could impact these states.

The species (type) and age (class) of livestock that graze across the planning area vary across FOs; however, they are primarily cow-calf pairs or yearling cattle in all states. Some allotments graze other kinds of livestock, including sheep, goats, bison, and horses.

Table 3-10. 5-Year Average Livestock Grazing Billed AUMs on BLM-Administered Lands (2018–2022)

State	Livestock Type	5-Year Average Billed AUMs (2018–2022)	5-Year Average Billed AUMs on Allotments with Greater than 15 Percent PHMA Land	Percentage of Billed AUMs on Allotments with Greater than 15 Percent PHMA Land
California				
California	Total	125,340	121,325	96.8
	Cattle or yearlings	119,062	115,259	96.8
	Sheep or goats	6,253	6,066	97.0
	Horses	25	0	0.0

State	Livestock Type	5-Year Average Billed AUMs (2018–2022)	5-Year Average Billed AUMs on Allotments with Greater than 15 Percent PHMA Land	Percentage of Billed AUMs on Allotments with Greater than 15 Percent PHMA Land
Colorado				
Colorado	Total	220,393	126,183	57.3
	Cattle or yearlings	179,459	102,713	57.2
	Sheep or goats	37,685	21,577	57.3
	Horses	3,248	1,893	58.3
Idaho				
Idaho	Total	951,401	741,979	78.0
	Cattle or yearlings	889,655	693,751	78.0
	Sheep or goats	57,896	45,261	78.2
	Horses	3,850	2,968	77.1
Montana				
Montana	Total	1,172,025	885,551	75.6
	Cattle or yearlings	1,142,298	863,412	75.6
	Sheep or goats	24,798	18,597	75.0
	Horses	4,930	3,542	71.9
Nevada				
Nevada	Total	1,246,931	1,092,825	87.6
	Cattle or yearlings	1,161,276	1,017,420	87.6
	Sheep or goats	82,934	73,219	88.3
	Horses	2,720	2,186	80.3
North Dakota				
North Dakota	Total	6,656	3,871	58.2
	Cattle or yearlings	6,643	3,863	58.2
	Sheep or goats	13	8	59.6
	Horses	0	0	0
Oregon				
Oregon	Total	729,029	678,191	93.0
	Cattle or yearlings	723,561	672,765	93.0
	Sheep or goats	4,242	4,069	95.9
	Horses	1,227	1,356	100
South Dakota				
South Dakota	Total	67,020	35,588	53.1
	Cattle or yearlings	59,483	31,602	53.1
	Sheep or goats	7,430	3,950	53.2
	Horses	107	71	66.3
Utah				
Utah	Total	631,994	258,438	40.9
	Cattle or yearlings	492,945	201,581	40.9
	Sheep or goats	138,283	56,598	40.9
	Horses	766	258	33.7
Wyoming				
Wyoming	Total	1,362,534	1,334,637	98.0
	Cattle or yearlings	1,206,723	1,182,489	98.0
	Sheep or goats	145,971	142,806	97.8
	Horses	9,840	9,342	94.9

Source: BLM 2023

The BLM-administered lands and other public and private lands support values to the local economies across the socioeconomic study area by providing forage for local farmers to raise their cattle, sheep, goats, bison, and horses. These, in turn, provide food to the farmers, their families, and the surrounding communities. Under the Taylor Grazing Act, a portion of BLM grazing revenue is returned to the county of origin; 50 percent of Section 15[10] fees collected are returned to counties, and 12.5 percent of Section 3[11] fees are returned to counties. Grazing revenue and the disbursement that is returned to the county vary by county and may have a higher level of importance at the local level for some communities. In addition, the lands provide value through the social and cultural connections with livestock grazing in the analysis areas; these values are discussed in **Chapter 4**, Social Setting and Nonmarket Values.

Across the US there are different types of farms and ranches that operate and make business decisions in different ways. The USDA Economic Research Service developed a classification, or "typology", of farms and ranches based on annual gross cash farm income (the ranch or farm's revenue prior to deducting expenses), primary occupation of the operator, and ownership of the farm or ranch. Farms and ranches are broadly categorized into family and non-family ranches based on whether the majority of the ranching business is owned by the primary operator and relatives of the primary operator (non-family ranches are those where the operator and individuals who are related to the operator do not own a majority of the business). Family ranches are further categorized by size and primary occupation of the operator as described below (USDA Economic Research Service 2024):

- Small family ranches are those that have gross cash farm income of less than $350,000 per year. These ranches are broken into four types based on the primary occupation of the operator and size of the ranch: retirement ranches (where the operators are retired but continue to ranch on a small scale), off-ranch primary occupation (where the operators report a primary occupation other than farming or ranching), ranch primary occupation with low sales (where the operators report that farming or ranching is their primary occupation and the gross cash farm income of their farm is less than $150,000), and ranch primary occupation with moderate sales (where the operators report that farming or ranching is their primary occupation and the gross cash farm income of their ranch is at least $150,000 but less than $350,000).
- Midsize family ranches are those that have gross cash farm income of at least $350,000 but less than $1 million.
- Large family ranches are those that have gross cash farm income of at least $1 million but less than $5 million.
- Very large family ranches are those that have gross cash farm income of at least $5 million.

[10] Section 15 lands are public lands that lie outside a grazing district administered by the BLM under Section 15 of the Taylor Grazing Act. The BLM authorizes livestock grazing on these lands by issuing leases to private parties.
[11] Section 3 of the Taylor Grazing Act concerns grazing permits issued on BLM-administered lands within the grazing districts established under the act. It gave leasing preference to landowners and homesteaders in or adjacent to the grazing district lands.

Table 3-11 shows the percentage of farms and ranches in the beef cattle ranching and farming or sheep goat farming industries by the ranch typology described above for each state in the analysis area. The data provided include farms and ranches in as well as outside of the analysis area and on and off BLM-managed lands; however, the data can be used for illustrative purposes to examine how different types of farms and ranches might be impacted by the BLM-management decisions differently. Additionally, the data shown is for farms and ranches that produced or sell at least $1,000 of agricultural products per year, so it does not include very small farms and ranches that produce less than $1,000 of agricultural products or where the operators normally consume the products that are produced. In all of the states in the analysis area, except California, the largest percentage of ranches fell in the category of small family ranch with off-ranch primary occupation (with percentages ranging from 24.7 percent of ranches in Montana to 45.4 percent of ranches in Utah). Ranches that fell into the category of small family ranch with ranch primary occupation and low sales made up a large percentage of total ranches, especially in Colorado, Montana, North Dakota, South Dakota, and Wyoming, where the percentages of this type of ranch was above 20 percent. Furthermore, when considering all small family ranches where ranching is the primary occupation (both low sales and moderate sales together), the percentage was larger than small family off-ranch primary occupation ranches in Montana, North Dakota, South Dakota, and Wyoming (USDA National Agricultural Statistics Service 2012, 2024). The BLM-management decisions that impact livestock grazing would likely have a greater effect on small family ranches where ranching is the primary occupation than other types of ranches. This is because small family ranches where ranching is the primary occupation rely more heavily on ranching than other types of small family ranches and they tend to have less flexibility and resources for modifying business practices based on the BLM-management decisions than larger ranches (for example, they have less ability to absorb higher costs, if ranching costs were to increase).

Table 3-11. Percentage of Beef Cattle and Sheep and Goat Farms and Ranches by Ranch Type for Each State in the Analysis Area (2024)

Ranch Size	Ranch Type	California	Colorado	Idaho	Montana	Nevada	North Dakota	Oregon	South Dakota	Utah	Wyoming	US Total
Small family ranches	Retirement ranch[1]	35.3	24.3	25.3	15.6	28.6	11.0	36.7	9.9	27.3	16.3	33.9
	Off-ranch primary occupation[1]	34.9	37.7	43.5	24.7	31.7	30.1	38.8	28.5	45.4	28.5	45.8
	Ranch primary occupation with low sales[1]	16.3	21.1	18.8	21.8	14.6	22.5	15.4	21.2	13.2	18.5	17.3
	Ranch primary occupation with moderate sales	4.7	6.6	5.1	14.9	7.2	16.8	3.0	17.5	3.8	14.1	0.7
Midsize family ranches		2.9	4.1	2.8	13.3	7.7	13.4	2.6	15.4	3.2	11.5	0.3
Large-scale family ranches		1.3	1.2	1.1	3.2	2.9	3.7	1.0	3.8	0.8	3.7	0.1
Very large-scale family ranches		0.4	0.2	0.2	0.2	0.4	0.1	0.1	0.2	0.0	0.2	0.0
Non-family ranches		4.2	4.8	3.3	6.3	6.8	2.4	2.6	3.4	6.3	7.2	1.8
Total		100	100	100	100	100	100	100	100	100	100	100

Source: USDA National Agricultural Statistics Service 2012, 2024

[1]Data from the 2022 Census of Agriculture did not break out small family farms with low sales into separate categories for retirement ranches, off-ranch primary occupation, and ranch primary occupation with low sales, so these percentages were estimated based on data from the 2012 census, which was the last year data was reported for these categories separately.

3.6 WILD HORSE AND BURROS

The Wild Free-Roaming Horses and Burros Act of 1971, as amended by the Federal Land Policy and Management Act of 1976 and the Public Rangeland Improvement Act of 1978, directs the protection and management of wild horses and burros on BLM-administered lands. Responsibility for wild horse and burro management is governed by 43 Code of Federal Regulations 4700. One of the BLM's top priorities is to ensure the health of the public lands so that the species depending on them, including the nation's wild horses and burros, can thrive. The BLM policies and regulations also direct that wild horses and burros are to be managed as self-sustaining populations of healthy animals.

The 53.8 million acres across the western US where wild horses or burros were found roaming at the time the 1971 Wild Free-Roaming Horses and Burros Act was passed are known as herd areas. A subset of these areas (approximately 31.6 million acres nationwide) have been determined suitable for long-term management of wild horses and burros and are known as herd management areas (WHB HMAs). Wild horses and burros within WHB HMAs are managed with the goal of maintaining sustainable ecological conditions and multiple-use relationships on federal lands. Both herd areas and WHB HMAs can include private or state lands, but the BLM has management authority only over public lands.

To carry out its duties under the 1971 law, the BLM periodically evaluates each herd area to determine whether it has adequate food, water, cover, and space to sustain healthy and diverse wild horse and burro populations over the long term. The BLM may designate an appropriate management level (AML) and specify an allowable range in horse numbers for each WHB HMA, based on the available forage and other resources necessary to sustain the horse or burro populations, as well as resource objectives and other designated uses of the BLM-administered lands.

In the planning area, there are approximately 15 million acres of wild horse and burro WHB HMAs. The BLM administers 168 WHB HMAs within California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, and Wyoming. Current conditions within the planning area show that wild horse populations continue to grow, often exceeding AMLs. As wild horse and burro populations exceed AMLs, wild horses and burros can be causal factors for failing to meet applicable standards (**Table 3-12**).

Table 3-12. Wild Horse and Burro Herd Management Areas by State

State	Acres of WHB HMAs	Statewide "High" AML	Estimated Current Population	Percent above AML
California	2,053,082	2,200	10,140	361
Colorado	365,988	827	1,873	126
Idaho	383,894	617	555	0
Montana	27,094	120	195	63
Nevada	14,032,947	12,811	46,570	264
Oregon	2,733,577	2,700	4,532	68
Utah	3,644,013	3,795	4,017	6
Wyoming	26,917,766	2,200	4,734	115
Total	**50,158,361**	**25,270**	**72,616**	**208**

Source: BLM 2022

Wild horses are often termed "living symbols of the historic and pioneer spirit of the West." (16 U.S.C. § 1331). As such, some stakeholders place a social value on horses related to this symbolism. Wild horses may also hold value for some due to an emotional connection related to the long history of human-horse interactions throughout civilization (Scasta, Henning and Beck 2018).

As discussed in Rodriguez (2020) people's emotional responses to horses as well as the increasing need for management of wild populations have resulted in controversy about this issue throughout the West (Michaels 2018; Scasta, Henning and Beck 2018; Scasta 2019) Concerns over increasing wild horse and burro populations and program costs have prompted discussions, studies, and proposals. The BLM uses wild horse and burro funding for a variety of activities, including off-range holding activities, gathers, and other activities. For fiscal year 2021, expenditures totaled an estimated $122.2 million (CRS 2022).

3.7 PUBLIC FINANCES

A summary of revenue collected from BLM mineral and energy development and public finances related to BLM public land use are included below.

3.7.1 State and Local Revenues

State and local governments collect a variety of revenues related to the use of natural resources. These revenues could be indirectly impacted by BLM management decisions on GRSG HMAs, if the decisions affect the level of use of natural resources. The following is a description of major sources of revenue and the potential link to BLM resources and resource uses.

Tax revenue at the state level is collected from various sources, including the following:

- State business income taxes and personal income taxes on employee earnings are collected for earnings on employment and industries in certain states (there is no state income tax in Wyoming).
- Severance tax is imposed on nonrenewable natural resources that are removed from the earth. Natural resources that are subject to severance taxation include metallic minerals, molybdenum, oil and gas, oil shale, and coal. Rates of taxation vary by mineral resource and state (see **Table 3-13** for the severance tax rates for oil and gas for each state in the planning area).
- State sales tax is imposed on purchases directly or indirectly associated with BLM-administered lands and resource uses (for example, purchases of household goods by livestock operators on BLM-administered lands).
- Other state revenue sources include sources such as State Conservation Fees or Wyoming's Impact Assistance Tax Program, which require developers on public lands to pay impact assistance payments as warranted by the application/plan of development approval (State of Wyoming 2021).

Table 3-13. Severance Tax Rate by State, 2023

State	Tax Type	Severance Tax (as a percentage of production revenue)	Severance Tax (per bbl of oil)	Severance Tax (per 50,000 cubic feet of gas)
California	Oil and Gas Production Assessment	N/A	$0.5038349	$2.52
Colorado[1]	Severance Tax	2.0 to 5.0	N/A	N/A
Idaho	Oil and Gas Conservation Tax	2.5	N/A	N/A
Montana	Natural Gas and Oil Production Tax	9.19 (for oil) and 9.79 (for natural gas)	N/A	N/A
Nevada	Oil and Gas Conservation Fee	N/A	$0.15	$0.15
North Dakota	Oil and Gas Gross Production Tax	5.0 (for oil production)	N/A	$3.53 (for gas production)
Oregon	Oil and Gas Production Tax	6.0	N/A	N/A

State	Tax Type	Severance Tax (as a percentage of production revenue)	Severance Tax (per bbl of oil)	Severance Tax (per 50,000 cubic feet of gas)
South Dakota	Energy Minerals Severance Tax	4.5	N/A	N/A
Utah[1]	Oil and Gas Severance Tax	3.0 to 5.0	N/A	N/A
Wyoming	Oil and Natural Gas Severance Tax	6.0	N/A	N/A

Source: National Conference of State Legislatures 2018
N/A = data not applicable
[1]The calculations of revenues from severance tax in the impacts analysis assumed a rate of 5 percent for Colorado and Utah (see Appendix 18, Appendix 10, and Chapter 4 for more details on the impacts analysis on economic conditions, including impacts on revenue from taxes and fees associated with oil and gas activity).

Tax rates can vary widely across local taxing entities within a state, and a county often includes many different taxing entities (e.g., counties, school districts, municipalities, special districts). At the local level, taxes that can be impacted by BLM-administered land uses include the following:

- Local sales tax is imposed at a variable rate based on jurisdiction. It is imposed on purchases directly or indirectly associated with BLM-administered lands and resource uses.
- Ad valorem and other property taxes, which are determined based on local mill levy rates, property valuations, and the gross value of minerals produced within their jurisdiction (including federal minerals located within their jurisdiction).

In addition to state and local taxes, states and local governments receive revenue sharing payments associated with mineral development and grazing on BLM-managed lands and minerals.

As discussed in **Section 3.1**, the leasing and development of minerals and geothermal resources generates federal revenues through rents and royalties. The Office of Natural Resource Revenue collects, accounts for, and verifies energy and mineral revenues and distributes a portion of these funds to states and counties in accordance with governing laws. As shown below, ONRR distributes millions of dollars back to mineral and energy producing states each year. The allocation of these federal disbursements between state expenditures, local distributions, and savings is dictated by statutes in each State.

Table 3-14. Office of Natural Resource Revenue Disbursements to State and Local Governments

State	2018	2019	2020	2021	2022
Utah	$76,192,140	$71,694,837	$53,902,022	$55,144,537	$89,592,227
Idaho	$4,368,184	$3,713,807	$4,575,241	$4,328,968	$4,990,428
Colorado	$112,567,174	$108,050,475	$57,115,433	$90,875,874	$142,599,470
North Dakota	$53,223,775	$93,654,132	$66,717,834	$83,389,365	$163,646,101
Nevada	$5,352,679	$6,813,611	$7,750,788	$6,712,843	$9,380,215
Wyoming	$563,955,988	$641,109,256	$457,474,034	$479,888,613	$785,726,557

Source: Office of Natural Resource Revenue: Disbursements FY 2018 - 2022 (accessed from https://revenuedata.doi.gov/query-data#)

Since fiscal revenues are collected from federal mineral extraction at multiple levels, revenue associated with federal mineral leasing and production can account for a significant portion of annual budgets at both the State and local level. Even if a State is not heavily reliant on revenues from federal mineral production, the mining sector (including oil and gas extraction) may account for a greater percentage of the local tax base

and local funding for schools, roads, and a variety of public services within communities may be more closely tied to the collection of ad valorem taxes.

In additional to federal mineral and energy revenue sharing payments, a portion of BLM grazing receipts are returned to county of origin. Under the Taylor Grazing Act, 50 percent of Section 15[12] fees collected are returned to counties, and 12.5 percent of Section 3[13] fees are returned to counties. Grazing revenue and the disbursement that are returned to the county vary by county and may have a higher level of importance at the local level for some communities.

Payments in Lieu of Taxes (PILTs)

PILTs are federal payments to local governments that help offset losses in property taxes due to nontaxable federal lands within their boundaries.[14] However, PILTs are not guaranteed and are subject to annual congressional budget appropriations.

BLM-administered lands fall under Section 6902 of the PILT law, which establishes a formula for calculating payments for qualifying acres of entitlement lands. Payment is typically made directly to the eligible local government. Section 6902 of the PILT act states that PILTs may be used by recipients (usually counties) for any governmental purpose; they are not required to be further distributed to other local government units.

The Department of the Interior computes payments authorized under Section 6902 of the act using the greater of the following two alternatives: (1) $2.94 (in 2022) multiplied by the number of acres of qualified federal surface land, reduced by the amount of funds received by the locality in the prior fiscal year, such as from the Secure Rural Schools program or the mineral leasing program; or (2) $0.42 (in 2022) multiplied by the number of acres of qualified federal surface land in the unit of local government, with no deduction for the prior year's payments. Both alternatives are subject to a population ceiling limitation computed by multiplying the county population by a corresponding dollar value (adjusted annually for inflation) contained in the act. Mineral revenue-sharing programs are factored in the PILT calculations, which means that BLM management decisions that impact mineral extractions and operations could impact PILTs disbursed to local governments.

PILTs are transferred to county or local governments, as applicable, and are in addition to other federal payments, including those from grazing fees. Counties in the Utah analysis area received about $38.2 million in PILTs in 2023 for nearly 27.9 million acres of federal lands. About 70.5 percent of the federal land in the Utah analysis area was BLM-administered land. After applying the calculated payment per acre of federal land for each county to the BLM acres, the estimated BLM-related portion of PILT revenue in the Utah analysis area was about $24.7 million. This was the highest BLM-related portion of PILT revenue to counties across all states in the analysis areas (see **Table 3-15**).

[12] Section 15 lands are public lands that lie outside a grazing district administered by the BLM under Section 15 of the Taylor Grazing Act. The BLM authorizes livestock grazing on these lands by issuing leases to private parties.
[13] Section 3 of the Taylor Grazing Act concerns grazing permits issued on BLM-administered lands within the grazing districts established under the act. It gave leasing preference to landowners and homesteaders in or adjacent to the grazing district lands.
[14] Public Law 94-565, dated October 20, 1976, was rewritten and amended by Public Law 97-258 on September 13, 1982, and was codified at 31 US Code 69. The law recognizes that local governments' inability to collect property taxes on federally owned land can create a financial impact. PILTs are in place to help mitigate the financial impact. See Public Law 94-565 and Public Law 97-258 for more details on limits and appropriations.

Table 3-15. Estimated BLM-Related PILT Revenue

State	County	2023 Total PILTs to County ($000)	Total Approximate Entitlement Acres (thousand acres)	2023 Average Payment per Acre	BLM-Administered Acres (thousand acres)	Estimated BLM-Related Portion of PILT Revenue to County ($000)
Counties in California						
California	Lassen	$2,542	1,670	$1.52	1,011	$1,540
	Modoc	$798	1,734	$0.46	273	$126
	Analysis area total	**$3,340**	**3,404**	**$0.98**	**1,284**	**$1,666**
	State total	**$61,030**	**43,713**	**$1.40**	**15,143**	**$21,142**
Counties in Colorado						
Colorado	Eagle	$2,677	851	$3.14	235	$740
	Garfield	$3,721	1,189	$3.13	670	$2,097
	Grand	$1,928	795	$2.42	135	$328
	Jackson	$232	515	$0.45	176	$79
	Mesa	$4,128	1,557	$2.65	961	$2,548
	Moffat	$989	1,672	$0.59	1,482	$876
	Rio Blanco	$674	1,499	$0.45	1,140	$513
	Routt	$2,051	663	$3.09	80	$249
	Analysis area total	**$16,399**	**8,740**	**$1.88**	**4,880**	**$7,430**
	State total	**$45,525**	**23,714**	**$1.92**	**8,159**	**$15,663**
Counties in Idaho						
Idaho	Adams	$454	551	$0.82	53	$44
	Bear Lake	$771	286	$2.70	41	$111
	Bingham	$946	301	$3.15	285	$896
	Blaine	$2,708	1,325	$2.04	606	$1,238
	Bonneville	$1,657	589	$2.81	91	$256
	Butte	$453	895	$0.51	504	$255
	Camas	$199	444	$0.45	124	$56
	Caribou	$607	446	$1.36	70	$95
	Cassia	$2,732	919	$2.97	503	$1,497
	Clark	$168	702	$0.24	345	$83
	Custer	$938	2,935	$0.32	813	$260
	Elmore	$3,071	1,357	$2.26	585	$1,323
	Fremont	$1,480	702	$2.11	144	$303
	Gem	$367	133	$2.75	71	$195
	Gooding	$793	252	$3.15	252	$793
	Jefferson	$599	190	$3.15	190	$599
	Jerome	$303	96	$3.15	90	$284
	Lemhi	$1,188	2,642	$0.45	576	$259
	Lincoln	$1,059	585	$1.81	577	$1,044
	Madison	$141	63	$2.23	19	$42
	Minidoka	$557	177	$3.15	91	$286
	Oneida	$917	408	$2.25	270	$605
	Owyhee	$1,687	3,628	$0.46	3,628	$1,686
	Payette	$200	64	$3.12	64	$199
	Power	$923	293	$3.15	197	$621

State	County	2023 Total PILTs to County ($000)	Total Approximate Entitlement Acres (thousand acres)	2023 Average Payment per Acre	BLM-Administered Acres (thousand acres)	Estimated BLM-Related Portion of PILT Revenue to County ($000)
Idaho *(cont.)*	Twin Falls	$2,009	638	$3.15	542	$1,704
	Washington	$963	341	$2.83	220	$621
	Analysis area total	**$27,890**	**20,965**	**$1.33**	**10,949**	**$15,354**
	State total	**$38,198**	**32,635**	**$1.17**	**11,619**	**$13,600**
	Counties in Montana					
Montana	Beaverhead	$943	2,053	$0.46	658	$302
	Big Horn	$19	41	$0.45	27	$12
	Blaine	$1,186	452	$2.62	451	$1,184
	Carbon	$1,360	575	$2.37	220	$520
	Carter	$267	594	$0.45	504	$227
	Chouteau	$462	156	$2.97	111	$330
	Custer	$1,037	332	$3.12	332	$1,037
	Dawson	$61	64	$0.95	62	$59
	Fallon	$52	116	$0.45	116	$52
	Fergus	$1,462	484	$3.02	345	$1,042
	Garfield	$256	815	$0.31	493	$155
	Madison	$1,187	1,056	$1.12	248	$279
	McCone	$360	274	$1.31	201	$264
	Musselshell	$39	88	$0.45	87	$39
	Petroleum	$110	335	$0.33	282	$92
	Phillips	$619	1,377	$0.45	1,078	$485
	Powder River	$267	594	$0.45	256	$115
	Prairie	$192	427	$0.45	427	$192
	Roosevelt	$2	4	$0.45	4	$2
	Rosebud	$224	326	$0.69	230	$158
	Stillwater	$553	199	$2.78	6	$15
	Sweet Grass	$688	294	$2.34	16	$37
	Treasure	$2	0.748	$2.54	0.748	$2
	Valley	$1,336	1,122	$1.19	919	$1,094
	Wibaux	$12	27	$0.45	27	$12
	Yellowstone	$244	78	$3.12	77	$239
	Analysis area total	**$12,939**	**11,884**	**$1.09**	**7,179**	**$7,947**
	State total	**$40,331**	**27,467**	**$1.47**	**7,836**	**$11,505**

State	County	2023 Total PILTs to County ($000)	Total Approximate Entitlement Acres (thousand acres)	2023 Average Payment per Acre	BLM-Administered Acres (thousand acres)	Estimated BLM-Related Portion of PILT Revenue to County ($000)
Counties in Nevada						
Nevada	Churchill	$2,797	2,135	$1.31	2,033	$2,664
	Elko	$4,129	7,905	$0.52	6,830	$3,567
	Eureka	$403	2,157	$0.19	2,013	$376
	Humboldt	$2,184	4,979	$0.44	4,318	$1,894
	Lander	$1,191	3,332	$0.36	3,007	$1,074
	Lincoln	$959	6,388	$0.15	5,611	$842
	Nye	$3,844	8,548	$0.45	6,470	$2,910
	Pershing	$1,308	2,919	$0.45	2,903	$1,301
	Washoe	$4,199	2,935	$1.43	2,652	$3,795
	White Pine	$1,456	5,186	$0.28	4,344	$1,220
	Analysis area total	**$22,470**	**46,483**	**$0.48**	**40,182**	**$19,644**
	State total	**$31,196**	**56,565**	**$0.55**	**47,729**	**$26,323**
Counties in North Dakota						
North Dakota	Bowman	$18	40	$0.45	33	$15
	Slope	$61	136	$0.45	0	$0
	Analysis area total	**$79**	**175**	**$0.45**	**33**	**$15**
	State total	**$2,006**	**1,819**	**$1.10**	**59**	**$65**
Counties in Oregon						
Oregon	Baker	$1,473	1,016	$1.45	367	$532
	Crook	$1,835	940	$1.95	496	$968
	Deschutes	$3,317	1,445	$2.29	457	$1,048
	Grant	$794	1,766	$0.45	171	$77
	Harney	$1,387	4,463	$0.31	3,880	$1,206
	Lake	$1,387	3,693	$0.38	2,484	$933
	Malheur	$3,327	4,299	$0.77	4,260	$3,297
	Union	$1,382	624	$2.21	6	$14
	Analysis area total	**$14,902**	**18,247**	**$0.82**	**12,121**	**$8,075**
	State total	**$27,162**	**31,323**	**$0.87**	**15,063**	**$13,062**
Counties in South Dakota						
South Dakota	Butte	$505	160	$3.15	146	$459
	Harding	$254	100	$2.54	30	$76
	Analysis area total	**$759**	**260**	**$2.91**	**176**	**$534**
	State total	**$8,050**	**2,813**	**$2.86**	**274**	**$785**
Counties in Utah						
Utah	Beaver	$1,308	1,285	$1.02	1,145	$1,165
	Box Elder	$3,776	1,213	$3.11	1,063	$3,311
	Cache	$869	283	$3.07	0	$0
	Carbon	$1,357	436	$3.11	403	$1,255
	Dagget	$163	362	$0.45	110	$50
	Duchesne	$2,351	897	$2.62	150	$393
	Emery	$1,464	2,245	$0.65	2,031	$1,324
	Garfield	$1,059	2,613	$0.41	1,101	$446

State	County	2023 Total PILTs to County ($000)	Total Approximate Entitlement Acres (thousand acres)	2023 Average Payment per Acre	BLM-Administered Acres (thousand acres)	Estimated BLM-Related Portion of PILT Revenue to County ($000)
Utah *(cont.)*	Grand	$1,441	1,744	$0.83	1,621	$1,340
	Iron	$3,905	1,243	$3.14	994	$3,123
	Juab	$1,448	1,538	$0.94	1,406	$1,324
	Kane	$1,226	2,299	$0.53	1,589	$847
	Millard	$1,726	3,355	$0.51	2,988	$1,538
	Morgan	$38	16	$2.37	0	$0
	Piute	$303	362	$0.84	165	$138
	Rich	$550	221	$2.48	169	$420
	Sanpete	$1,638	535	$3.06	136	$416
	Sevier	$2,439	968	$2.52	232	$584
	Summit	$1,602	532	$3.01	0.454	$1
	Tooele	$4,043	2,106	$1.92	1,946	$3,737
	Uintah	$3,605	1,830	$1.97	1,495	$2,946
	Wasatch	$1,375	462	$2.98	5	$14
	Wayne	$542	1,328	$0.41	887	$362
	Analysis area total	**$38,229**	**27,872**	**$1.37**	**19,637**	**$24,734**
	State total	**$46,208**	**32,971**	**$1.40**	**22,298**	**$31,250**
	Counties in Wyoming					
Wyoming	Albany	$1,758	674	$2.61	300	$784
	Big Horn	$1,379	1,545	$0.89	1,106	$988
	Campbell	$967	368	$2.63	228	$598
	Carbon	$1,601	2,721	$0.59	2,028	$1,193
	Converse	$985	405	$2.43	145	$354
	Crook	$875	334	$2.62	149	$392
	Fremont	$3,081	3,186	$0.97	2,083	$2,014
	Hot Springs	$953	570	$1.67	514	$860
	Johnson	$1,268	830	$1.53	502	$767
	Laramie	$30	10	$3.15	10	$30
	Lincoln	$1,755	1,946	$0.90	1,015	$916
	Natrona	$4,235	1,485	$2.85	1,449	$4,134
	Niobrara	$393	125	$3.14	124	$390
	Park	$2,420	3,593	$0.67	562	$379
	Platte	$334	106	$3.14	82	$258
	Sheridan	$1,191	439	$2.71	49	$133
	Sublette	$1,092	2,428	$0.45	1,256	$565
	Sweetwater	$3,824	4,602	$0.83	4,304	$3,577
	Uinta	$1,749	568	$3.08	531	$1,633
	Washakie	$1,365	959	$1.42	922	$1,312
	Weston	$655	309	$2.12	75	$158
	Analysis area total	**$31,909**	**27,202**	**$1.17**	**17,436**	**$21,434**
	State total	**$34,308**	**29,849**	**$1.15**	**17,472**	**$20,083**

Source: US DOI 2023

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Chapter 4. Social Setting and Nonmarket Values

4.1 Social Conditions and Community Interests

The 10-state range-wide planning area encompass a diverse landscape of social conditions, including both rural and urban populations. The socioeconomic analysis areas for each state where GRSG HMAs are located tend to be more rural areas of each state; however, the attitudes, beliefs, values, opinions, and perceptions about BLM-managed public resources and the effects of policies and actions can vary substantially across social and geographic groups around and associated with the socioeconomic analysis areas. These views and beliefs of residents, visitors, commercial users, traditional or subsistence users, tribes, and interest-based or place-based groups reflect different cultural and economic linkages that people have with BLM-administered lands. Those with common interests can typically be defined by communities of place or communities of interest, or both, as detailed below.[15]

4.1.1 Communities of Place

Communities of place are communities of people who are bound together because of where they reside, work, visit, or otherwise spend a continuous portion of their time. The various communities in the socioeconomic study areas share a strong link to the land and natural resources. Due to the size of the planning area, a narrative is not included here for all relevant communities of place. Please see state-specific discussions of key geographic areas in the 2015 Sage-Grouse Plan Amendments /EISs (BLM 2015a, 2015b, 2015c, 2015d, 2015e, 2015f, 2015g). While some changes to the population and economic conditions have occurred in communities (as described in **Chapter 2** at the county level), the key communities and concerns described in the previous plans are still applicable.

Some key concerns expressed in public comments and outlined in 2015 revolved around concern for the preservation of rural characteristics and values. For example, a shift toward larger, more mechanized agricultural operations, as well as the increasing diversification of local economies, have challenged traditional ways of life in many communities. Nevertheless, farming and ranching remain important parts of the economy, society, and culture across the socioeconomic study areas.

In some areas, particularly those with scenic and recreational amenities, farmlands and ranches are being sold and used for recreational purposes or subdivided for homesites. This is part of a larger trend in which many rural communities in the western United States have witnessed "migration turnaround," which is a reversal of the rural-to-urban migration that characterized much of the United States prior to the 1970s. Some rural areas are now experiencing a significant increase in population after decades of stability or decline.

Despite population increases across many regions of the study areas, some rural communities continue to lose population. This is due, in part, to the out-migration of young people and the aging of the existing population. In contrast to communities where in-migration is occurring, residents of these communities

[15] Additional information on social characteristics of counties in Nevada can be found in the county-level socioeconomic baseline reports published by the Nevada Economic Assessment Project, accessed here: https://extension.unr.edu/neap/about-neap-program.aspx.

may be more concerned about the economic survival of their communities. Multiple-use management of and access to BLM-administered lands, which comprise a large portion of lands in many counties, are cited as paramount concerns in these areas (BLM 2006a).

Residents expressed some similar themes during public scoping and the June 2012 Economic Strategies Workshop (BLM and Forest Service 2012; BLM 2012b). Comments supported maintaining or expanding access to BLM-administered lands for grazing, recreational purposes, and mineral extraction. Many expressed concern that placing additional constraints on these activities might create economic hardship within their communities and alter traditional cultural values and lifestyles. Additionally, some argued that constraints on livestock grazing would exacerbate existing trends of conversion of ranch lands to agricultural and residential uses, perhaps with the unintended consequence of decreasing open space and wildlife habitat.

4.1.2 Communities of Interest

Communities of interest are organizations and groups of individuals who have common interests and views in the use and management of BLM-managed public resources. Many organizations or groups of individuals may belong to or share values with more than one community of interest. While the specific relevant communities of interest, and the relative importance of these groups in a given area, vary through the planning area, key overall groups have been identified based on input from the 2015 Sage-Grouse Plan Amendments/EISs and public input. These are summarized below.

Habitat and resource conservation communities of interest are organizations and groups of individuals who have a number of conservation objectives; most believe broadly that protecting at-risk species and maintaining habitats and ecosystems for all species, including GRSG habitats, are fundamental values that should be a high priority in public policy (Brown et al. 2015). Within the socioeconomic analysis areas, many conservation communities believe in the intrinsic value of GRSG and well-functioning, healthy sagebrush ecosystems. Conservation communities could also include persons and organizations concerned with protecting wild horses and burros. These communities emphasize the need to safeguard nonuse values associated with natural resources, as further described in the section below.

Other interest groups with ties to use values of GRSG include those who hunt GRSG for recreational purposes and those who hunt GRSG for subsistence use. While the rational for valuation of the species may vary from those groups who emphasize conservation, both groups are generally supportive of management that would provide for sustained habitat to support the species for the long term.

Mineral development and production communities of interest are organizations and groups of individuals who believe mineral development is a vital component of national, state, and local economies—creating jobs, generating income, and contributing tax and royalty payments to all levels of government. Throughout the socioeconomic analysis areas, many of these communities also believe mineral development and production are socially important, because they support the social systems of local communities by providing private sector livelihoods and revenues to governments. With respect to oil and gas production, these communities believe that domestic development and production are important to national energy security. They believe that many years of compatible development have been achieved in the area, providing significant benefits to the local and regional economy. This group can also include businesses with a tie-in to oil and gas development and production. Those with development as a common interest are likely to prioritize management that emphasizes continued economic contributions associated with this use.

Intertwined with the above communities of shared interest are state, county, and local governments and local residents. State, county, and local governments strive to protect the interests of the residents, and they support various communities by funneling tax revenue into important public infrastructure and services. Some residents across the socioeconomic analysis areas seek to preserve the historical agricultural setting of the community and are reluctant to embrace change, especially changes that could impact the way of life and the character of the community. Some residents are concerned about increased demands on local government services and infrastructure. Other residents are concerned about changes that could impact economic and business opportunities, in the form of changes in employment and earnings. Local chambers of commerce are another example of a specific group with an interest in economic tie-ins with GRSG management.

Other specific types of business groups with a tie-in to GRSG management include those associated with real estate, tourism, and recreation. These groups would benefit from management that allows for continued or increased recreational and tourism activities on BLM-administered lands. In addition, individuals and groups who represent farming and ranch operators can be impacted by GRSG management decisions, which impact the level and locations of grazing on BLM-administered lands and the jobs and socioeconomic contributions associated with these uses.

Academic institutions work to preserve, learn, and pass on knowledge about natural resources, such as GRSG, and represent a group with common interests.

Federally recognized tribes are sovereign nations who value public land and resources for their cultural and spiritual significance. For tribal members, protecting cultural resources, combined with maintaining access to traditional cultural sites, is extremely important. These cultural sites include areas of past occupation and also areas where traditional practices, such as plant gathering and hunting, have occurred. Other groups and individuals with interests in archaeology and history also value cultural resources, though these should not be conflated with the unique relationships and responsibilities upheld by the BLM with tribal nations.

The factors that interest groups perceive as impacting GRSG, and the ways in which GRSG management is seen as impacting communities, may vary by the community of interest. One recent study examined different stakeholder groups and their perspectives on factors most important for GRSG species management. Viewpoints toward the role of climate change and predators in sage-grouse management varied most among stakeholder groups, while less division was present related to the importance of sod-busting (breaking up new ground for cultivation) and concerns for the economic impacts of listing GRSG as an endangered species.

4.2 NONMARKET VALUES

BLM-administered lands provide a range of goods and services that benefit society in a variety of ways. Some of these goods and services, such as solid and fluid minerals, are bought and sold in markets; hence, they have a readily observed market value. Others have a less clear connection to market activity, even though society derives benefits from them. In some cases, goods and services have both market and nonmarket values. This section provides an overview of several nonmarket values associated with GRSG management.

For the purposes of this effort, the BLM defines "value" as the combination of all benefits that people receive from BLM-managed lands and resources. Total value is the sum of market value from economic activities and nonmarket value. However, it is important to note that nonmarket values, in the discussion below, are not directly comparable to the previous sections that describe various resource uses and revenue on BLM-administered lands. The market indicators discussed above describe the effects on economic (market) activity in the region, and the market values of many of the activities are monetized. However, nonmarket

values tend to differ across groups and individuals based on preferences, so there are challenges associated with monetizing nonmarket values. Therefore, nonmarket values are discussed qualitatively.

The nonmarket values associated with GRSG management on BLM-administered lands include both use (direct and indirect) and nonuse values (such as existence values and bequest values held by the general public from self-sustaining populations of GRSG; BLM 2013). This section provides an overview of the use and nonuse nonmarket values that may be affected by management of GRSG HMAs.

Nonmarket values associated with GRSG and GRSG habitat can also be viewed through the lenses of ecosystem services. Ecosystem services, or the benefits that people receive from nature, are commonly classified within four major categories: regulating, provisioning, cultural, and supporting (Millennium Ecosystem Assessment 2005). Sagebrush environments, which support GRSG populations, provide numerous ecosystem services, such as providing services associated with food products from livestock production; hunting; other recreational opportunities; and the provision of water for municipal, industrial, and irrigation uses. In addition, intact sagebrush ecosystems reduce wildfire return intervals and host many species of wildlife, including game animals and other sensitive, threatened, and endangered species. Healthy sagebrush ecosystems sequester carbon, which can be enhanced through conservation efforts on public lands (Bennett and Pierce 2020).

People also receive intrinsic benefits from nature that are diverse in inspiration but consistently highly valued. These could be intrinsic benefits from seeing or knowing a flourishing, biodiverse sagebrush ecosystem exists; intrinsic benefits from feeling secure such habitats will exist for the enjoyment and health of future friends and family members; or intrinsic benefits from preserving ancestral/heritage/cultural connections established through sagebrush ecosystems and the GRSG species. Comparatively, there are others whose non-market values associated with public lands, including intrinsic and bequest values, are threatened by land use restrictions associated with GRSG HMAs.

4.2.1 Mineral Extraction and Development (including Leasable Minerals, Locatable Minerals, and Mineral Materials)

Most of the value associated with mineral extraction is economic value from the market activities. However, many mine operators and workers gain additional value through the lifestyle of working at a mine. Many mine workers come from generations of people who work in mines, and there can be social cohesion from families of mine workers.

4.2.2 Livestock Grazing

Public lands managed for livestock grazing provide both market values (for example, forage for livestock) and nonmarket values. The ranching community benefits from multiple sagebrush ecosystem services, including supporting services that provide forage for livestock, which in turn allow for provisioning services, such as beef production.

However, many ranchers value the ranching lifestyle more than the income generated by their ranching operations. Beyond jobs and income associated with ranching, the lands associated with ranching also contribute to the quality of life and enjoyment for many area residents and visitors by supporting open space, wildlife habitat, working landscapes, and a rural lifestyle (Brymer et al. 2018). One primary reason ranchers indicate they own land is for the "tradition, values and culture" rather than primarily for profit (Tanaka et al. 2005).

In a survey of 645 ranchers in the western United States (not exclusive to sagebrush areas), participants identified the cultural values of maintaining their families' traditions and values as the most important reason for owning a ranch, followed by passing on the ranch and ranch lifestyle to future generations (Tanaka and Maczko 2017). Many public land ranchers work elsewhere part-time and rely on the ranch for only 20 percent of their income (Hanus 2011), relying instead on outside jobs or other savings to support their ranching operation. Families that work off the ranch may do so for health insurance reasons as well as supplemental income. Income from outside of the ranch may also be needed due to increased pressure of government regulation. Changes related to regulation and management practices of grazing affect ranching operations, ability to operate, and the continued activity of ranching in the West.

Some studies have found nonmarket values of ranching associated with use values to residents (Mangun et al. 2005) and tourists in the form of open space and western ranch scenery (Ellingson et al. 2006). Others see nonmarket opportunity costs associated with livestock grazing that may, depending on management methods and other variables, reduce native plant species and forage for wildlife (Todres et al. 2003).

4.2.3 Wild Horse and Burros

Values associated with wild horses and burros vary depending on the viewpoints of different individual groups. Some groups highly value horses and consider them as beloved animals that should receive a greater share of BLM resources. Groups valuing wild horses and burros emphasize the importance of the existence value associated with the preservation of free-roaming populations; they often note factors such as historical and cultural values and view wild horses as a symbol of the West.

Other groups view free-roaming horses as interlopers that place additional stress on fragile ecosystems, and compete with livestock and native wildlife for forage and water (National Academies of Sciences, Engineering, and Medicine 2013).

Most WHB HMAs contain GRSG habitat in a sagebrush vegetation community. Overall management direction is to manage for healthy populations of wild horses and burros to achieve a thriving natural ecological balance with respect to wildlife, livestock use, and other multiple uses. Protecting areas from surface-disturbing activities for the purpose of protecting GRSG would also protect forage for wild horses and burros and limit conflicts with humans or surface disturbance. BLM management decisions that restrict WHB HMAs for the protection of GRSG might increase the cost associated with managing wild horses, but impacts are not likely to be material.

4.2.4 Greater Sage-Grouse Conservation

Economists have long recognized that wildlife species, especially rare, threatened, and endangered species, have economic values beyond just viewing. This is supported by a series of legal decisions and technical analyses. The US Court of Appeals in 1989 first clarified that the Department of the Interior, in assessing damages in Natural Resource Damage Assessment cases, should include what it termed as "passive use values" (that is, existence values provided to nonusers of the species) as a compensable value in addition to any use value. These passive use values are also included in Oil Pollution Act damage assessments. The term "passive use values" is interchangeable with the previously defined term "nonuse values." This ruling and subsequent analysis for Natural Resource Damage Assessment and Oil Pollution Act assessments are consistent with well-established economic theory showing that people derive value from passive use or nonuse as well as active uses of resources (Krutilla 1967). Economists have devoted a great deal of theoretical and empirical work to refining concepts and developing methods to measure these passive use values.

The BLM conducted a literature search to demonstrate the potential range of values that could be associated with species that are candidates for listing as threatened or endangered, such as GRSG populations. Analysts first verified there are no existing studies on the total economic value or nonuse valuation specific to the GRSG. This is not an uncommon occurrence, as there are dozens of rare or potentially threatened species that have not been studied, despite the very high policy relevance of the species and the large magnitude of economic value at stake in these policy decisions.

The BLM used three criteria to identify studies that are most applicable to the current analysis: (1) whether the species valuation study was located in the same geographic region as the GRSG HMAs; (2) whether the species was listed as threatened or endangered; and (3) whether the species was hunted (implying a mix of use and nonuse values). No studies met all three criteria, as there are no other species in the literature in the geographic region (intermountain) for a species that is both hunted and listed as sensitive.

The primary article used by the BLM was the peer-reviewed journal article by Richardson and Loomis (2009), which is a compilation of the economic values of threatened, endangered, and rare species. A literature review was also conducted to determine whether there had been any recent studies on GRSG or closely related species provides a summary of the studies with features most similar to the GRSG species.

Table 4-1. Existing Estimates of the Annual Total Nonmarket Value of Protecting Habitat for Species Similar to GRSG

Region	Species	Listed	Hunted	Annual Value per Household[b]	Change Valued
Four Corners (Arizona, Colorado, New Mexico, and Utah)	Mexican spotted owl	Yes	No	$77.20	Avoid extinction in 15 years in the Four Corners region
New England	Wild turkey	No	Yes	$22.07	Avoid extinction in New England
Texas (also Louisiana, New York City, Chicago, and Atlanta)	Whooping crane	Yes	No	$57.67	Avoid extinction
Maine	Peregrine falcon	Yes	No	$42.72	Restore self-sustaining population
South Carolina and the rest of the US	Red-cockaded woodpecker	Yes	No	$19.39	Restore habitat to increase the chance of survival to 99 percent
Atlantic coast	Atlantic red knot	Yes	No	$21.64	Avoid extinction

Sources: Loomis and Ekstrand 1997 (Mexican spotted owl); Stevens et al. 1991 (New England wild turkey); Bowker and Stoll 1988 (whooping crane); Kotchen and Reiling 2000 (peregrine falcon); Reaves et al. 1999 (red-cockaded woodpecker); Myers 2014 (Atlantic red knot)
All these sources, with the exception of Myers 2014, are as cited in Richardson and Loomis (2009). Myers 2014 is cited in Subroy et al. 2019.
Notes: Stated preference values for households may have a degree of hypothetical bias that could overstate the actual monetary amount households would pay by a factor of two to three. All values are adjusted to $2023.

Chapter 5. Environmental Justice

5.1 Introduction

This section supports the environmental justice screening of the GRSG range-wide analysis area, focusing on the counties within California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming that encompass a substantial amount of BLM-administered acres in GRSG HMAs, as detailed in **Chapter 1**, Introduction.

Environmental justice embodies the principle of fair treatment and meaningful involvement for all individuals, regardless of their race, color, national origin, or income, in relation to the formulation, execution, and enforcement of environmental laws, regulations, and policies. It underscores the essential concept that no specific group, whether defined by race, ethnicity, or socioeconomic status, should disproportionately bear the adverse environmental impacts arising from industrial, municipal, or commercial activities, or the implementation of federal, state, local, and tribal programs and policies (BLM 2005).

Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994), mandates federal agencies to identify and address disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations in the United States. The EO mandates that each federal agency "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations" (59 *Federal Register* 7629 [1994]). EO 14096, Revitalizing Our Nation's Commitment to Environmental Justice for All, enacted on April 21, 2023, complements EO 12898.

Furthermore, the BLM Land Use Planning Handbook (BLM 2005), emphasized by the significance outlined in Instruction Memorandum 2022-059, reinforces the BLM's dedication to environmental justice. This commitment is evident in providing substantial opportunities for low-income, minority, and American Indian and Alaska Native populations to meaningfully participate and in considering these populations when developing mitigation measures, as appropriate.

5.2 Environmental Justice Screening Criteria

For this analysis, the BLM analyzed minority populations, low-income populations, and American Indian and Alaska Native populations within each applicable county within each state, as identified above, using the definitions and thresholds outlined in guidance documents from the Council on Environmental Quality (CEQ) and the BLM Instruction Memorandum 2022-059 (CEQ 1997; BLM 2022a).

The CEQ defines minorities as individuals who identify as American Indian or Alaska Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic. A minority environmental justice population is recognized if the percentage of minority individuals constitutes greater than or equal to 50 percent of the total population within a given area or if the minority population percentage is "meaningfully greater" than the minority population percentage in a reference area (CEQ 1997). To determine whether a minority population is "meaningfully greater," the minority population percentage in the reference area is multiplied by 1.1 (equivalent to 110 percent) to calculate a threshold value (BLM 2022a). Subsequently, each county's minority population percentage within that state is compared against this calculated threshold. Counties with

minority populations meeting or exceeding this threshold are identified as having potential environmental justice populations.

This comprehensive approach ensures that both clear numerical benchmarks and relative comparisons are considered in identifying minority environmental justice populations. For the purposes of this analysis, the state serves as the reference area. In California and Nevada, which are states with large urban metropolitan areas, the percentage of the population in non-metropolitan areas of the state are used as the reference area populations. GRSG HMAs are largely in rural areas, so non-metropolitan areas would allow a more consistent comparison of regions without including any outliers in demographic data from metropolitan areas.

Low-income populations are defined relative to the annual statistical poverty thresholds from the US Census Bureau (CEQ 1997). The CEQ guidance does not provide criteria for determining low-income populations as explicitly as it does for minority populations; however, the BLM defines low-income individuals as people whose income is less than or equal to twice (200 percent of) the federal poverty level (BLM 2022a). For this analysis, low-income populations were identified following guidance in BLM IM 2022-059. A county is considered to have a significant low-income population and contain environmental justice populations when its low-income population percentage is greater than or equal to 50 percent of the overall population or if the low-income population percentage is greater than or equal to the low-income population percentage of a reference area. Similar to minority populations, the state is used as the reference area for low-income populations except as noted above.

American Indian and Alaska Native individuals are defined as those who identify as American Indian and Alaska Native alone or in combination with one or more races, or they are part of a federally recognized tribe. American Indian and Alaska Native populations are included in minority populations; however, to explore key issues and resources in the analysis areas that are important to individuals who identify as American Indian and Alaska Native, this analysis uses a more sensitive threshold than the threshold for minority populations to identify American Indian and Alaska Native environmental justice populations separately from minority environmental justice populations. For the purposes of this analysis, American Indian and Alaska Native environmental justice populations are considered present when the percentage of American Indian and Alaska Native individuals in a county is greater than or equal to 50 percent or greater than or equal to the percentage of American Indian and Alaska Native individuals in the reference area. As with minority and low-income populations, the reference area for comparing American Indian and Alaska Native populations is the state. Non-metropolitan data are used for American Indian and Alaska Native populations in California and Nevada to exclude any outliers in demographic data from metropolitan areas.

The CEQ instructs agencies to seek tribal representation in a manner that is consistent with the government-to-government relationship between the United States and tribal governments, the federal government's trust responsibility to federally recognized tribes, and any treaty rights (CEQ 1997; see Section 5.2.1 of the 2024 Greater Sage-Grouse Draft Resource Management Plan Amendment and Final Environmental Impact Statement for more details on tribal consultation for this effort).

Appendix A includes tables showing the percentage of minority, low-income, and American Indian and Alaska Native populations for each state in the range-wide planning area. They include each county in the analysis area with a large portion of BLM-administered lands in GRSG HMAs. The tables also indicate whether the county met the threshold for minority, low-income, and/or American Indian and Alaska Native populations and is therefore identified as an environmental justice population. **Appendix A** also includes

figures of each state that indicate which counties in the analysis areas are identified as an environmental justice population.

Both counties included in the California analysis area for having a large area of BLM-administered land in GRSG HMAs were identified as containing environmental justice populations (see **Table A-30** and **Figure A-11** in **Appendix A**). The state of California overall has a non-metropolitan minority population of 29.3 percent, and the threshold for a minority environmental justice population is 32.2 percent. In the California analysis area, Lassen County exceeds the threshold for minority populations, with a minority population of 36 percent, and qualifies as a minority environmental justice population. The low-income threshold in California is 29 percent. Both Lassen County and Modoc County exceed the threshold for low-income populations and are identified as environmental justice populations. California has a non-metropolitan American Indian and Alaska Native population of 5.9 percent; however, neither county in the California analysis area exceeds the threshold for American Indian and Alaska Native populations.

Overall, seven of the eight counties in the Colorado analysis area were identified as having environmental justice populations (see **Table A-31** and **Figure A-12** in **Appendix A**). The minority population in Colorado is 33.2 percent, and the threshold for minority populations is 36.5 percent. Notably, none of the counties within the Colorado analysis area meet the criteria for a "meaningfully greater" minority population, which would classify them as environmental justice populations. However, the Colorado analysis area does encompass seven counties where the low-income population equals or exceeds the state's designated low-income threshold of 23.6 percent. Furthermore, Moffat County and Rio Blanco County have American Indian and Alaska Native populations that exceed the state's American Indian and Alaska Native population threshold of 2.5 percent, highlighting their significance in relation to American Indian and Alaska Native communities.

In the Idaho analysis area, 25 of the 27 counties meet the criteria for containing environmental justice populations that could face disproportionate and adverse impacts from BLM management decisions on GRSG HMAs (see **Table A-32** and **Figure A-13** in **Appendix A**). In Idaho, the minority population constitutes 19.4 percent of the total population, and the threshold for minority environmental justice populations is 21.3 percent. Fourteen counties surpass the meaningfully greater threshold for a minority population, designating them as environmental justice populations. Across the Idaho analysis area, 24 counties have a low-income population equal to or exceeding the state threshold of 31.3 percent. Additionally, 14 counties in the analysis area have American Indian and Alaska Native populations that meet or exceed the threshold for environmental justice populations, which is 2.6 percent for the state of Idaho.

In the Montana analysis area, 18 of the 26 counties were identified as environmental justice populations that could be adversely affected by BLM management decisions on GRSG HMAs (see **Table A-33** and **Figure A-14** in **Appendix A**). For minority populations, seven counties exceed the threshold for a meaningfully greater minority population of 16.4 percent, marking them as environmental justice populations. Across the analysis area, 18 counties demonstrate a higher low-income population than the state threshold of 31.1 percent. Seven counties also meet or exceed the state threshold of 8.2 percent for American Indian and Alaska Native environmental justice populations. Examining geographic clusters and their connection to the GRSG HMAs is pivotal to understanding the impacts of BLM management decisions on GRSG HMAs. These 18 counties are largely located in central Montana, as well as along Montana's southern, eastern, and western borders.

The entire Nevada analysis area is identified as containing environmental justice populations that could be impacted by BLM management decisions on GRSG HMAs (see **Table A-34** and **Figure A-15** in

Appendix A). The non-metropolitan population for minority populations in Nevada is 28.8 percent, with a threshold for minority populations of 31.7 percent. In the Nevada analysis area, four counties—Elko, Humboldt, Pershing, and Washoe Counties—surpass the threshold for a meaningfully greater minority population, marking them as environmental justice populations. Five counties—Eureka, Humboldt, Lander, Nye, and Pershing Counties—have low-income populations equal to or exceeding the state average of 31.2 percent. All 10 counties in the Nevada analysis area meet or exceed the threshold of 2.5 percent for American Indian and Alaska Native populations.

No county in the North Dakota analysis area is identified as containing an environmental justice population (see **Table A-35** and **Figure A-16** in **Appendix A**). In North Dakota, the minority population constitutes 16.9 percent of the total population, and the threshold for minority populations is 18.6 percent. No counties in the North Dakota analysis area surpass the threshold for a meaningfully greater minority population. No counties in the North Dakota analysis area demonstrate a low-income population exceeding the state threshold of 25.2 percent. Also, no counties include a higher American Indian and Alaska Native population than the state threshold of 6.8 percent.

Overall, seven of the eight counties in the Oregon analysis area were identified as environmental justice populations (see **Table A-36** and **Figure A-17** in **Appendix A**). In Oregon, the minority population is 25.9 percent of the total population, with a threshold for a minority population of 28.5 percent. Only one county in the Oregon analysis area, Malheur County, surpasses the threshold, designating it as an environmental justice population. For low-income populations, seven counties in the Oregon analysis area contain low-income populations equal to or exceeding the state average of 28.7 percent. These counties are Baker, Crook, Grant, Harney, Lake, Malheur, and Union Counties. For American Indian and Alaska Native populations, three counties in the Oregon analysis area meet or exceed the state threshold of 3.3 percent: Harney, Lake, and Malheur Counties. These counties identified as environmental justice populations could be impacted by BLM management decisions on GRSG HMAs.

One county in South Dakota's analysis area, Butte County, is identified as containing an environmental justice population, and the environmental justice population in this county could be impacted by the BLM management decisions regarding GRSG HMAs (see **Table A-37** and **Figure A-18** in **Appendix A**). No county in the South Dakota analysis area exceeds the threshold for a meaningfully greater minority population of 21.1 percent or the threshold for American Indian and Alaska Native populations of 10.4 percent. However, Butte County has a higher low-income population than the state's threshold of 29.0 percent. These data indicate that while there are not environmental justice populations based on minority population in South Dakota, attention should be given to the county with a meaningfully greater low-income population to assess its relationship to the GRSG HMAs and potential environmental justice impacts.

Across the Utah analysis area, 18 of the 23 counties are identified as environmental justice populations (see **Table A-38** and **Figure A-19** in **Appendix A**). The minority population in the state of Utah is 22.7 percent, and the threshold for minority population is 25.0 percent; however, no counties in the Utah analysis area surpass the threshold for a meaningful greater minority population. For low-income populations, 17 counties have a higher low-income population than the state's threshold of 24.7 percent. For American Indian and Alaska Native populations, 10 counties meet or exceed the American Indian and Alaska Native population threshold of 2.0 percent. These counties that are identified as containing environmental justice populations could experience impacts from BLM management decisions on GRSG HMAs.

In the Wyoming analysis area, 15 of the 21 counties are identified as containing environmental justice populations (see **Table A-39** and **Figure A-20** in **Appendix A**). Six of these counties surpass the

threshold for a meaningfully greater minority population of 17.6 percent, designating them as environmental justice populations. Moreover, 12 counties in the analysis area contain a higher low-income population than the state threshold of 26.5 percent. For American Indian and Alaska Native populations, two counties, Fremont County and Weston County, exceed the American Indian and Alaska Native population threshold of 3.7 percent. These counties that are identified as containing environmental justice populations could be impacted by the BLM management decisions regarding GRSG HMAs. These data underscore the presence of environmental justice populations and a heightened low-income population in multiple counties in Wyoming, indicating a need for specific attention to these populations in the context of GRSG HMAs and potential environmental justice impacts.

The findings of areas containing environmental justice populations in the analysis areas for each state were instrumental in evaluating potential disparities in the impacts of various alternatives on minority and low-income populations. Because counties were identified as containing environmental justice populations, as discussed above, the BLM management decisions on GRSG HMAs could impact environmental justice populations disproportionately. The following section includes a discussion of environmental justice issues of concern raised in the previous efforts in 2015.

5.3 Environmental Justice Issues of Concern

As discussed above, Environmental justice includes the principle of meaningful involvement for all individuals, regardless of their race, color, national origin, or income. In 2022 through 2024, the BLM initiated formal consultation with tribes and outreach and meetings with the public, including those who meet the criteria for environmental justice consideration that have interests or traditional cultural properties in the analysis area. In January 2022, the BLM held two virtual public scoping meetings at different times during the day to encourage public participation across a wide group of people in various locations and to accommodate various needs. The meetings were recorded and shared on the project's ePlanning website for those who were unable to attend. In 2012, the BLM and the Forest Service conducted an economic strategies workshop to identify public concerns related to potential social, economic, and environmental justice impacts resulting from management alternatives (BLM and Forest Service 2012; BLM 2012; see Chapter 5, Consultation and Coordination, for more detail on government-to-government consultations with tribes as well as meetings and outreach to the public for this effort).

The BLM maintains the project's ePlanning website as well as a national GRSG conservation website that aims to help the public learn how BLM is working on maintaining and restoring GRSG. These sites provide background information, updated documents, information on public meetings, and contact information.

Comments that the BLM received during these outreach efforts helped guide resource and impact analysis considerations. Additionally, the agencies reviewed the scoping report for the current EIS to identify comments related to environmental justice issues. This section summarizes findings from those efforts and discusses the issues that will be addressed in the impacts analysis on environmental justice populations.

A key issue of concern relating to environmental justice populations for many of the states, including California, Nevada, Colorado, Idaho, Montana, Oregon, South Dakota, and Utah, largely pertained to the interests of those who identify as American Indian and Alaska Native, the cultural significance of the GRSG to American Indian and Alaska Native populations, and the importance of hunting and subsistence. Some concerns revolved around the viability of GRSG populations. Historical records highlight the importance of GRSG to individuals who identify as American Indian and Alaska Native across the planning area who traditionally relied on GRSG as a vital food source. GRSG has played a vital role in traditions and customs, and it has served as inspiration for ceremonial dances.

It was noted that the preservation of GRSG habitat would have beneficial effects for those who identify as American Indian and Alaska Native who hold cultural value for the bird (BLM and Forest Service 2012). American Indian and Alaska Native populations across the planning area engage in hunting and subsistence activities on federal lands outside the boundaries of their reservations. Access to hunting and subsistence resources is a concern for many environmental justice populations within the state analysis areas, especially for American Indian and Alaska Native populations. The profound connection between the GRSG habitat and Native American culture underscores the importance of considering these aspects in the planning and decision-making processes. On the other hand, some comments expressed concern that habitat conservation in some alternatives could negatively impact road realignment projects near their reservation and plans to expand their reservation boundaries; this is because their reservation is surrounded by PHMAs.

Another issue of concern for environmental justice populations was regarding economic impacts on environmental justice populations from greater restrictions on livestock grazing and mineral, oil and gas, and renewable energy development. This issue was especially of concern in counties with high poverty rates and declining economic opportunities (BLM 2013b). However, at the time this report is being published, there is a lack of evidence that the types of operations that are most likely to be impacted by BLM management decisions employ a higher percentage of people who identify as a minority, low-income, or American Indian and Alaska Native. These types of operations that are most likely to be impacted by BLM management decisions include mining, renewable energy, and ranching and livestock operations—especially small family-owned ranches and livestock operations (see Section 3.5, Livestock Grazing, in this Appendix for more information on ranch types that are most likely to be affected by BLM decisions).[16] Therefore, there is not evidence that impacts on economic conditions due to BLM decisions will lead to disproportionate impacts on environmental justice populations, and economic impacts on environmental justice populations will not be carried forward in the impacts analysis on environmental justice populations. Impacts on economic conditions may occur across the analysis area, and these impacts on economic conditions from restrictions on livestock grazing and mineral, oil, and gas development are analyzed and discussed in the impacts analysis on social and economic conditions as it relates to all populations in surrounding communities. Additional screening and consideration of environmental justice populations and analysis of any disproportionate and adverse impacts will occur at the implementation stage at a scale commensurate with the scope and scale of management actions being considered to provide additional protections for local GRSG populations. Depending on conditions at that time, communities with environmental justice concerns may change

In Wyoming and Idaho, issues of concern were brought up relating to impacts on food prices and availability due to restrictions on grazing and mineral development (especially trona mining, which is used in household and food products). These comments were brought up in the context of economic conditions; however, increases in food prices and decreases in food availability tend to disproportionately impact low-income individuals who have more limited means for finding alternatives; therefore, this issue of concern will be carried forward and examined in the impacts analysis on environmental justice populations.

The 2015 EISs contained issues that were not brought up in public comments but were considered important issues for environmental justice populations; these issues were analyzed in the impacts analysis on environmental justice populations. One of these issues was the impact on environmental justice populations from changes in availability for firewood permits. The current BLM management decisions, however, will not

[16] Small family-owned ranches and livestock operations tend to employ more family workers and fewer wageworkers than agricultural and crop farms. Wageworkers, such as grader and sorter farm laborer, tend to include high percentages of individuals who identify as part of an environmental justice population (USDA Economic Research Service 2023).

change the availability for firewood permits; therefore, this issue of concern will not be carried forward in the impacts analysis.

Visual and auditory impacts on environmental justice populations from mining development and operations and travel management decisions were other issues that were considered in the 2015 EISs. The previous 2015 plans included specific management decisions that could impact areas used for spiritual and religious practices, but these types of site-specific decisions are not included in the current effort. Therefore, impacts on environmental justice populations from visual and auditory disruptions will not be carried forward in the impacts analysis. Impacts on visual and auditory resources will be considered for potential inclusion in the implementation-level NEPA analysis.

In addition to the issues raised by the public, as discussed above, the BLM will consider and analyze other issues of concern for environmental justice populations. These issues include impacts on environmental justice populations from potential changes in water quality, air quality, and climate change from potential mineral development under alternatives with less restrictions. These issues were not analyzed in the 2015 EISs; however, they are considered important to the analysis in the current efforts.

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Chapter 6. References

Bartis, T. J., T. LaTourrette, L. Dixon, D. J. Peterson, and G. Cecchine. 2005. Oil Shale Development in the US Prospects and Policy Issues. RAND Corporation. Internet website: https://www.rand.org/content/dam/rand/pubs/monographs/2005/RAND_MG414.pdf.

BEA (US Bureau of Economic Analysis). 2010a. Total Full-time and Part-time Employment by NAICS Industry. Internet website: https://apps.bea.gov/itable/?ReqID=70&step=1#eyJhcHBpZCI6NzAsInN0ZXBzIjpbMSwyNCwyOSwyNSwzMV0sImRhdGEiOltbIlRhYmxlSWQiLCIzMyJdLFsiQ2xhc3NpZmljYXRpb24iLCJOQUlDUyJdLFsiTWFqb3JfQXJlYSIsIjQiXV19.

_____. 2010b. CAINC5N Personal Income by Major Component and Earnings by NAICS Industry. Internet website: https://apps.bea.gov/iTable/?reqid=70&step=1&acrdn=6#eyJhcHBpZCI6NzAsInN0ZXBzIjpbMSwyNCwyOSwyNSwzMV0sImRhdGEiOltbIlRhYmxlSWQiLCIzMiJdLFsiQ2xhc3NpZmljYXRpb24iLCJOQUlDUyJdLFsiTWFqb3JfQXJlYSIsIjQiXV19.

_____. 2021a. Total Full-time and Part-time Employment by NAICS Industry. Internet website: https://apps.bea.gov/itable/?ReqID=70&step=1#eyJhcHBpZCI6NzAsInN0ZXBzIjpbMSwyNCwyOSwyNSwzMV0sImRhdGEiOltbIlRhYmxlSWQiLCIzMyJdLFsiQ2xhc3NpZmljYXRpb24iLCJOQUlDUyJdLFsiTWFqb3JfQXJlYSIsIjQiXV19.

_____. 2021b. CAINC5N Personal Income by Major Component and Earnings by NAICS Industry. Internet website: https://apps.bea.gov/iTable/?reqid=70&step=1&acrdn=6#eyJhcHBpZCI6NzAsInN0ZXBzIjpbMSwyNCwyOSwyNSwzMV0sImRhdGEiOltbIlRhYmxlSWQiLCIzMiJdLFsiQ2xhc3NpZmljYXRpb24iLCJOQUlDUyJdLFsiTWFqb3JfQXJlYSIsIjQiXV19.

Bennett, Drew E., and Julie Suhr Pierce. 2020. Sagebrush Conservation Strategy — Challenges to Sagebrush Conservation. Chapter 2- Human Dimensions of Sagebrush. Prepared for the US Geological Survey. Internet website: https://pubs.usgs.gov/of/2020/1125/ofr20201125.pdf.

Bentley Brymer, A. L., D. T. Taylor, J. Wulfhorst, L. A. Torell, N. R. Rimbey, and J. A. Tanaka. 2018. "Economic and social impact assessment of ranching on public lands: A guide to concepts, methods, and applications." *Journal of Rangeland Applications* 4. Internet website: https://thejra.nkn.uidaho.edu/index.php/jra/article/view/17.

Berryhill, H. B. Jr., D. M. Brown, A. Brwon, and D. A. Taylor. 1950. Coal Resources of Wyoming. United States Department of the Interior, Geological Survey Circular 81. Washington, DC. September 1950.

BLM (United States Department of the Interior, Bureau of Land Management). 2004. Mineral Occurrence and Development Potential Report, Casper Field Office Planning Area. Casper, Wyoming.

_____. 2009. Approved Resource Management Plan Amendments/Record of Decision (ROD) for Designation of Energy Corridors on Bureau of Land Management-Administered Lands in the 11 Western States. Washington, DC. January 2009.

_____.2013. Bureau of Land Management Socioeconomics Program Guidance: Economic Methods for Estimating Nonmarket Environmental Values. Internet website: https://www.blm.gov/sites/blm.gov/files/uploads/IM2013-131_a1.chg1_.pdf.

_____. 2015a. Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS. Internet website: https://eplanning.blm.gov/eplanning-ui/project/105596/570.

_____. 2015b. Northwest Colorado Greater Sage-Grouse Proposed LUPA/Final EIS. Internet website: https://eplanning.blm.gov/eplanning-ui/project/103343/570.

_____. 2015c. Idaho and Southwest Montana Greater Sage-Grouse Proposed LUPA/Final EIS. Internet website: https://eplanning.blm.gov/eplanning-ui/project/103344/570.

_____. 2015d. North Dakota Greater Sage-Grouse Proposed LUPA/Final EIS. Internet website: https://eplanning.blm.gov/eplanning-ui/project/36811/570.

_____. 2015e. Oregon Greater Sage-Grouse Proposed LUPA/Final EIS. Internet website: https://eplanning.blm.gov/eplanning-ui/project/103348/570.

_____. 2015f. South Dakota Greater Sage-Grouse Proposed LUPA/Final EIS. Internet website: https://eplanning.blm.gov/eplanning-ui/project/68940/570.

_____. 2015g. Utah Greater Sage-Grouse Proposed LUPA/Final EIS. Internet website: https://eplanning.blm.gov/eplanning-ui/project/103346/570.

_____. 2015h. Wyoming Greater Sage-Grouse Proposed LUPA/Final EIS. Internet website: https://eplanning.blm.gov/eplanning-ui/project/103347/570.

_____. 2015i. Utah Geothermal Occurrence Development Potential Map from 2015 RFD. Washington, DC.

_____. 2021. Wind Energy Rights-of-Way (ROW) on Public Lands. October 2021. Internet website: https://www.blm.gov/sites/default/files/docs/2021-11/PROJECT%20LIST%20WIND_October%202021.pdf.

_____. 2022a. Addressing Environmental Justice in NEPA Documents: Frequently Asked Questions. Internet website: https://www.blm.gov/sites/default/files/docs/2022-09/IM2022-059_att1.pdf.

_____. 2022b. Public Land Statistics Report. Internet website: https://www.blm.gov/sites/defa022ult/files/docs/2022-07/Public_Land_Statistics_2021_508.pdf.

_____. 2022c. Applications for Permit to Drill. Internet website: https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/operations-and-production/permitting/applications-permits-drill.

_____. 2022d. Frequently Asked Questions about the Federal Coal Leasing Program. Internet website: https://eplanning.blm.gov/public_projects/nepa/64842/78268/88489/CoalFAQ.pdf.

_____. 2022e. Solar Energy Rights-of-Way (ROW) on Public Lands – as of 12/28/2022. Internet website: https://www.blm.gov/sites/default/files/docs/2023-03/PROJECT_LIST_SOLAR_FY2022.pdf.

_____. 2023a. Colorado Reasonably Foreseeable Development Scenario for Fluid Minerals. September 2023 update for use in BLM Greater Sage-Grouse Planning. Washington, DC. Unpublished.

_____. 2023b. Idaho Fluid Minerals Reasonably Foreseeable Development Scenario update 2023 GRSG EIS. Washington, DC. Unpublished.

_____. 2023c. Montana Reasonably Foreseeable Development Scenario for Fluid Minerals. August 2023 update for use in BLM Greater Sage-Grouse Planning. Washington, DC. Unpublished.

_____. 2023d. North Dakota Reasonably Foreseeable Development Scenario for Fluid Minerals. September 2023 update for use in BLM Greater Sage-Grouse Planning. Washington, DC. Unpublished.

_____. 2023e. Nevada-California GRSG Planning Area. Updates to fluid minerals Reasonably Foreseeable Development Scenario. August 2023. Washington, DC. Unpublished.

_____. 2023f. Oregon Reasonably Foreseeable Development Scenario for Fluid Minerals. August 2023 update for use in BLM Greater Sage-Grouse Planning. Washington, DC. Unpublished.

_____. 2023g. South Dakota Reasonably Foreseeable Development Scenario for Fluid Minerals. August 2023 update for use in BLM Greater Sage-Grouse Planning. Washington, DC. Unpublished.

_____. 2023h. Utah Reasonably Foreseeable Development Scenario for Fluid Minerals. August 2023 update for use in BLM Greater Sage-Grouse Planning. Washington, DC. Unpublished.

_____. 2023i. Wyoming Reasonably Foreseeable Development Scenario for Fluid Minerals. September 2023 update for use in BLM Greater Sage-Grouse Planning. Washington, DC. Unpublished.

_____. 2023j. Wyoming Mining and Minerals. Internet website: https://www.blm.gov/programs/energy-and-minerals/mining-and-minerals/about/wyoming.

_____. 2023k. GRSG Rangewide Locatable Minerals Alternative 3 Reasonably Foreseeable Development Scenario. Washington, DC. Unpublished.

_____. 2023l. 2023 Reasonably Foreseeable Development Scenario for Greater Sage-Grouse Sagebrush Focal Areas Recommended for Withdrawal. Washington, DC. Unpublished.

BLM and Forest Service (United States Department of the Interior, Bureau of Land Management and United States Department of Agriculture, Forest Service). 2015. Nevada and Northeastern California Greater Sage-Grouse Proposed LUPA/Final EIS.

BLS (US Bureau of Labor Statistics). 2023. Local Area Unemployment Statistics — State(s) where Area(s) Located or Census Regions and Divisions (Screen 1 of 6). Internet website: Local Area Unemployment Statistics: Multiscreen Data Search: US Bureau of Labor Statistics (bls.gov).

Burgex Mining Consultants. What are locatable minerals? Internet website: https://burgex.com/2016/01/21/what-are-locatable-minerals/.

California Department of Finance. 2014. State of California Manual of State Funds, State School Fund. Internet website: https://www.dof.ca.gov/.

_____. 2023. Demographic Research Unit. Report P-2A: Total Population Projections, California Counties, 2020–2060 (Baseline 2019 Population Projections; Vintage 2023 Release). Sacramento: California. July 2023. Internet website: https://dof.ca.gov/forecasting/demographics/projections/.

Callison, A. 2023. The Top 5 Reasons Why More People Are Moving to Idaho. Internet website: https://www.callisongroupidaho.com/blog/the-top-5-reasons-why-more-people-are-moving-to-idaho/#:~:text=One%20of%20the%20main%20drivers,Idaho%20in%20search%20of%20work.

Castleman, T. 2023. "California population winners and losers: Why some counties boomed and other shrank." *Los Angeles Times*. Internet website: https://www.latimes.com/california/story/2023-04-05/here-are-californias-fastest-growing-and-shrinking-counties.

CEQ (Council on Environmental Quality). 1997. Environmental Justice: Guidance under the National Environmental Policy Act. Internet website: https://www.epa.gov/environmentaljustice/ceq-environmental-justiceguidance-under-national-environmental-policy-act.

City of Billings. 2023. Explore Billings. Internet website: https://www.billingsmt.gov/1776/Explore-Billings.

Colorado Department of Local Affairs, Division of Local Government. 2018. Federal Mineral Lease and State Severance Tax Direct Distribution, Program Guidelines. Denver, Colorado. Internet website: https://cdola.colorado.gov/direct-distribution-resources.

Colorado Department of Local Affairs, Energy/Mineral Impact Assistance Fund. Internet website: https://cdola.colorado.gov/funding-programs/energy/mineral-impact-assistance-fund-grant-eiaf.

Colorado Legislative Council Staff. 2023. Economic and Revenue Forecast. March 2023. Internet website: https://leg.colorado.gov/sites/default/files/images/march2023forecast.pdf#page=33.

Colorado State Demography Office (Colorado Department of Local Affairs, State Demography Office). 2022. County Components of Change for Colorado, 1970–2050. Internet website: https://demography.dola.colorado.gov/assets/html/sdodata.html.

CRS (Congressional Research Service). 2022. Wild Horse and Burro Management: Overview of Costs. Internet website: https://crsreports.congress.gov/product/pdf/IF/IF11060.

Cunningham, S. 2021. "Oregon's 2020 natural population increase was the lowest on record." *Southern Oregon Business Journal*. Internet website: https://southernoregonbusiness.com/oregons-2020-natural-population-increase-was-the-lowest-on-record/.

DEQ (Wyoming Department of Environmental Quality). 2003. Wyoming's Long Term Strategy for Visibility Protection, 2003 Review Report, Appendix G. Air Quality Division. Cheyenne, Wyoming. Internet website: https://eqc.wyo.gov/public/ViewPublicDocument.aspx?DocumentId=5282.

EIA (U.S. Energy Information Administration). 2021. Annual Energy Outlook 2021. Internet website: https://www.eia.gov/outlooks/aeo/pdf/AEO_Narrative_2021.pdf

Eberhardt, L. L., A. K. Majorowicz, and J. A. Wilcox. 1982. "Apparent rates of increase for two feral horse herds." *Journal of Wildlife Management* 46 (2): 367–374.

Eureka County. 2018. Eureka County, Nevada, Socioeconomic Conditions and Trends Update. Internet website: https://www.yuccamountain.org/trends18/pop.htm.

GAO (Government Accountability Office). 2019. Hardrock Mining: Updated Information on State Royalties and Taxes. B-330854. Internet website: https://www.gao.gov/products/b-330854.

Garrott, R. A., and L. Taylor. 1990. "Dynamics of a feral horse population in Montana." *Journal of Wildlife Management* 54 (4): 603–612.

Garrott, R. A., D. B. Siniff, and L. L. Eberhardt. 1991. "Growth rates of feral horse populations." *Journal of Wildlife Management* 55(4): 641–648.

Geothermal Energy Association. 2015. Brief Economic Values. Internet website: https://geothermal.org/sites/default/files/2021-02/Issue_Brief_Economic_Values_2015.pdf#:~:text=GEA%20estimates%20that%20geothermal%20provides%20approximately%20%24117%20million,fossil%20fuel%20emissions%20based%20on%20current%20geothermal%20generation.

Grand Park Colorado. 2019. Why is Everyone Moving to Colorado? Internet website: https://www.grandparkco.com/why-is-everyone-moving-to-colorado/.

Gregory, R. W. 2014. Wyoming Trona Summary Report. Wyoming State Geological Survey. Internet website: https://www.wsgs.wyo.gov/products/wsgs-2014-trona-summary.pdf.

Gruenspecht, H. 2019. The US Coal Sector: Recent and Continuing Challenges. The Brookings Institution. Internet website: https://www.brookings.edu/articles/the-u-s-coal-sector/.

Haacke, J. E., J. A. Luppens, D. C. Scott, L. M. Osmonson, T. J. Rohrbacher, and M. S. Ellis. 2008. Assessment of Coal Geology, Resources, and Reserves in the Gillette Coalfield, Powder River Basin, Wyoming. US Geological Survey Open-File Report 2008-1202. Revised February 2, 2012.

Headwaters Economics. 2021. Federal Fossil Fuel Disbursements to States: Companion Data Download. Internet website: https://headwaterseconomics.org/tax-policy/federal-fossil-fuel-disbursements-to-states.

Idaho Department of Labor. 2023. Population Forecasts. Internet website: https://lmi.idaho.gov/data-tools/population-projections/.

Lawrence, O. A. 2010. "Geologic assessment of undiscovered oil and gas in the Powder River Basin Province Wyoming and Montana." *In* Total Petroleum Systems and Geologic Assessment of Oil and Gas Resources in the Powder River Basin Province, Wyoming and Montana: US Geological Survey Series DDS–69–U, chapter 1. P. 97. Revised April 2010. Internet website: https://pubs.usgs.gov/dds/dds-069/dds-069-u/REPORTS/69_U_CH_1.pdf.

Lee, K. 2023. "The recovery left Nevada behind. Can the state change its luck?" *New York Times*. Internet website: https://www.nytimes.com/2023/08/04/business/economy/nevada-economy-las-vegas-jobs.html.

Mine Safety Health Administration. 2023. Wyoming quarterly coal mine production. US Department of Labor. Internet website: https://www.wsgs.wyo.gov/docs/wsgs-web-msha-23q1.xlsx.

Montana Department of Commerce. 2022. Montana State and County Population Projection by Gender, Race and Age from Regional Economic Models Incorporated (REMI) compiled by Montana Department of Commerce. Internet website: https://ceic.mt.gov/People-and-Housing/Population.

Montana Legislative Fiscal Division. 2019. Natural Resource Taxes, US Mineral Royalties. Legislative Fiscal Report 2019 Biennium, Volume 2, Revenue Estimates. Internet website: http://budget.mt.gov/budgets/2019_budget.

Muntean, J. L., R. Micander, and B. Ayling. 2022. The Nevada Mineral Industry 2021: Nevada Bureau of Mines and Geology Special Publication MI-2021.

National Academies of Sciences, Engineering, and Medicine. 2013. *Using Science to Improve the BLM Wild Horse and Burro Program: A Way Forward*. The National Academies Press, Washington, DC. Internet website: https://doi.org/10.17226/13511.

Nevada Department of Taxation. 2021. Nevada County Population Projections, 2021 to 2040. Internet website: https://tax.nv.gov/uploadedFiles/taxnvgov/Content/TaxLibrary/Nevada%20County%20Population%20Projections%202021%20to%202040.pdf.

Nevada State Demographers Office. 2021. Population Projections. Internet website: https://tax.nv.gov/uploadedFiles/taxnvgov/Content/TaxLibrary/Nevada%20County%20Population%20Projections%202021%20to%202040.pdfNevada Revised Statutes § 328.450-470. 2021. Account for Revenue from Lease of Federal Lands: Apportionment of money by State Controller. Internet website: https://www.leg.state.nv.us/Division/Legal/LawLibrary/NRS/NRS-328.html#NRS328Sec450.

NREL (National Renewable Energy Laboratory). 2021. Geothermal Power Production and District Heating Market Report. Golden, Colorado. July 2021. Internet website: https://www.nrel.gov/docs/fy21osti/78291.pdf.

ONRR (Office of Natural Resources Revenue). 2023. County-Level Mineral Federal Production and Revenues. Internet website: https://revenuedata.doi.gov/query-data#.

Portland State University, Population Research Center, Oregon Population Forecast Program. 2022. Current Forecast Summary for All Areas. Internet website: https://www.pdx.edu/population-research/population-forecasts.

Schott, B. 2017. Utah Coal Industry Employment in Long-term Decline. Utah Policy. Internet website: https://utahpolicy.com/archive/12979-utah-coal-industry-employment-in-long-term-decline.

State of Nevada Commission on Mineral Resources. 2021. Nevada Geothermal Production for 2021. Internet website: https://minerals.nv.gov/uploadedFiles/mineralsnvgov/content/Programs/Geo/GEO%20PROD%20SUMMARY%202021.pdf.

_____. 2023. Division of Minerals. Nevada Geothermal Power Plants. January 2023. Las Vegas Office, Las Vegas, Nevada. Internet website: https://minerals.nv.gov/uploadedFiles/mineralsnvgov/content/Programs/Geo/NVGeoPowerPlants_20230117.pdf.

State of Wyoming Legislature. 2021. Distribution for FY 2021 Severance Taxes. W.S. 39-14-801. Internet website: https://www.wyoleg.gov/2021/Databook/Operations/Revenue/h-Severance%20Tax%20Flow%20Chart.pdf.

Taylor, O. J. 1987. Oil Shale, Water Resources, and Valuable Minerals of the Piceance Basin, Colorado: the Challenge and Choices of Development. US Geological Survey Professional Paper 1310. US Government Printing Office, Washington. Internet website: https://pubs.usgs.gov/pp/1310/report.pdf.

University of Utah, Kem C. Gardner Policy Institute. 2022. State and County Projections 2020–2060. Internet website: https://gardner.utah.edu/demographics/population-projections/.

University of Virginia Weldon Cooper Center, Demographics Research Group. 2018. National Population Projections. Internet website: https://demographics.coopercenter.org/national-population-projections.

US Census Bureau. 2023. ACS Table B02010 "American Indian and Alaska Native Alone or in Combination with One or More Other Races" and B01003 "Total Population."

US Department of Commerce. 2022. Census Bureau, American Community Survey Office, Washington, DC.

US Department of the Treasury. 2021. Federal Natural Resources Other than Oil and Gas. Internet website: https://www.fiscal.treasury.gov/files/reports-statements/financial-report/2021/federal-natural-resources.pdf.

US DOI (US Department of the Interior). 2023. Payments in Lieu of Taxes (PILT): Individual PILT Payments by County. Internet website: https://www.doi.gov/pilt.

US Environmental Protection Agency. 2022. EPA's Environmental Justice Screening and Mapping Tool (Version 2.1). Internet website: https://ejscreen.epa.gov/mapper/.

USDA (US Department of Agriculture), Economic Research Service. 2023. Farm Labor. Internet website: https://www.ers.usda.gov/topics/farm-economy/farm-labor/#demographic.

_____. 2024. Farm Structure and Contracting. Internet website: https://www.ers.usda.gov/topics/farm-economy/farm-structure-and-organization/farm-structure-and-contracting/.

USDA, National Agricultural Statistics Service. 2012. 2012 Census of Agriculture. National Agricultural Statistics Service. Internet website: https://agcensus.library.cornell.edu/census_year/2012-census/.

_____. 2024. 2022 Census of Agriculture. National Agricultural Statistics Service. Internet website: https://www.nass.usda.gov/Publications/AgCensus/2022/index.php.

Utah Legislature Higher Education Appropriations Committee. 2008. Issue Brief – HED – Federal Mineral Lease Deductions. Number USHE – 15. Internet website: https://le.utah.gov/committee/committee.jsp?year=2008&com=APPHED.

Vega, L. 2022. Mining Towns Go Boom-Bust. Internet website: https://www.kdminer.com/mining-towns-go-boom-bust/article_eaf7435f-e87d-54c5-af33-1c3f70b0e8e7.html.

Williams, C. F., M. J. Reed, R. H. Mariner, J. DeAngelo, and P. S. Galanis, Jr. 2008. Assessment of Moderate- and High-Temperature Geothermal Resources of the United States. US Geological Survey Fact Sheet 2008-3082. Internet website: https://pubs.usgs.gov/fs/2008/3082/pdf/fs2008-3082.pdf.

Williams-Derry, C., and C. Kunkel. 2021. Has the Bakken Peaked? Exhaustion of High-quality Drilling Sites Could Point to Falling Oil Output. Institute for Energy Economics and Financial Analysis. Internet website: https://ieefa.org/wp-content/uploads/2021/11/Has-the-Bakken-Peaked_November-2021.pdf.

WOGCC (Wyoming Oil and Gas Conservation Commission). 2023. Powder River Basin Production Data. Wyoming. Internet website: http://pipeline.wyo.gov/coalbedchart.cfm.

Wolfe, M. L. 1980. "Feral horse demography: A preliminary report." *Journal of Range Management* 33 (5): 354–360.

Wolfe, M. L., L. C. Ellis, and R. MacMullen. 1989. "Reproductive rates of feral horses and burros." *Journal of Wildlife Management* 53(4): 916–919.

Workman, J. P. 1986. *Range Economics*. Macmillan Publishing Company, New York City, New York.

Wyoming Department of Administration and Information, Economic Analysis Division. 2019. Population Forecasts for Wyoming, Counties, Cities, and Towns for 2019–2040. Internet website: http://eadiv.state.wy.us/pop/.

Wyoming Mining Association. 2023. Trona. Internet website: https://www.wyomingmining.org/minerals/trona/.

Appendix A

Supplementary Tables and Figures

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Appendix A. Supplementary Tables and Figures

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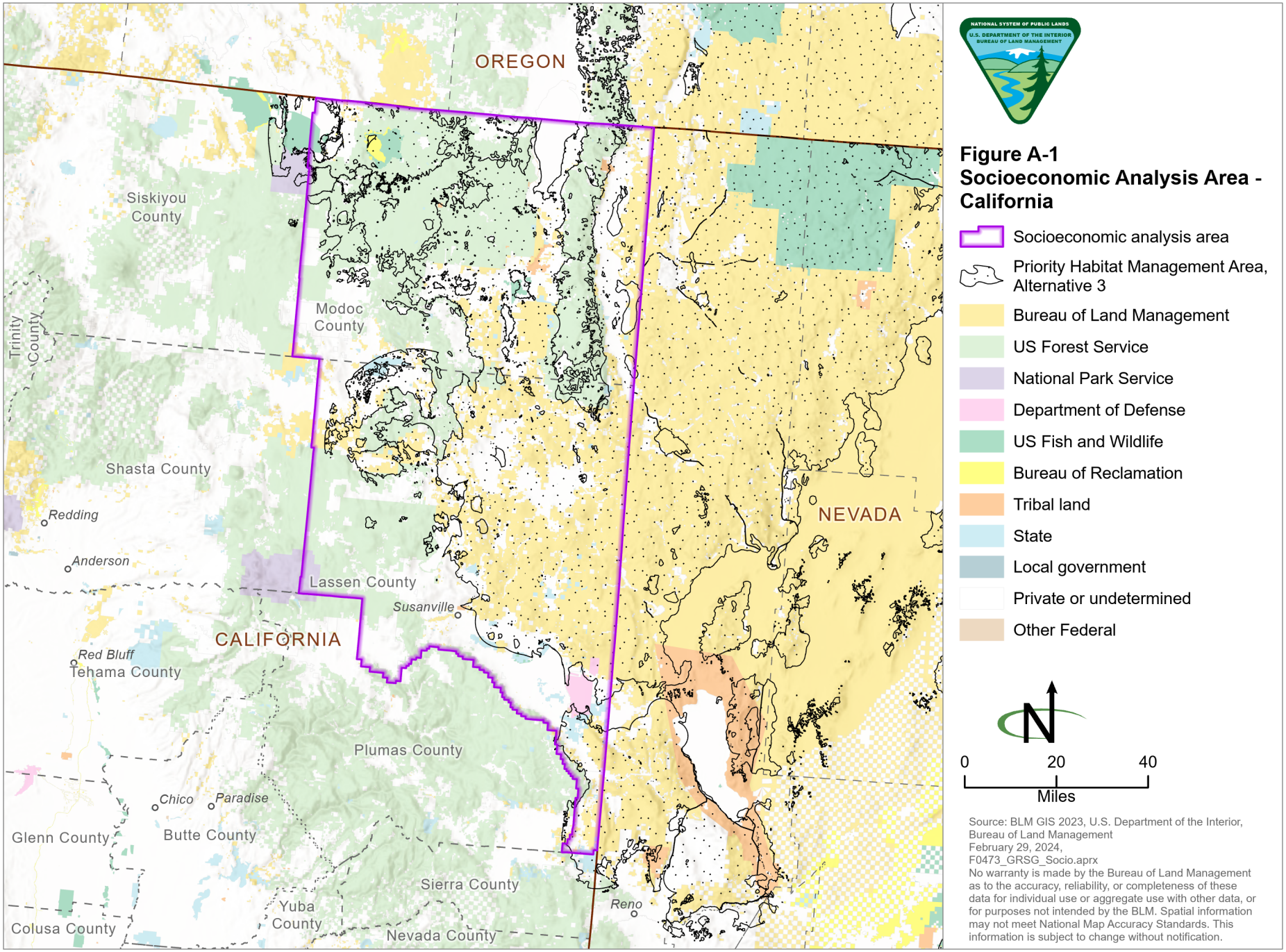
Table A-1. Analysis Areas Overview

Analysis Area	BLM Management Unit(s)	Counties*
California	Eagle Lake FO	Lassen
	Applegate FO	Modoc
Colorado	Colorado River Valley FO	Eagle, Garfield, Routt
	Grand Junction FO	Mesa
	Kremmling FO	Garfield, Grand, Jackson
	Little Snake FO	Moffatt, Routt
	White River FO	Garfield, Rio Blanco
Idaho	Bruneau FO	Owyhee
	Burley FO	Cassia, Minidoka, Twin Falls
	Challis FO	Custer, Lehmi
	Four Rivers FO	Washington, Elmore, Adams, Gem, Payette
	Jarbidge FO	Owyhee, Twin Falls, Elko
	Owyhee FO	Owyhee
	Pocatello FO	Oneida, Power, Bear Lake, Bingham, Caribou, Bonneville
	Salmon FO	Lehmi
	Shoshone FO	Blaine, Camas, Butte, Elmore, Gooding, Jerome, Lincoln, Minidoka, Power
	Upper Snake FO	Bingham, Blaine, Bonneville, Butte, Clark, Custer
Montana	Miles City FO	Big Horn, Carter, Custer, Dawson, Fallon, Garfield, McCone, Power River, Prairie, Roosevelt, Rosebud, Treasure, Valley, Wibaux
	Lewistown FO	Chouteau, Fergus, Meagher, Petroleum
	Dillion FO	Beaverhead, Madison
	Havre FO	Blaine, Phillips, Chouteau
	Malta FO	Phillips
	Glasgow FO	Valley
	Billings FO	Bighorn, Carbon, Golden Valley, Musselshell, Stillwater, Sweetgrass, Wheatland, Yellowstone
	Butte FO	Park, Gallatin, Deer Lodge
	Upper Missouri River FO	Blaine, Chouteau, Fergus, Phillips
North Dakota	North Dakota FO	Slope, Bowman
Nevada	Mountain Lewis FO	Lander, Eureka, Nye, White Pine
	Tonopah FO	Nye
	Sierra Front FO	Washoe
	Stillwater FO	Mineral, Churchill, Nye, Lander
	Tuscarora FO	Elko, Eureka, Lander
	Wells FO	Elko
	Caliente FO	Lincoln, Nye
	Wells FO	Elko
	Black Rock FO	Humboldt, Washoe, Pershing
	Humboldt River FO	Humboldt, Washoe, Pershing
	Bristlecone FO	White Pine, Nye
	Eagle Lake FO	Washoe
	Basin and Range FO	Lincoln, Nye
Oregon	Lakeview DO	Harney, Lake
	Prineville DO	Crook, Deschutes, Harney, Lake
	Vale DO	Union, Malheur, Harney, Grant, Baker
	Burns DO	Crook, Grant, Harney, Lake, Malheur
South Dakota	South Dakota FO	Butte, Harding

Analysis Area	BLM Management Unit(s)	Counties*
Utah	Salt Lake FO	Box Elder, Morgan, Rich, Summit, Tooele, Wasatch, Cache
	Cedar City FO	Beaver, Iron
	Fillmore FO	Juab, Millard
	Kanab FO	Garfield, Iron, Kane
	Moab FO	Grand
	Price FO	Carbon, Emery
	Richfield FO	Garfield, Piute, Sanpete, Wayne
	Vernal FO	Daggett, Duchesne, Uintah
Wyoming	Casper FO	Converse, Goshen, Natrona, Platte
	Newcastle FO	Campbell, Crook, Niobrara, Weston
	Worland FO	Big Horn, Hot Springs, Park, Washakie
	Rawlins FO	Carbon, Fremont, Laramie, Sweetwater
	Rock Springs FO	Fremont, Lincoln, Sublette, Sweetwater, Uinta
	Cody FO	Bighorn, Park
	Buffalo FO	Campbell, Johnson, Sheridan
	Lander FO	Carbon, Fremont, Hot Springs, Natrona, Sweetwater

Source: BLM GIS 2023

*Includes counties with GRSG mapped HMAs and more than 1,000 acres of BLM-administered lands in the planning area, or those included for social and economic connections with GRSG HMAs counties


OREGON
Siskiyou County
Modoc County
Trinity County
Shasta County
Redding
Anderson
Lassen County
Susanville
CALIFORNIA
Red Bluff
Tehama County
NEVADA
Plumas County
Chico
Paradise
Glenn County
Butte County
Sierra County
Yuba County
Colusa County
Nevada County
Reno
NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Figure A-1
Socioeconomic Analysis Area - California
Socioeconomic analysis area
Priority Habitat Management Area, Alternative 3
Bureau of Land Management
US Forest Service
National Park Service
Department of Defense
US Fish and Wildlife
Bureau of Reclamation
Tribal land
State
Local government
Private or undetermined
Other Federal
N
0
20
40
Miles
Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx
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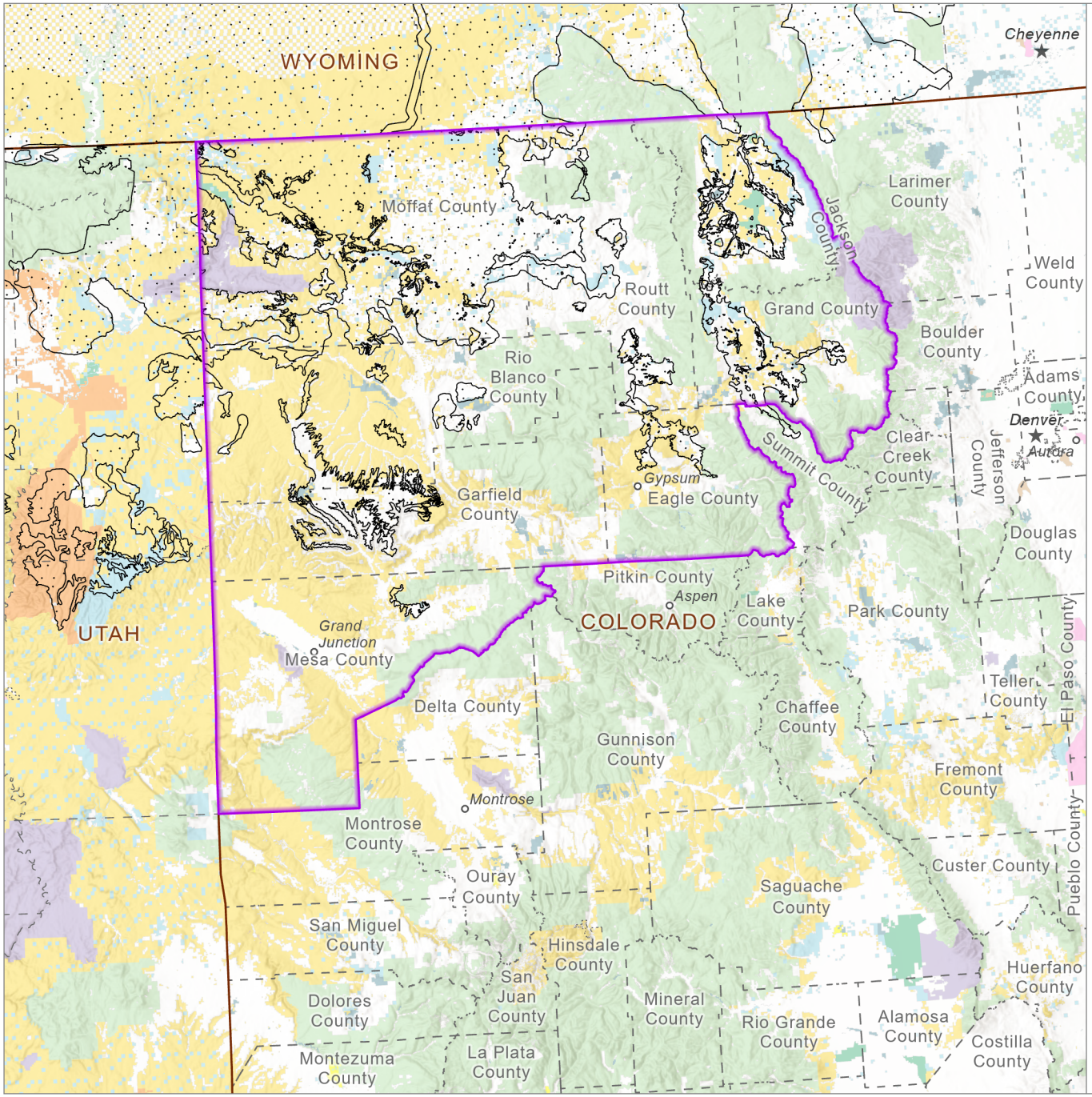


Figure A-2
Socioeconomic Analysis Area - Colorado

- Socioeconomic analysis area
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

N

0 30 60
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
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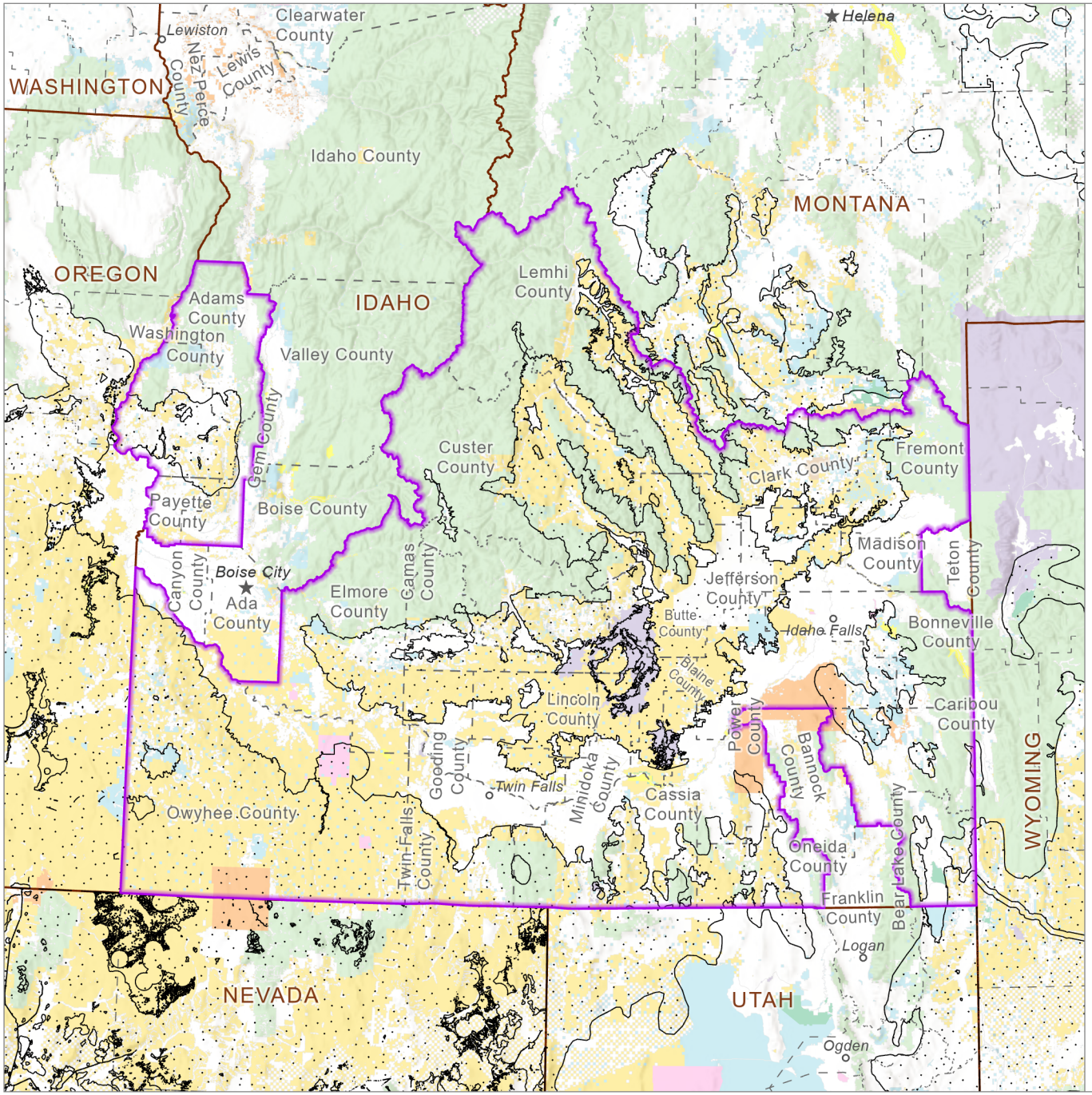


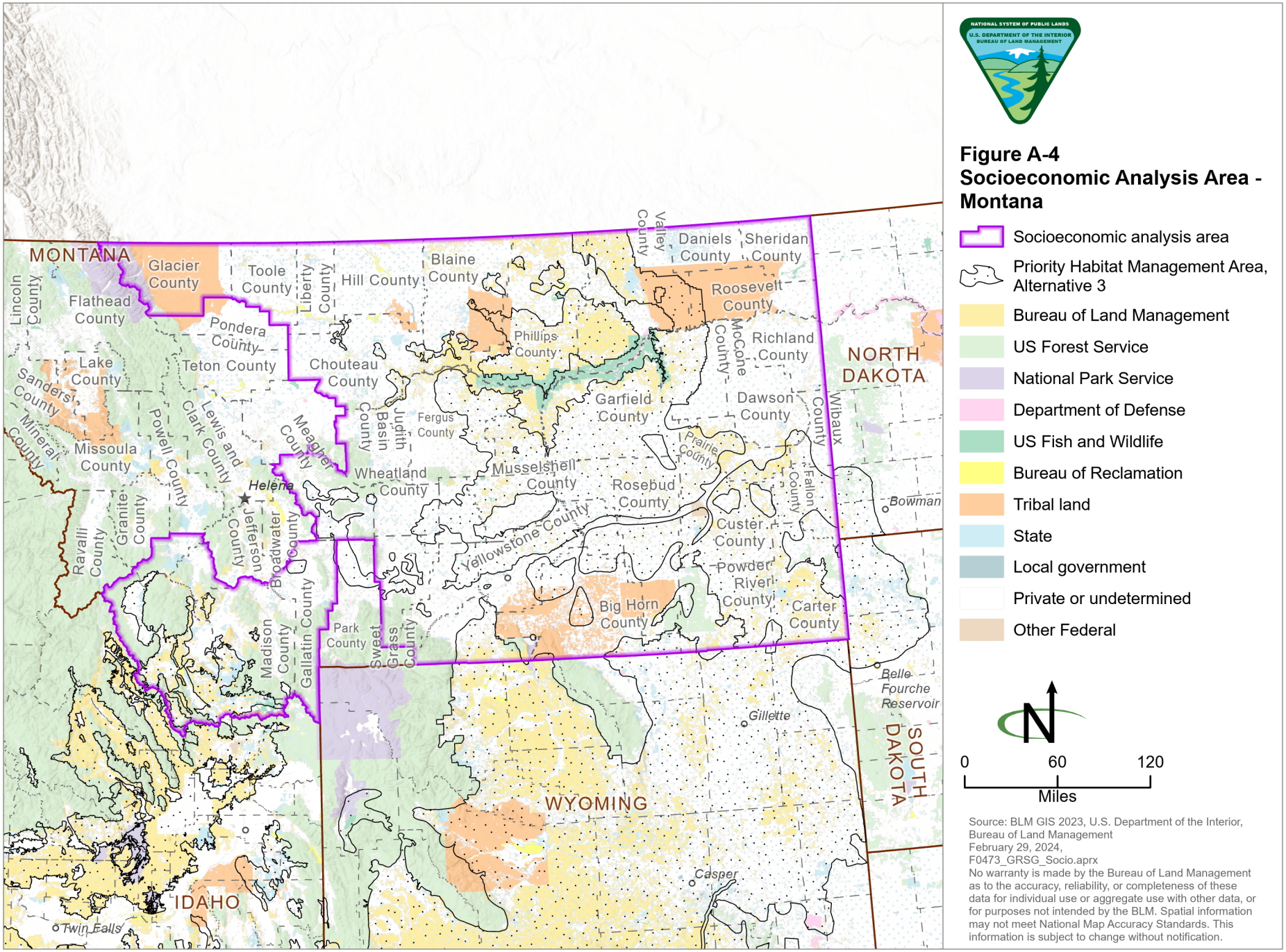
Figure A-3
Socioeconomic Analysis Area - Idaho

- Socioeconomic analysis area
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

N

0 40 80
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
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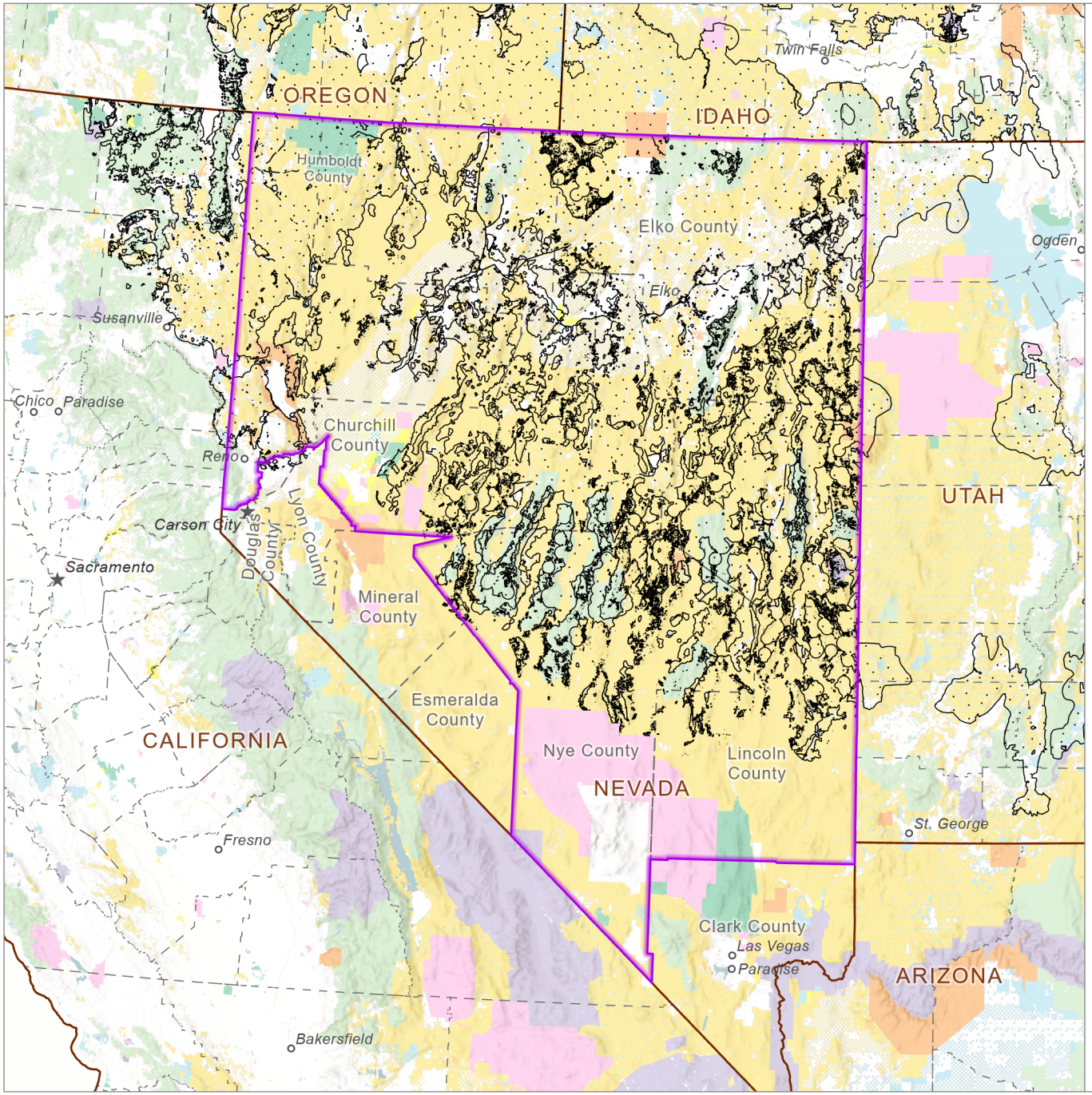


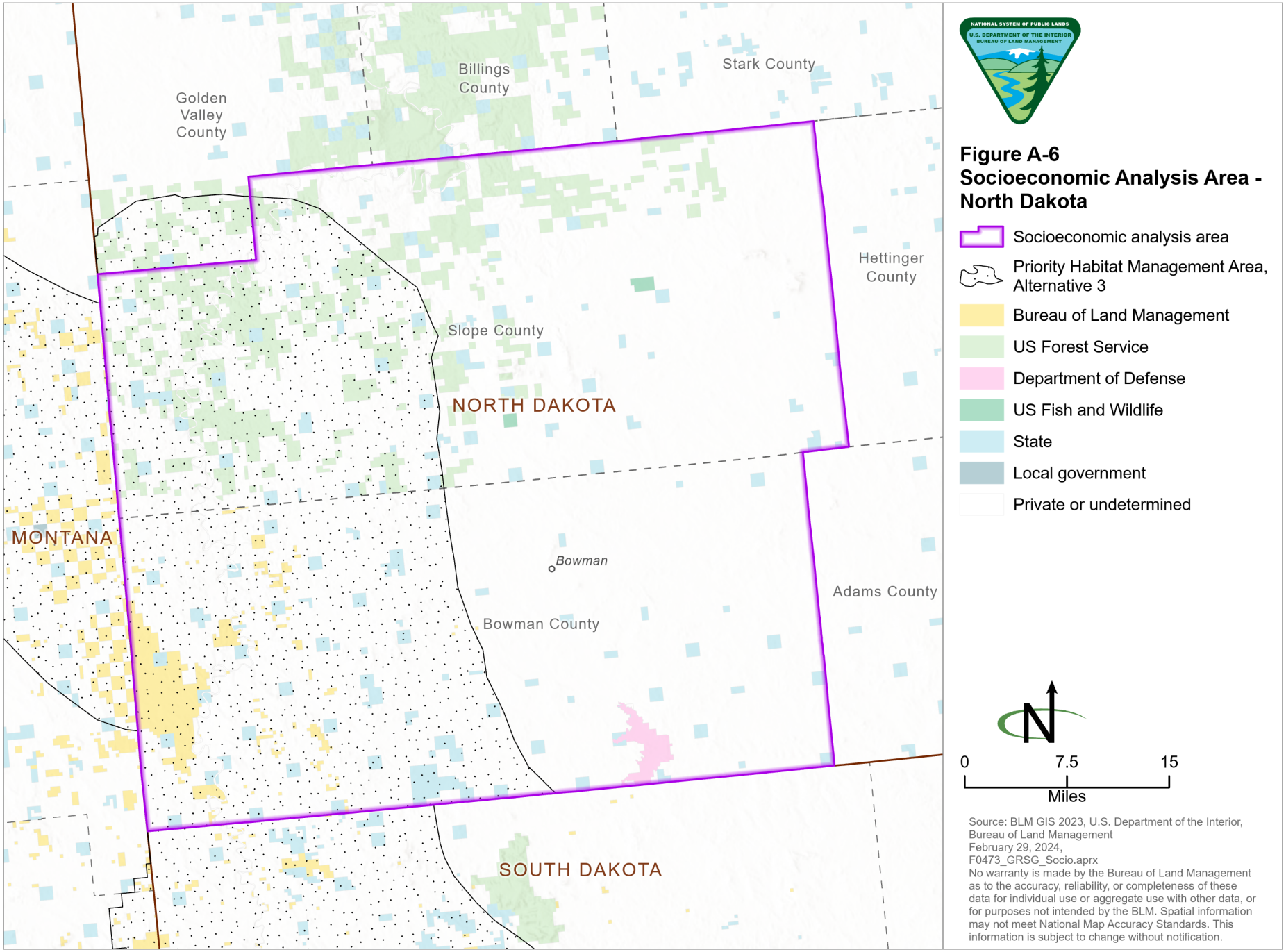
Figure A-5
Socioeconomic Analysis Area - Nevada

- Socioeconomic analysis area
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

N

0 50 100
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx
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Billings County
Stark County
Golden Valley County
Hettinger County
Slope County
NORTH DAKOTA
MONTANA
Bowman
Adams County
Bowman County
SOUTH DAKOTA
Figure A-6
Socioeconomic Analysis Area - North Dakota
Socioeconomic analysis area
Priority Habitat Management Area, Alternative 3
Bureau of Land Management
US Forest Service
Department of Defense
US Fish and Wildlife
State
Local government
Private or undetermined
N
0
7.5
15
Miles
Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx
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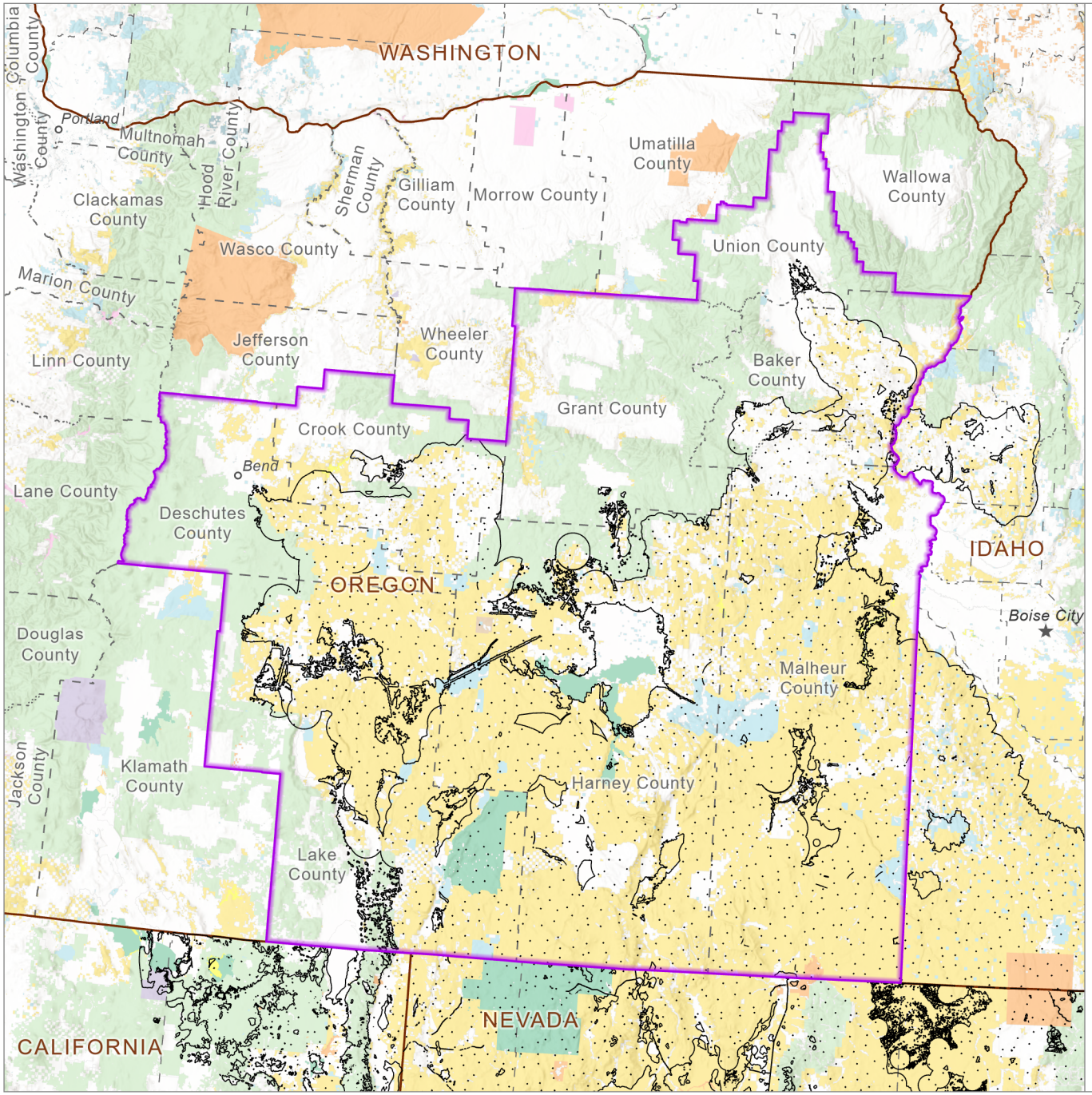


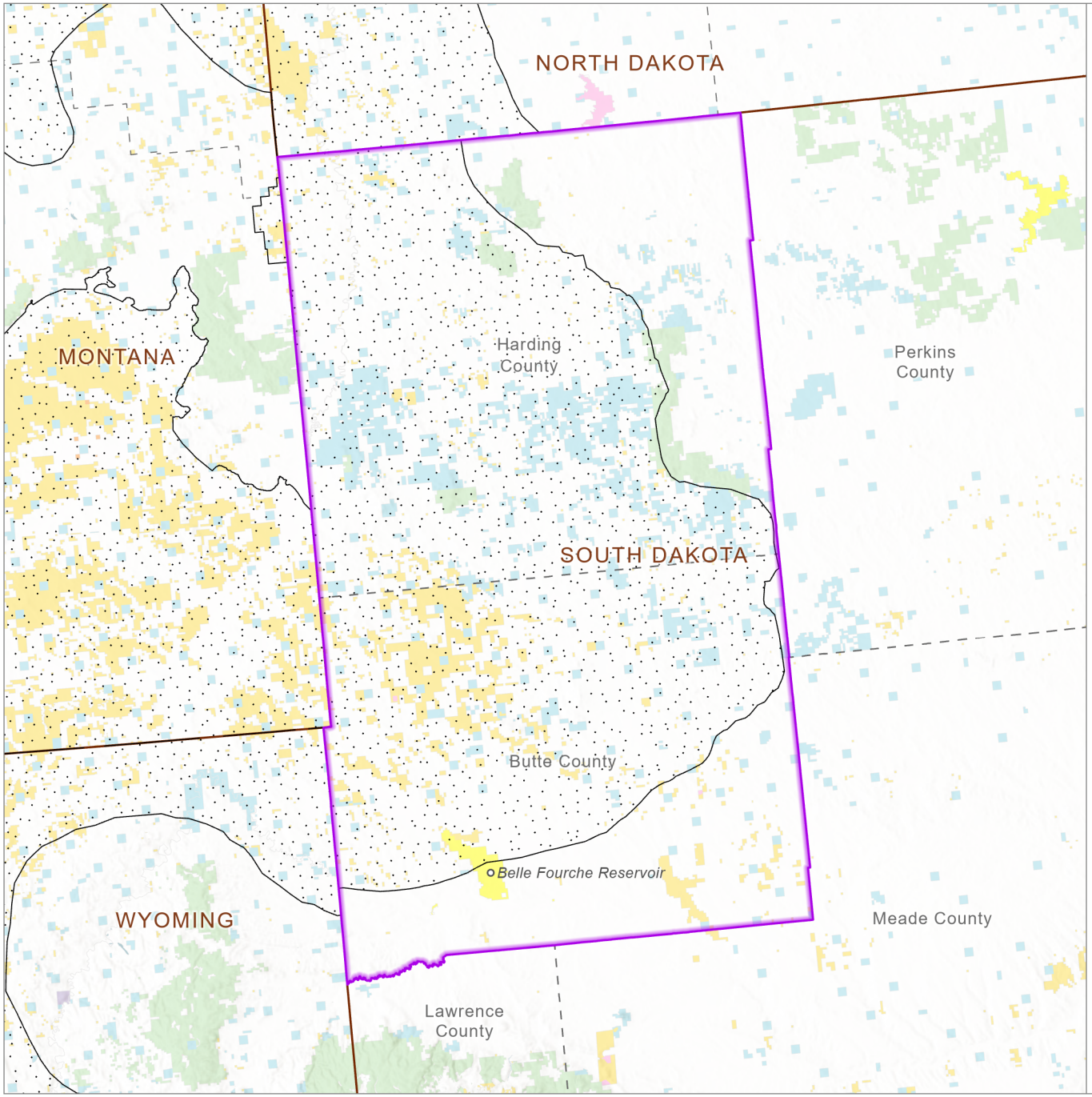
Figure A-7
Socioeconomic Analysis Area - Oregon

- Socioeconomic analysis area
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

N

0 30 60
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
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U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Figure A-8
Socioeconomic Analysis Area - South Dakota

- Socioeconomic analysis area
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined

N

0 10 20
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx

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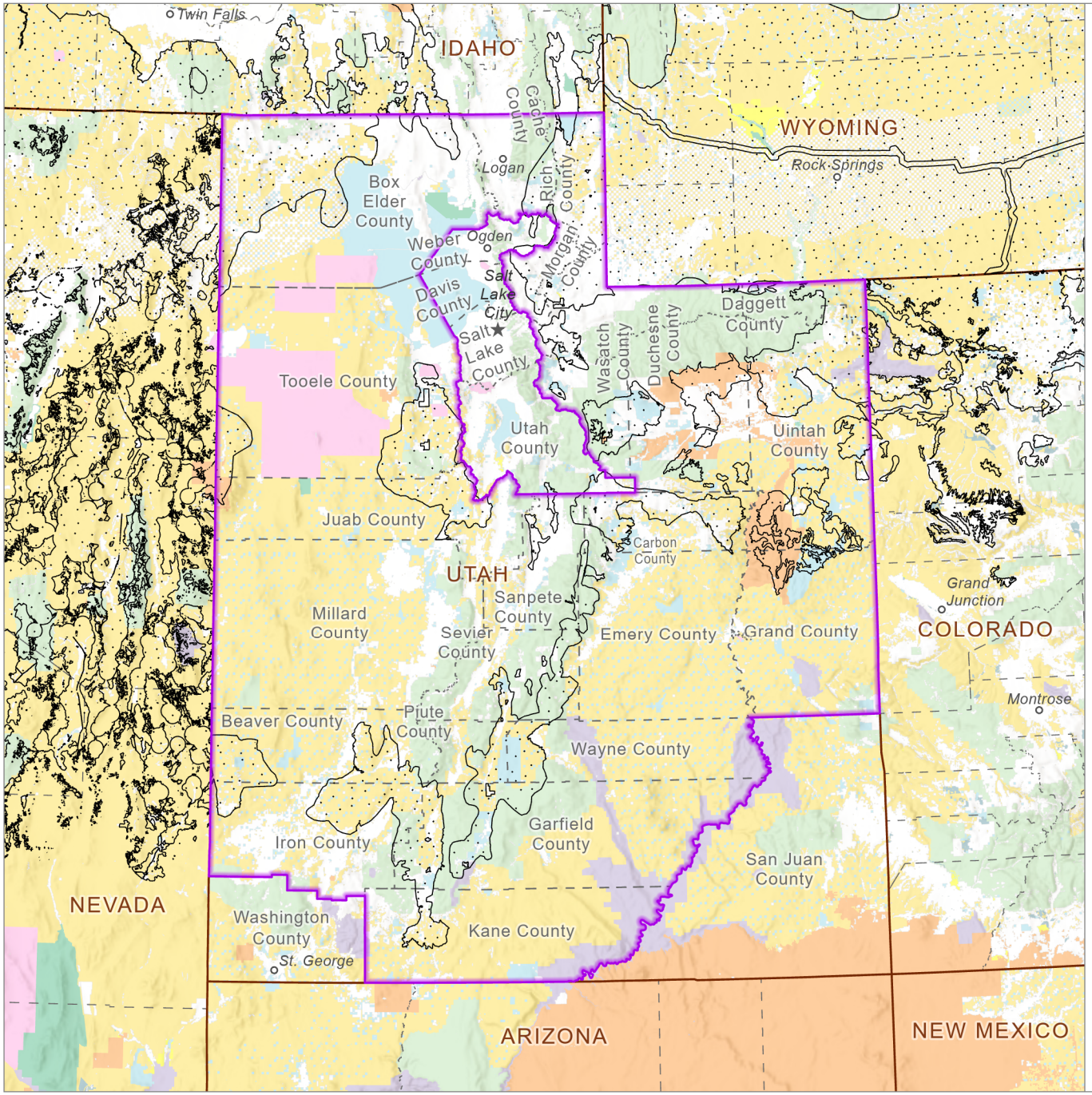
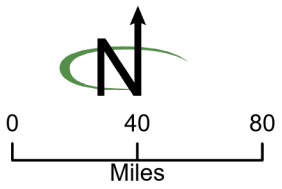




Figure A-9
Socioeconomic Analysis Area - Utah

- Socioeconomic analysis area
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal



Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx

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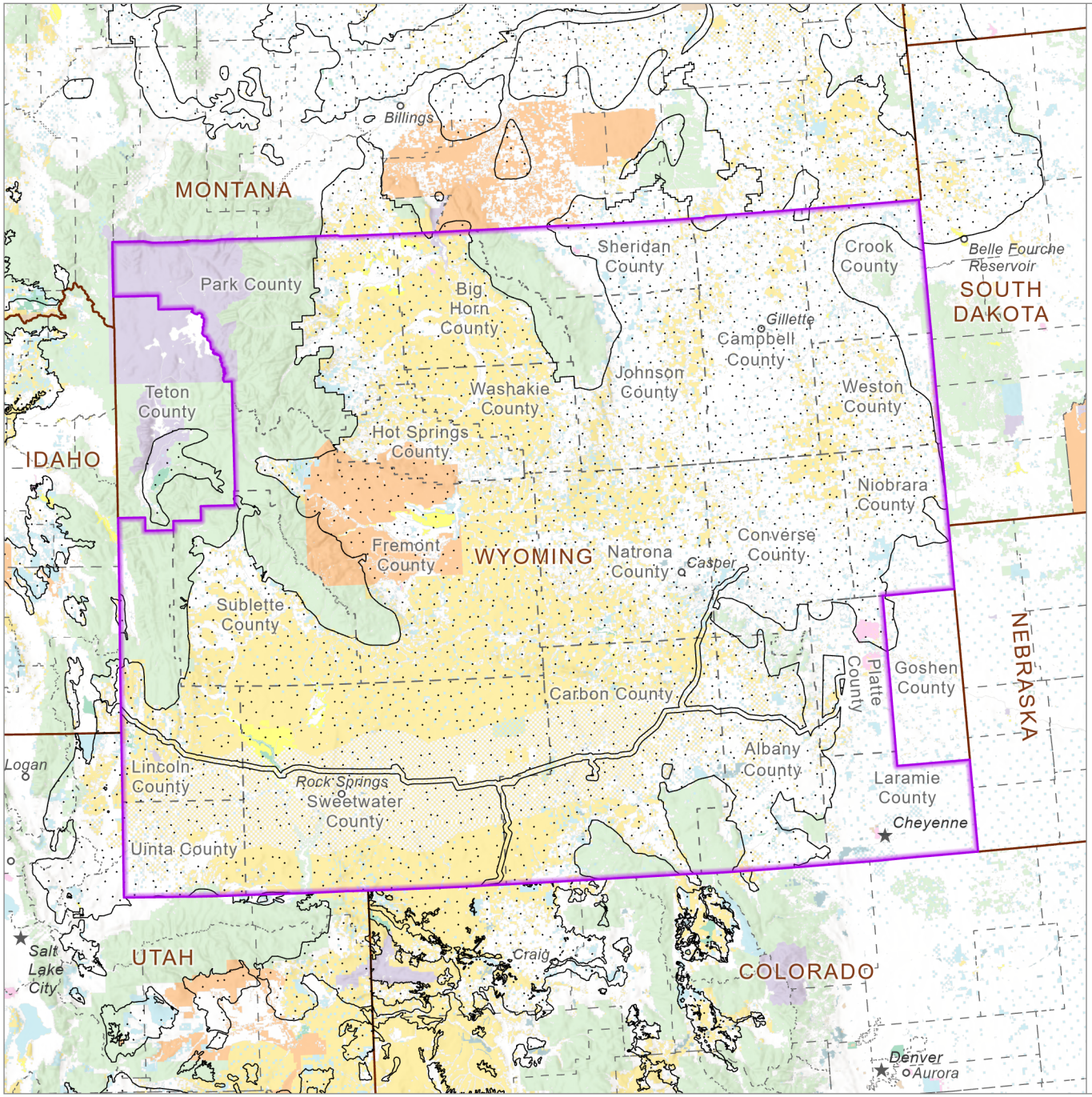


Figure A-10
Socioeconomic Analysis Area - Wyoming

- Socioeconomic analysis area
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

N

0 50 100
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx
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Table A-2. California Analysis Area Employment by Sector (2010 and 2021)

Sector	Lassen County		Modoc County		California	
	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	13,221	12,147	4,084	4,144	19,642,444	23,906,353
Wage and salary employment	10,792	9,761	2,771	2,843	14,946,231	17,891,462
Proprietors employment	2,429	2,386	1,313	1,301	4,696,213	6,014,891
Farm proprietors employment	388	330	369	310	65,373	56,890
Nonfarm proprietors employment	2,041	2,056	944	991	4,630,840	5,958,001
Farm employment	743	547	550	531	232,546	229,419
Nonfarm employment	12,478	11,600	3,534	3,613	19,409,898	23,676,934
Private nonfarm employment	5,644	5,554	2,274	2,472	16,731,726	20,952,239
By Industry (Number of Jobs/Percentage of Total Employment)						
Forestry, fishing, and related activities	(D)	179	165	173	212,034	250,669
	N/A	1.5	4.0	4.2	1.1	1.0
Mining (including quarrying and oil and gas extraction)	(D)	31	23	16	60,321	33,528
	N/A	<1	<1	<1	<1	<1
Utilities	52	19	(D)	(D)	59,325	65,390
	<1	<1	N/A	N/A	<1	<1
Construction	340	(D)	(D)	230	865,760	1,253,884
	2.6	N/A	N/A	5.6	4.4	5.2
Manufacturing	53	(D)	(D)	49	1,322,661	1,375,410
	<1	N/A	N/A	1.2	6.7	5.8
Wholesale trade	103	125	106	111	724,350	731,178
	<1	1.0	2.6	2.7	3.7	3.1
Retail trade	1,059	1,147	350	347	1,880,146	2,031,941
	8.0	9.4	8.6	8.4	9.6	8.5
Transportation and warehousing	144	176	(D)	(D)	567,979	1,371,207
	1.1	1.4	N/A	N/A	2.9	5.7
Information	111	69	(D)	18	508,681	643,367
	<1	<1	N/A	<1	2.6	2.7
Finance and insurance	224	164	62	71	953,789	1,191,722
	1.7	1.4	1.5	1.7	4.9	5.0
Real estate and rental and leasing	279	261	135	109	1,033,832	1,250,434
	2.1	2.1	3.3	2.6	5.3	5.2
Professional, scientific, and technical services	(D)	(D)	(D)	135	1,703,399	2,093,532
	N/A	N/A	N/A	3.3	8.7	8.8

Sector	Lassen County		Modoc County		California	
	2010	2021	2010	2021	2010	2021
Management of companies and enterprises	(D)	(D)	0	(D)	207,092	277,998
	N/A	N/A	<1	N/A	1.1	1.2
Administrative and support and waste management and remediation services	264	312	(D)	167	1,248,607	1,526,406
	2.0	2.6	N/A	4.0	6.4	6.4
Educational services	52	(D)	(D)	(D)	439,530	543,623
	<1	N/A	N/A	N/A	2.2	2.3
Health care and social assistance	1,144	(D)	(D)	(D)	1,868,906	2,822,918
	8.7	N/A	N/A	N/A	9.5	11.8
Arts, entertainment, and recreation	108	125	(D)	(D)	538,934	566,938
	<1	1.0	N/A	N/A	2.7	2.4
Accommodation and food services	670	491	(D)	(D)	1,369,983	1,575,223
	5.1	4.0	N/A	N/A	7.0	6.6
Other services	569	533	363	276	1,166,397	1,346,871
	4.3	4.6	8.9	6.7	5.9	5.6
Government and government enterprises	6,834	6,046	1,260	1,141	2,678,172	2,724,695
	51.7	49.8	30.9	27.5	13.6	11.4

Sources: BEA 2010a, 2021a

Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

Table A-3. California Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Lassen County		Modoc County		California	
	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	1,199,962	1,306,255	422,859	470,297	2,021,173,112	3,006,183,929
Population (persons)	34,901	33,159	9,695	8,661	37,322,360	39,237,836
Per capita personal income (dollars)	34,382	39,394	43,616	54,301	54,155	76,614
Earnings by place of work (thousands of dollars)	867,687	862,861	242,007	237,057	1,485,310,195	2,102,644,661
Wages and salaries (thousands of dollars)	548,235	559,651	114,672	127,163	1,018,944,023	1,533,988,242
Supplement to wages and salaries	227,382	237,842	44,040	49,275	244,650,288	314,285,006
Proprietors' income	92,070	65,368	83,296	60,619	221,715,883	254,371,413
Farm earnings	33,376	33,493	49,605	46,041	16,493,516	13,000,600
Nonfarm earnings	834,311	829,368	192,402	191,016	1,468,816,679	2,089,644,061
Private nonfarm earnings	246,745	239,192	98,009	98,195	1,193,995,472	1,773,635,412
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)						
Forestry, fishing, and related activities	(D)	7,845	8,162	7,844	8,014,985	12,442,843
	N/A	<1	4.2	4.1	<1	<1
Mining (including quarrying and oil and gas extraction)	(D)	148	113	47	5,785,463	2,782,958
	N/A	<1	<1	<1	<1	<1
Utilities	4,434	289	(D)	(D)	10,091,492	16,861,048
	<1	<1	N/A	N/A	<1	<1
Construction	35,809	(D)	(D)	12,963	70,297,737	109,185,172
	4.3	N/A	N/A	6.8	4.8	5.2
Manufacturing	1,500	(D)	(D)	1,504	144,716,142	187,224,671
	<1	N/A	N/A	<1	9.9	9.0
Wholesale trade	5,723	7,155	5,476	7,056	65,932,062	77,475,792
	<1	<1	2.8	3.7	4.5	3.7
Retail trade	39,104	43,884	12,161	11,055	87,111,142	105,037,033
	4.7	5.3	6.3	5.8	5.9	5.0
Transportation and warehousing	6,634	7,446	(D)	(D)	42,050,052	80,454,289
	<1	<1	N/A	N/A	2.9	3.9
Information	6,831	3,969	(D)	1,642	66,885,925	170,115,835
	<1	<1	N/A	<1	4.6	8.1
Finance and insurance	8,929	10,248	2,636	2,882	96,828,994	129,619,624
	1.1	1.2	1.4	1.5	6.6	6.2
Real estate and rental and leasing	5,500	6,221	6,437	5,468	46,287,943	78,843,605
	<1	<1	3.3	2.9	3.2	3.8

Sector	Lassen County		Modoc County		California	
	2010	2021	2010	2021	2010	2021
Professional, scientific, and technical services	(D)	(D)	(D)	4,912	173,852,388	278,359,156
	N/A	N/A	N/A	2.6	11.8	13.3
Management of companies and enterprises	(D)	(D)	0	0	27,886,735	46,364,289
	N/A	N/A	<1	<1	1.9	2.2
Administrative and support and waste management and remediation services	8,181	10,529	(D)	3,992	60,152,055	87,147,299
	<1	1.3	N/A	2.1	4.1	4.2
Educational services	1,687	(D)	(D)	(D)	22,861,346	30,940,204
	<1	N/A	N/A	N/A	1.6	1.5
Health care and social assistance	66,811	(D)	(D)	(D)	139,684,524	198,966,464
	8.0	N/A	N/A	N/A	9.5	9.5
Arts, entertainment, and recreation	1,322	8,784	(D)	(D)	28,445,898	33,112,096
	<1	1.1	N/A	N/A	1.9	1.6
Accommodation and food services	16,021	14,256	(D)	(D)	41,882,247	69,491,806
	1.9	1.7	N/A	N/A	2.9	3.3
Other services (except government and government enterprises)	23,093	20,103	10,846	8,718	55,228,342	59,211,228
	2.8	2.4	5.6	4.6	3.8	2.8
Government and government enterprises	587,567	590,176	94,393	92,821	274,821,207	316,008,649
	70.4	71.2	49.1	48.6	18.7	15.1

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

Table A-4 (Part 1). Colorado Analysis Area Employment by Sector (2010 and 2021)

Sector	Eagle County		Garfield County		Grand County		Jackson County		State of Colorado	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	40,796	49,061	36,761	39,938	10,275	11,497	1,012	1,050	3,143,637	3,945,819
Wage and salary employment	29,146	34,530	25,144	26,897	6,822	7,755	603	611	2,346,646	2,881,642
Proprietors employment	11,650	14,531	11,617	13,041	3,453	3,742	409	439	796,991	1,064,177
Farm proprietors employment	131	177	549	658	167	185	79	102	32,509	35,517
Nonfarm proprietors employment	11,519	14,354	11,068	12,383	3,286	3,557	330	337	764,482	1,028,660
Farm employment	195	243	747	854	249	275	134	158	45,101	47,988
Nonfarm employment[2]	40,601	48,818	36,014	39,084	10,026	11,222	878	892	3,098,536	3,897,831
Private nonfarm employment	37,241	45,306	30,584	33,747	8,656	9,812	685	723	2,643,912	3,388,729
By Industry (Number of Jobs/Percentage of Total Employment)										
Forestry, fishing, and related activities	(D)	123	176	157	134	98	68	43	11,750	13,423
	N/A	<1	<1	<1	1.3	<1	6.7	4.1	<1	<1
Mining (including quarrying and oil and gas extraction)	(D)	207	2,755	937	138	68	22	40	48,728	37,994
	N/A	<1	7.5	2.3	1.3	<1	2.2	3.8	1.6	1.0
Utilities	69	74	217	233	(D)	(D)	1	(D)	8,738	9,401
	<1	<1	<1	<1	N/A	N/A	<1	N/A	<1	<1
Construction	3,939	5,020	4,366	5,701	1,059	1,299	(D)	(D)	185,291	276,197
	9.7	10.2	11.9	14.3	10.3	11.3	N/A	N/A	5.9	7
Manufacturing	367	643	456	576	150	220	(D)	(D)	138,462	165,302
	<1	1.3	1.2	1.4	1.5	1.9	N/A	N/A	4.4	4.2
Wholesale trade	549	558	867	658	(D)	(D)	(D)	10	101,457	120,434
	1.3	1.1	2.4	1.6	N/A	N/A	N/A	1.0	3.2	3.1
Retail trade	3,545	4,271	3,648	3,807	889	1,006	94	97	298,985	341,676
	8.7	8.7	9.9	9.5	8.7	8.8	9.3	9.2	9.5	8.7
Transportation and warehousing	628	1,185	873	908	183	178	(D)	(D)	78,550	181,227
	1.5	2.4	2.4	2.3	1.8	1.5	N/A	N/A	2.5	4.6
Information	447	337	260	269	62	46	(D)	6	83,591	89,824
	1.1	<1	<1	<1	<1	<1	N/A	<1	2.7	2.3

Sector	Eagle County		Garfield County		Grand County		Jackson County		State of Colorado	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Finance and insurance	1,728	2,203	1,247	1,519	286	346	(D)	(D)	191,501	251,294
	4.2	4.5	3.4	3.8	2.8	3.0	N/A	N/A	6.1	6.4
Real estate and rental and leasing	4,586	5,359	2,992	3,067	1,034	1,126	25	(D)	179,287	238,959
	11.2	10.9	8.1	7.7	10.1	9.8	2.5	N/A	5.7	6.1
Professional, scientific, and technical services	2,353	3,092	2,220	2,636	479	597	(D)	44	273,909	381,312
	5.8	6.3	6.0	6.6	4.7	5.2	N/A	4.2	8.7	9.7
Management of companies and enterprises	222	327	204	274	41	69	0	0	32,391	52,152
	<1	<1	<1	<1	<1	<1	0	0	1	1.3
Administrative and support and waste management and remediation services	2,205	3,637	1,704	2,075	398	501	(D)	28	185,584	211,660
	5.4	7.4	4.6	5.2	3.9	4.4	N/A	2.7	5.9	5.4
Educational services	362	839	505	780	69	(D)	1	(D)	59,323	77,829
	<1	1.7	1.4	2.0	<1	N/A	<1	N/A	1.9	2
Health care and social assistance	2,277	3,559	2,611	3,380	298	(D)	43	(D)	280,604	359,593
	5.6	7.3	7.1	8.5	2.9	N/A	4.2	N/A	8.9	9.1
Arts, entertainment, and recreation	3,955	3,962	896	1,261	1,137	(D)	23	24	86,224	100,129
	9.7	8.1	2.4	3.2	11.1	N/A	2.3	2.3	2.7	2.5
Accommodation and food services	7,030	7,285	2,730	3,286	1,667	(D)	81	91	232,845	281,218
	17.2	14.8	7.4	8.2	16.2	N/A	8.0	8.7	7.4	7.1
Other services	2,495	2,625	1,857	2,223	491	596	(D)	(D)	166,692	199,105
	6.1	5.4	5.1	5.6	4.8	5.2	N/A	N/A	5.3	5
Government and government enterprises	3,360	3,512	5,430	5,337	1,370	1,410	193	169	454,624	509,102
	8.2	7.2	14.8	13.4	13.3	12.3	19.1	16.1	14.5	12.9

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.

N/A means data not available or present.

Table A-4 (Part 2). Colorado Analysis Area Employment by Sector (2010 and 2021)

Sector	Mesa County		Moffatt County		Rio Blanco County		Routt County		State of Colorado	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	83,210	92,746	7,590	7,039	4,771	4,333	20,850	23,642	3,143,637	3,945,819
Wage and salary employment	61,085	67,103	5,440	4,892	3,401	3,009	13,779	15,603	2,346,646	2,881,642
Proprietors employment	22,125	25,643	2,150	2,147	1,370	1,324	7,071	8,039	796,991	1,064,177
Farm proprietors employment	1,904	2,245	434	475	267	292	634	761	32,509	35,517
Nonfarm proprietors employment	20,221	23,398	1,716	1,672	1,103	1,032	6,437	7,278	764,482	1,028,660
Farm employment	2,389	2,724	540	588	384	424	777	908	45,101	47,988
Nonfarm employment[2]	80,821	90,022	7,050	6,451	4,387	3,909	20,073	22,734	3,098,536	3,897,831
Private nonfarm employment	70,707	78,863	5,733	5,389	3,215	2,682	18,086	20,173	2,643,912	3,388,729
By Industry (Number of Jobs/Percentage of Total Employment)										
Forestry, fishing, and related activities	375	487	137	150	(D)	(D)	229	176	11,750	13,423
	<1	<1	1.8	2.1	N/A	N/A	1.1	<1	<1	<1
Mining (including quarrying and oil and gas extraction)	3,847	1,836	673	401	955	531	682	281	48,728	37,994
	4.6	2	8.9	5.7	20.0	12.3	3.3	1.2	1.6	1
Utilities	228	230	(D)	(D)	(D)	47	(D)	151	8,738	9,401
	<1	<1	N/A	N/A	N/A	1.1	N/A	<1	<1	<1
Construction	5,777	7,487	389	474	341	236	1,987	2,154	185,291	276,197
	6.9	8.1	5.1	6.7	7.1	5.4	9.5	9.1	5.9	7
Manufacturing	2,912	3,605	102	100	87	79	185	262	138,462	165,302
	3.5	3.9	1.3	1.4	1.8	1.8	0.9	1.1	4.4	4.2
Wholesale trade	2,595	2,575	270	179	(D)	27	(D)	383	101,457	120,434
	3.1	2.8	3.6	2.5	N/A	<1	N/A	1.6	3.2	3.1
Retail trade	9,751	10,667	921	992	292	298	1,902	1,990	298,985	341,676
	11.7	11.5	12.1	14.1	6.1	6.9	9.1	8.4	9.5	8.7
Transportation and warehousing	3,106	3,742	(D)	(D)	118	90	452	434	78,550	181,227
	3.7	4	N/A	N/A	2.5	2.1	2.2	1.8	2.5	4.6

Sector	Mesa County		Moffatt County		Rio Blanco County		Routt County		State of Colorado	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Information	1,099	754	73	34	26	14	222	162	83,591	89,824
	1.3	<1	1	<1	<1	<1	1.1	<1	2.7	2.3
Finance and insurance	3,909	4,576	184	153	93	81	815	1,291	191,501	251,294
	4.7	4.9	2.4	2.2	1.9	1.9	3.9	5.5	6.1	6.4
Real estate and rental and leasing	4,841	5,948	240	303	155	192	2,296	2,718	179,287	238,959
	5.8	6.4	3.2	4.3	3.2	4.4	11	11.5	5.7	6.1
Professional, scientific, and technical services	4,273	4,497	(D)	(D)	(D)	107	1,353	1,548	273,909	381,312
	5.1	4.8	N/A	N/A	N/A	2.5	6.5	6.5	8.7	9.7
Management of companies and enterprises	220	273	(D)	(D)	(D)	0	86	161	32,391	52,152
	<1	<1	N/A	N/A	N/A	0	<1	<1	1	1.3
Administrative and support and waste management and remediation services	4,386	3,963	241	260	208	267	808	1,091	185,584	211,660
	5.3	4.3	3.2	3.7	4.4	6.2	3.9	4.6	5.9	5.4
Educational services	673	1,164	(D)	46	13	(D)	311	447	59,323	77,829
	<1	1.3	N/A	<1	<1	N/A	1.5	1.9	1.9	2
Health care and social assistance	9,982	12,748	(D)	641	84	(D)	1,451	1,482	280,604	359,593
	12	13.7	N/A	9.1	1.8	N/A	7.0	6.3	8.9	9.1
Arts, entertainment, and recreation	1,832	1,837	130	100	65	74	1,491	1,681	86,224	100,129
	2.2	2	1.7	1.4	1.4	1.7	7.2	7.1	2.7	2.5
Accommodation and food services	6,246	7,405	519	529	309	254	2,113	2,567	232,845	281,218
	7.5	8	6.8	7.5	6.5	5.9	10.1	10.9	7.4	7.1
Other services	4,655	5,069	489	420	174	148	1,191	1,194	166,692	199,105
	5.6	5.5	6.4	6	3.6	3.4	5.7	5.1	5.3	5
Government and government enterprises	10,114	11,159	1,317	1,062	1,172	1,227	1,987	2,561	454,624	509,102
	12.2	12	17.4	15.1	24.6	28.3	9.5	10.8	14.5	12.9

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.

N/A means data not available or present.

Table A-5 (Part 1). Colorado Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Eagle County		Garfield County		Grand County		Jackson County		State of Colorado	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	2,945,228	5,419,735	2,658,288	4,172,419	593,517	987,549	65,526	85,628	257,794,659	410,948,218
Population (persons)	52,114	55,727	56,102	62,161	14,794	15,860	1,388	1,363	5,047,005	5,812,069
Per capita personal income (dollars)	56,515	97,255	47,384	67,123	40,119	62,267	47,210	62,823	51,079	70,706
Earnings by place of work (thousands of dollars)	1,926,976	3,169,983	1,874,869	2,179,885	360,574	539,284	36,612	43,196	189,411,524	284,315,350
Wages and salaries (thousands of dollars)	1,486,759	2,014,583	1,375,813	1,527,917	266,336	374,887	22,175	26,272	142,342,931	205,270,875
Supplement to wages and salaries	280,366	344,166	298,343	309,441	60,654	73,477	6,449	6,451	30,830,275	38,796,409
Proprietors' income	159,850	811,234	200,712	342,527	33,584	90,920	7,988	10,473	16,238,318	40,248,066
Farm earnings	2,813	3,048	-1,537	4,874	5,422	3,017	6,126	7,077	1,274,038	1,271,602
Nonfarm earnings	1,924,163	3,166,935	1,876,405	2,175,011	355,151	536,267	30,486	36,119	188,137,485	283,043,748
Private nonfarm earnings	1,687,285	2,906,149	1,532,926	1,800,253	268,137	434,057	20,393	27,183	152,495,628	241,395,201
By Industry (Total Income/Percentage of Total Nonfarm Income)										
Forestry, fishing, and related activities	(D)	2,606	2,211	2,430	1,112	1,164	2,076	1,400	6,588	320,845
	N/A	<1	<1	<1	<1	<1	6.8	3.9	<1	<1
Mining (including quarrying and oil and gas extraction)	(D)	2,878	266,670	86,968	3,032	2,212	143	2,908	321,055	12,297,287
	N/A	<1	14.2	4	<1	<1	<1	<1	7.8	4.3
Utilities	7,113	10,265	30,368	36,358	(D)	(D)	-23	(D)	28,003	1,942,237
	<1	<1	1.6	1.7	N/A	N/A	<1	N/A	<1	<1
Construction	205,408	472,655	268,636	385,833	37,897	85,149	(D)	(D)	351,863	21,691,588
	11	14.9	14.3	17.7	10.7	15.9	N/A	N/A	8.6	7.7

Sector	Eagle County		Garfield County		Grand County		Jackson County		State of Colorado	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Manufacturing	14,661	35,574	23,575	27,972	4,646	10,077	(D)	(D)	168,223	15,945,891
	<1	1.1	1.3	1.3	1.3	1.9	N/A	N/A	4.1	5.6
Wholesale trade	45,277	56,528	64,223	48,929	(D)	(D)	(D)	184	170,213	13,612,616
	2	1.8	3.4	2.2	N/A	N/A	N/A	<1	4.1	4.8
Retail trade	160,167	239,008	153,600	172,041	28,902	46,458	2,165	3,376	317,344	14,943,538
	8	7.5	8.2	7.9	8.1	8.7	7.1	<1	7.7	5.3
Transportation and warehousing	39,347	96,519	46,749	44,043	7,217	8,288	(D)	(D)	221,355	10,468,326
	2	3	2.5	2	2	1.6	N/A	N/A	5.4	3.7
Information	27,121	19,458	12,891	12,584	3,030	2,727	(D)	23	66,063	11,143,281
	1	<1	<1	<1	<1	<1	N/A	<1	1.6	3.9
Finance and insurance	54,158	77,514	51,897	63,448	9,508	8,081	(D)	(D)	175,245	16,982,485
	3	2.5	2.8	2.9	2.7	1.5	N/A	N/A	4.3	6
Real estate and rental and leasing	1,599	296,979	63,072	110,515	7,145	42,619	40	(D)	97,867	11,086,382
	<1	9.4	3.4	5.1	2	7.9	<1	N/A	2.4	3.9
Professional, scientific, and technical services	150,684	230,590	111,943	161,216	22,057	29,189	(D)	3,037	221,949	39,497,756
	8	7.3	6	7.4	6.2	5.4	N/A	<1	5.4	14
Management of companies and enterprises	7,347	26,424	12,546	17,839	258	752	0	N/A	19,444	8,200,880
	<1	<1	<1	<1	<1	<1	<1	N/A	<1	2.9
Administrative and support and waste management and remediation services	83,078	157,227	63,965	88,954	9,938	17,241	(D)	928	178,881	11,226,138
	4	5	3.4	4.1	2.8	3.2	N/A	<1	4.4	4
Educational services	17,693	35,061	16,411	29,117	1,242	(D)	71	(D)	14,243	3,375,199
	<1	1.1	<1	1.33	<1	N/A	<1	N/A	<1	1.2
Health care and social assistance	236,417	476,498	179,437	252,572	15,058	(D)	1,319	(D)	641,870	24,815,683
	12	15.1	9.6	11.6	4.2	N/A	4.3	N/A	15.6	8.8
Arts, entertainment, and recreation	162,596	148,401	11,904	37,519	40,202	(D)	153	(D)	21,044	3,504,050
	8	4.7	<1	1.7	11.3	N/A	<1	N/A	<1	1.2
Accommodation and food services	291,952	400,300	72,023	122,134	47,361	(D)	1,344	2,725	149,781	10,858,526
	15	12.6	3.8	5.6	13.3	N/A	4.4	<1	3.6	3.8

Sector	Eagle County		Garfield County		Grand County		Jackson County		State of Colorado	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Other services (except government and government enterprises)	136,403	121,664	80,806	99,781	18,601	18,593	(D)	(D)	198,507	9,482,493
	7	3.8	4.3	4.6	5.2	3.5	N/A	N/A	4.8	3.4
Government and government enterprises	236,878	260,786	343,479	374,758	87,015	102,210	10,093	8,936	734,608	41,648,547
	12	8.2	18.3	17.2	24.5	19.1	33.1	1.7	17.9	16.3

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

Table A-5 (Part 2). Colorado Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Mesa County		Moffat County		Rio Blanco County		Routt County		State of Colorado	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	6,315,127	8,200,469	573,275	649,057	329,636	354,530	1,519,904	2,468,236	257,794,659	410,948,218
Population (persons)	146,272	157,335	13,798	13,185	6,627	6,476	23,418	25,091	5,047,005	5,812,069
Per capita personal income (dollars)	43,174	52,121	41,548	49,227	49,742	54,745	64,904	98,371	51,079	70,706
Earnings by place of work (thousands of dollars)	4,113,463	4,751,435	390,283	369,509	278,704	227,785	1,070,631	1,249,949	189,411,524	284,315,350
Wages and salaries (thousands of dollars)	2,980,793	3,438,077	281,904	258,407	206,637	175,240	695,652	869,861	142,342,931	205,270,875
Supplement to wages and salaries	677,419	740,031	72,688	62,984	47,718	40,873	146,429	164,182	30,830,275	38,796,409
Proprietors' income	455,251	573,327	35,691	48,118	24,350	11,672	228,551	215,906	16,238,318	40,248,066
Farm earnings	9,318	14,278	6,694	7,740	3,536	4,634	-1,562	(5,279)	1,274,038	1,271,602
Nonfarm earnings	4,104,145	4,737,157	383,589	361,769	275,168	223,151	1,072,193	1,255,228	188,137,485	283,043,748
Private nonfarm earnings	3,369,537	3,967,749	301,325	294,323	204,858	149,249	952,081	1,061,442	152,495,628	241,395,201
By Industry (Total Income/Percentage of Total Nonfarm Income)										
Forestry, fishing, and related activities	6,588	6,239	1,403	2,021	(D)	(D)	4,893	2,454	295,273	320,845
	<1	<1	<1	<1	N/A	N/A	<1	<1	<1	<1
Mining (including quarrying and oil and gas extraction)	321,055	154,105	67,790	49,391	98,294	64,299	68,215	24,084	8,066,897	12,297,287
	7.8	3.3	17.7	13.7	35.7	28.8	6.4	1.9	4.3	4.3
Utilities	28,003	29,215	(D)	(D)	(D)	6,751	(D)	22,320	1,404,824	1,942,237
	<1	<1	N/A	N/A	N/A	3	N/A	1.8	<1	<1
Construction	351,863	501,499	24,569	23,726	33,372	12,019	262,668	148,592	10,809,310	21,691,588
	8.6	10.6	6.4	6.6	12.1	5.4	24.5	11.8	5.7	7.7
Manufacturing	168,223	195,366	3,891	4,269	2,876	3,704	7,552	13,980	12,096,270	15,945,891
	4.1	4.1	1	1.2	1	1.7	<1	1.1	6.4	5.6

Sector	Mesa County		Moffat County		Rio Blanco County		Routt County		State of Colorado	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Wholesale trade	170,213	188,071	17,416	10,949	(D)	1,120	(D)	30,119	9,735,613	13,612,616
	4.1	4	4.5	3	N/A	<1	N/A	2.4	5.2	4.8
Retail trade	317,344	440,093	31,027	43,679	8,506	6,835	69,439	103,376	10,967,020	14,943,538
	7.7	9.3	8.1	12.1	3.1	3	6.5	8.2	5.8	5.3
Transportation and warehousing	221,355	201,294	(D)	(D)	11,964	5,333	19,938	18,279	5,334,942	10,468,326
	5.4	4.3	N/A	N/A	4.3	2.4	1.9	1.5	2.8	3.7
Information	66,063	46,252	4,610	1,562	1,165	705	12,157	10,872	9,263,953	11,143,281
	1.6	<1	1.2	<1	<1	<1	1.1	<1	4.9	3.9
Finance and insurance	175,245	219,432	7,908	8,146	3,599	4,272	37,761	55,435	11,614,926	16,982,485
	4.3	4.6	2.1	2.3	1.3	1.9	3.5	4.4	6.2	6
Real estate and rental and leasing	97,867	192,685	3,020	9,575	1,181	2,287	34,332	129,246	-879,182	11,086,382
	2.4	4.1	<1	2.7	<1	1	3.2	10.3	<1	3.9
Professional, scientific, and technical services	221,949	236,348	(D)	(D)	(D)	2,925	76,421	106,542	24,124,299	39,497,756
	5.4	5	N/A	N/A	N/A	1.3	7.1	8.5	12.8	14
Management of companies and enterprises	19,444	16,761	(D)	(D)	(D)	N/A	6,624	11,145	5,339,038	8,200,880
	<1	<1	N/A	N/A	N/A	0	<1	<1	2.8	2.9
Administrative and support and waste management and remediation services	178,881	169,847	6,683	6,511	8,133	18,194	31,811	50,465	7,969,662	11,226,138
	4.4	3.6	1.7	1.8	3	8.2	3	4	4.2	4
Educational services	14,243	28,406	(D)	458	154	(D)	8,822	14,993	2,380,978	3,375,199
	<1	<1	N/A	<1	<1	N/A	<1	1.2	1.3	1.2
Health care and social assistance	641,870	881,844	(D)	42,572	2,736	(D)	98,430	91,752	18,365,718	24,815,683
	15.6	18.6	N/A	11.8	<1	N/A	9.2	7.3	9.8	8.8
Arts, entertainment, and recreation	21,044	28,335	1,375	2,405	413	1,955	47,784	69,447	2,229,508	3,504,050
	<1	<1	<1	<1	<1	<1	4.5	5.5	1.2	1.2
Accommodation and food services	149,781	230,495	11,215	13,955	11,810	7,531	64,752	114,449	6,260,189	10,858,526
	3.6	4.9	2.9	3.9	4.3	3.4	6	9.1	3.3	3.8
Other services (except government and government enterprises)	198,507	201,462	16,604	14,593	7,179	6,769	53,943	43,892	7,116,387	9,482,493
	4.8	4.3	4.3	4	2.6	3	5	3.5	3.8	3.4

Sector	Mesa County		Moffat County		Rio Blanco County		Routt County		State of Colorado	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Government and government enterprises	734,608	769,408	82,264	67,446	70,310	73,902	120,112	193,786	35,641,858	41,648,547
	17.9	16.2	21.4	18.6	25.6	33.1	11.2	15.4	18.9	16.3

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

Table A-6 (Part 1). Idaho Analysis Area Employment by Sector (2010 and 2021)

Sector	Adams County		Bear Lake County		Blaine County		Bingham County		Bonneville County		Butte County		Camas County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	2,018	2,480	3,073	3,459	21,672	23,118	19,307	22,148	60,131	80,803	9,408	9,904	683	686	868,718	1,125,054
Wage and salary employment	1,117	1,514	1,835	2,002	15,407	15,982	12,448	14,051	45,133	60,749	8,867	9,345	408	393	642,637	831,903
Proprietors employment	901	966	1,238	1,457	6,265	7,136	6,859	8,097	14,998	20,054	541	559	275	293	226,081	293,151
Farm proprietors employment	229	206	451	482	1,205	1,198	148	140	827	811	194	200	99	115	22,805	22,544
Nonfarm proprietors employment	672	760	787	975	5,060	5,938	6,711	7,957	14,171	19,243	347	359	176	178	203,276	270,607
Farm employment	262	258	519	550	2,119	2,171	305	331	1,192	1,211	263	272	139	156	37,294	38,894
Nonfarm employment	1,756	2,222	2,554	2,909	19,553	20,947	19,002	21,817	58,939	79,592	9,145	9,632	544	530	831,424	1,086,160
Private nonfarm employment	1,420	1,886	1,862	2,190	15,426	16,751	17,418	20,425	52,665	72,455	8,834	9,405	420	410	702,848	951,287
By Industry (Number of Jobs/Percentage of Total Employment)																
Forestry, fishing, and related activities	115	118	(D)	(D)	(D)	634	99	105	(D)	(D)	(D)	(D)	(D)	(D)	11,958	12,981
	5.7	4.8	N/A	N/A	N/A	2.7	<1	<1	N/A	N/A	N/A	N/A	N/A	N/A	1.4	1.2
Mining (including quarrying and oil and gas extraction)	19	16	(D)	(D)	(D)	43	189	131	(D)	(D)	19	(D)	0	1	4,428	4,579
	<1	<1	N/A	N/A	N/A	<1	1.0	<1	N/A	N/A	<1	N/A	0	<1	<1	<1
Utilities	(D)	12	(D)	(D)	64	75	31	29	56	98	1	1	0	(D)	2,954	3,347
	N/A	<1	N/A	N/A	<1	<1	<1	<1	<1	<1	<1	<1	0	N/A	<1	<1
Construction	135	236	133	189	1,441	1,895	1,946	2,839	4,119	5,753	38	62	(D)	72	53,502	88,220
	6.7	9.5	4.3	5.5	6.6	8.2	10.1	12.8	6.9	7.1	<1	<1	N/A	10.5	6.2	7.8
Manufacturing	71	155	80	127	2,431	2,292	507	529	2,437	4,766	28	80	(D)	(D)	58,472	77,093
	3.5	6.3	2.6	3.7	11.2	9.9	2.6	2.4	4.1	5.9	<1	<1	N/A	N/A	6.7	6.9
Wholesale trade	26	20	80	60	1,393	941	267	294	3,590	3,390	(D)	23	(D)	49	28,606	36,081
	1.3	<1	2.6	1.7	6.4	4.1	1.4	1.3	6	4.2	N/A	<1	N/A	7.1	3.3	3.2

Sector	Adams County		Bear Lake County		Blaine County		Bingham County		Bonneville County		Butte County		Camas County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Retail trade	281	211	447	392	1,956	2,020	1,820	1,966	8,368	10,524	143	154	(D)	22	98,083	119,168
	13.9	8.5	14.5	11.3	9.0	8.7	9.4	8.9	13.9	13.0	1.5	1.6	N/A	3.2	11.3	10.6
Transportation and warehousing	(D)	45	(D)	(D)	578	754	232	268	1,770	2,992	(D)	42	6	(D)	24,998	46,102
	N/A	1.8	N/A	N/A	2.7	3.3	1.2	1.2	2.9	3.7	N/A	<1	<1	N/A	2.9	4.1
Information	18	(D)	31	19	93	(D)	465	369	1,375	705	(D)	26	5	(D)	12,639	11,020
	<1	N/A	1	<1	<1	N/A	2.4	1.7	2.3	<1	N/A	<1	<1	N/A	1.5	1
Finance and insurance	51	53	65	83	709	916	964	1,178	2,816	3,699	54	(D)	(D)	(D)	37,341	50,029
	2.5	2.1	2.1	2.4	3.3	4.0	5.0	5.3	4.7	4.6	<1	N/A	N/A	N/A	4.3	4.4
Real estate and rental and leasing	108	87	129	187	723	923	2,105	2,851	3,197	4,595	42	(D)	20	19	43,697	62,155
	5.4	3.5	4.2	5.4	3.3	4.0	10.9	12.9	5.3	5.7	<1	N/A	2.9	2.8	5.0	5.5
Professional, scientific, and technical services	82	82	(D)	(D)	(D)	(D)	1,606	1,727	3,644	4,535	8,053	(D)	12	30	52,535	71,512
	4.1	3.3	N/A	N/A	N/A	N/A	8.3	7.8	6.1	5.6	85.6	N/A	1.8	4.4	6	6.4
Management of companies and enterprises	0	0	10	32	(D)	(D)	(D)	99	111	614	(D)	(D)	(D)	(D)	6,391	10,169
	0	0	<1	<1	N/A	N/A	N/A	<1	<1	<1	N/A	N/A	N/A	N/A	<1	<1
Administrative and support and waste management and remediation services	70	68	(D)	(D)	590	719	(D)	1,376	3,148	4,867	(D)	(D)	(D)	(D)	49,332	64,161
	3.5	2.7	N/A	N/A	2.7	3.1	N/A	6.2	5.2	6	N/A	N/A	N/A	N/A	5.7	5.7
Educational services	(D)	(D)	(D)	(D)	192	254	278	450	607	1,298	(D)	(D)	(D)	(D)	14,555	23,101
	N/A	N/A	N/A	N/A	<1	1.1	1.4	2	1	1.6	N/A	N/A	N/A	N/A	1.7	2.1
Health care and social assistance	(D)	(D)	(D)	(D)	1,856	2,050	1,005	1,265	8,516	12,638	(D)	(D)	(D)	(D)	89,550	117,370
	N/A	N/A	N/A	N/A	8.6	8.9	5.2	5.7	14.2	15.6	N/A	N/A	N/A	N/A	10.3	10.4
Arts, entertainment, and recreation	128	392	64	54	201	285	840	834	955	1,259	8	11	(D)	(D)	17,187	24,033
	6.3	15.8	2.1	1.6	<1	1.2	4.4	3.8	1.6	1.6	<1	<1	N/A	N/A	2	2.1
Accommodation and food services	93	139	189	203	781	896	2,756	2,748	4,278	6,539	81	71	(D)	(D)	54,452	78,157
	4.6	5.6	6.2	5.9	3.6	3.9	14.3	12.4	7.1	8.1	<1	<1	N/A	N/A	6.3	6.9
Other services	87	(D)	133	167	1,110	(D)	1,160	1,367	3,166	3,785	(D)	71	(D)	(D)	42,168	52,009
	4.3	N/A	4.3	4.8	5.1	N/A	6	6.2	5.3	4.7	N/A	<1	N/A	N/A	4.9	4.6

Sector	Adams County		Bear Lake County		Blaine County		Bingham County		Bonneville County		Butte County		Camas County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Government and government enterprises	336	336	692	719	4,127	4,196	1,584	1,392	6,274	7,137	311	227	124	120	128,576	134,873
	16.7	13.5	22.5	20.8	19	18.2	8.2	6.3	10.4	8.8	3.3	2.3	18.2	17.5	14.8	12

Sources: BEA 2010a, 2021a
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
N/A means data are not available or present.

Table A-6 (Part 2). Idaho Analysis Area Employment by Sector (2010 and 2021)

Sector	Caribou County		Cassia County		Clark County		Custer County		Elmore County		Fremont County		Gem County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	4,522	5,005	13,552	16,636	528	502	2,835	2,859	13,197	14,069	5,353	6,555	6,220	7,809	868,718	1,125,054
Wage and salary employment	3,265	3,715	10,261	12,642	377	351	1,780	1,659	10,797	11,221	3,146	3,684	3,414	4,592	642,637	831,903
Proprietors employment	1,257	1,290	3,291	3,994	151	151	1,055	1,200	2,400	2,848	2,207	2,871	2,806	3,217	226,081	293,151
Farm proprietors employment	368	364	574	610	65	62	239	242	331	321	506	530	787	754	22,805	22,544
Nonfarm proprietors employment	889	926	2,717	3,384	86	89	816	958	2,069	2,527	1,701	2,341	2,019	2,463	203,276	270,607
Farm employment	531	544	1,767	1,944	124	119	319	340	805	824	759	824	910	898	37,294	38,894
Nonfarm employment	3,991	4,461	11,785	14,692	404	383	2,516	2,519	12,392	13,245	4,594	5,731	5,310	6,911	831,424	1,086,160
Private nonfarm employment	3,275	3,781	9,997	13,067	239	256	2,025	2,070	6,153	7,726	3,427	4,677	4,381	5,897	702,848	951,287
By Industry (Number of Jobs/Percentage of Total Employment)																
Forestry, fishing, and related activities	(D)	(D)	444	553	(D)	(D)	(D)	64	(D)	188	(D)	(D)	(D)	(D)	11,958	12,981
	N/A	N/A	3.3	3.3	N/A	N/A	N/A	2.2	N/A	1.3	N/A	N/A	N/A	N/A	1.4	1.2
Mining (including quarrying and oil and gas extraction)	353	614	119	207	4	(D)	(D)	87	(D)	20	(D)	(D)	(D)	(D)	4,428	4,579
	7.8	12.3	<1	1.2	<1	N/A	N/A	3	N/A	<1	N/A	N/A	N/A	N/A	<1	<1

Sector	Caribou County		Cassia County		Clark County		Custer County		Elmore County		Fremont County		Gem County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Utilities	38	29	50	62	0	2	36	28	33	44	(D)	(D)	5	(D)	2,954	3,347
	<1	<1	<1	<1	0	<1	1.3	1	<1	<1	N/A	N/A	<1	N/A	<1	<1
Construction	(D)	381	618	967	(D)	(D)	179	221	457	559	435	715	482	824	53,502	88,220
	N/A	7.6	4.6	5.8	N/A	N/A	6.3	7.7	3.5	4	8.1	10.9	7.7	10.6	6.2	7.8
Manufacturing	(D)	801	1,288	1,558	(D)	(D)	57	(D)	444	810	104	210	242	416	58,472	77,093
	N/A	16.0	9.5	9.4	N/A	N/A	2	N/A	3.4	5.8	1.9	3.2	3.9	5.3	6.7	6.9
Wholesale trade	90	134	463	578	(D)	45	34	50	112	114	(D)	(D)	140	194	28,606	36,081
	2.0	2.7	3.4	3.5	N/A	9.0	1.2	1.7	<1	<1	N/A	N/A	2.3	2.5	3.3	3.2
Retail trade	397	400	1,735	2,091	(D)	(D)	275	239	1,143	1,216	459	618	598	824	98,083	119,168
	8.8	8	12.8	12.6	N/A	N/A	9.7	8.4	8.7	8.6	8.6	9.4	9.6	10.6	11.3	10.6
Transportation and warehousing	81	96	835	1,217	(D)	(D)	37	66	268	473	189	244	217	(D)	24,998	46,102
	1.8	1.9	6.2	7.3	N/A	N/A	1.3	2.3	2	3.4	3.5	3.7	3.5	N/A	2.9	4.1
Information	33	(D)	103	82	(D)	(D)	41	49	120	94	(D)	(D)	26	27	12,639	11,020
	<1	N/A	<1	<1	N/A	N/A	1.4	1.7	<1	<1	N/A	N/A	<1	<1	1.5	1
Finance and insurance	87	108	388	490	12	(D)	51	(D)	275	338	168	(D)	203	247	37,341	50,029
	1.9	2.2	2.9	2.9	2.3	N/A	1.8	N/A	2.1	2.4	3.1	N/A	3.3	3.2	4.3	4.4
Real estate and rental and leasing	177	175	522	819	11	10	102	(D)	397	439	276	405	274	371	43,697	62,155
	3.9	3.5	3.9	4.9	2.1	2	3.6	N/A	3.0	3.1	5.2	6.2	4.4	4.8	5	5.5
Professional, scientific, and technical services	145	(D)	370	442	(D)	(D)	85	96	248	327	151	(D)	201	318	52,535	71,512
	3.2	N/A	2.7	2.7	N/A	N/A	3.0	3.4	1.9	2.3	2.8	N/A	3.2	4.1	6	6.4
Management of companies and enterprises	(D)	(D)	(D)	73	0	0	(D)	(D)	0	(D)	0	(D)	(D)	(D)	6,391	10,169
	N/A	N/A	N/A	<1	0	0	N/A	N/A	0	N/A	0	N/A	N/A	N/A	<1	<1
Administrative and support and waste management and remediation services	(D)	149	(D)	400	(D)	(D)	(D)	(D)	345	(D)	116	286	(D)	(D)	49,332	64,161
	N/A	3	N/A	2.4	N/A	N/A	N/A	N/A	2.6	N/A	2.2	4.4	N/A	N/A	5.7	5.7
Educational services	(D)	(D)	(D)	139	(D)	(D)	10	12	174	135	(D)	(D)	(D)	72	14,555	23,101
	N/A	N/A	N/A	<1	N/A	N/A	<1	<1	1.3	1	N/A	N/A	N/A	<1	1.7	2.1
Health care and social assistance	(D)	(D)	(D)	1,552	(D)	(D)	93	(D)	573	1,007	(D)	(D)	(D)	888	89,550	117,370
	N/A	N/A	N/A	9.3	N/A	N/A	3.3	N/A	4.3	7.2	N/A	N/A	N/A	11.4	10.3	10.4
Arts, entertainment, and recreation	57	47	159	192	2	5	86	161	88	132	67	95	76	117	17,187	24,033
	1.3	<1	1.2	1.2	<1	1	3	5.6	<1	<1	1.3	1.4	1.2	1.5	2	2.1

Sector	Caribou County		Cassia County		Clark County		Custer County		Elmore County		Fremont County		Gem County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Accommodation and food services	170	131	481	1,028	(D)	(D)	291	363	789	964	320	514	253	412	54,452	78,157
	3.8	2.6	3.5	6.2	N/A	N/A	10.3	12.7	6	6.9	6.0	7.8	4.1	5.3	6.3	6.9
Other services	193	(D)	607	617	14	12	102	112	531	570	353	399	392	425	42,168	52,009
	4.3	N/A	4.5	3.7	2.7	2.4	3.6	3.9	4	4.1	6.6	6.1	6.3	5.4	4.9	4.6
Government and government enterprises	716	680	1,788	1,625	165	127	491	449	6,239	5,519	1,167	1,054	929	1,014	128,576	134,873
	15.8	13.6	13.2	9.8	31.3	25.3	17.3	15.7	47.3	39.2	21.8	16.1	14.9	13	14.8	12

Source: BEA 2010a, 2021a
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
N/A means data are not available or present.

Table A-6 (Part 3). Idaho Analysis Area Employment by Sector (2010 and 2021)

Sector	Gooding County		Jefferson County		Jerome County		Lemhi County		Lincoln County		Madison County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	8,060	8,968	10,513	13,444	11,133	12,880	4,316	4,627	2,323	2,602	18,186	26,790	868,718	1,125,054
Wage and salary employment	6,014	6,718	6,323	8,177	8,557	10,158	2,715	2,837	1,596	1,789	13,423	20,080	642,637	831,903
Proprietors employment	2,046	2,250	4,190	5,267	2,576	2,722	1,601	1,790	727	813	4,763	6,710	226,081	293,151
Farm proprietors employment	564	535	742	725	523	516	326	329	257	289	381	404	22,805	22,544
Nonfarm proprietors employment	1,482	1,715	3,448	4,542	2,053	2,206	1,275	1,461	470	524	4,382	6,306	203,276	270,607
Farm employment	1,950	2,023	1,185	1,130	1,692	1,711	414	426	555	626	663	713	37,294	38,894
Nonfarm employment	6,110	6,945	9,328	12,314	9,441	11,169	3,902	4,201	1,768	1,976	17,523	26,077	831,424	1,086,160
Private nonfarm employment	4,934	5,941	7,850	10,751	8,311	9,974	3,041	3,357	1,245	1,486	15,383	23,529	702,848	951,287
By Industry (Number of Jobs/Percentage of Total Employment)														
Forestry, fishing, and related activities	(D)	(D)	631	522	449	486	(D)	(D)	(D)	176	(D)	189	11,958	12,981
	N/A	N/A	6	3.9	4	3.8	N/A	N/A	N/A	6.8	N/A	<1	1.4	1.2

Sector	Gooding County		Jefferson County		Jerome County		Lemhi County		Lincoln County		Madison County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Mining (including quarrying and oil and gas extraction)	(D)	(D)	31	28	23	24	(D)	(D)	0	0	(D)	40	4,428	4,579
	N/A	N/A	<1	<1	<1	<1	N/A	N/A	0	0	N/A	<1	<1	<1
Utilities	40	54	25	33	(D)	(D)	(D)	15	(D)	(D)	(D)	(D)	2,954	3,347
	<1	<1	<1	<1	N/A	N/A	N/A	<1	N/A	N/A	N/A	N/A	<1	<1
Construction	330	539	950	1,645	579	793	366	460	(D)	245	883	1,348	53,502	88,220
	4.1	6	9	12.2	5.2	6.2	8.5	9.9	N/A	9.4	4.9	5	6.2	7.8
Manufacturing	802	999	1,020	1,262	1,437	1,933	134	160	(D)	177	810	1,284	58,472	77,093
	10.0	11.1	9.7	9.4	12.9	15	3.1	3.5	N/A	6.8	4.5	4.8	6.7	6.9
Wholesale trade	199	170	356	512	(D)	(D)	58	66	(D)	(D)	1,345	(D)	28,606	36,081
	2.5	1.9	3.4	3.8	N/A	N/A	1.3	1.4	N/A	N/A	7.4	N/A	3.3	3.2
Retail trade	583	604	939	1,291	1,132	1,259	437	474	139	(D)	2,073	2,983	98,083	119,168
	7.2	6.7	8.9	9.6	10.2	9.8	10.1	10.2	6	N/A	11.4	11.1	11.3	10.6
Transportation and warehousing	343	262	414	498	1,144	1,042	(D)	92	57	103	(D)	(D)	24,998	46,102
	4.3	2.9	3.9	3.7	10.3	8.1	N/A	2	2.5	4	N/A	N/A	2.9	4.1
Information	18	(D)	53	66	104	(D)	48	38	(D)	(D)	125	270	12,639	11,020
	<1	N/A	<1	<1	<1	N/A	1.1	<1	N/A	N/A	<1	1	1.5	1
Finance and insurance	164	211	348	416	229	189	134	88	(D)	39	612	780	37,341	50,029
	2.0	2.4	3.3	3.1	2.1	1.5	3.1	1.9	N/A	1.5	3.4	2.9	4.3	4.4
Real estate and rental and leasing	257	(D)	601	864	395	(D)	178	204	(D)	(D)	1,016	1,584	43,697	62,155
	3.2	N/A	5.7	6.4	3.5	N/A	4.1	4.4	N/A	N/A	5.6	5.9	0	5.5
Professional, scientific, and technical services	280	197	(D)	(D)	238	283	231	228	(D)	37	1,253	1,962	52,535	71,512
	3.5	2.2	N/A	N/A	2.1	2.2	5.4	4.9	N/A	1.4	6.9	7.3	6	6.4
Management of companies and enterprises	12	17	(D)	(D)	16	88	16	(D)	0	0	(D)	71	6,391	10,169
	<1	<1	N/A	N/A	<1	<1	<1	N/A	0	0	N/A	<1	<1	<1
Administrative and support and waste management and remediation services	116	143	281	438	285	522	147	(D)	(D)	101	(D)	1,845	49,332	64,161
	1.4	1.6	2.7	3.3	2.6	4.1	3.4	N/A	N/A	3.9	N/A	6.9	5.7	5.7
Educational services	10	(D)	(D)	144	96	122	17	(D)	(D)	11	(D)	4,282	14,555	23,101
	<1	N/A	N/A	1.1	<1	<1	<1	N/A	N/A	<1	N/A	16.0	1.7	2.1

Sector	Gooding County		Jefferson County		Jerome County		Lemhi County		Lincoln County		Madison County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Health care and social assistance	(D)	(D)	(D)	969	596	617	338	(D)	(D)	145	(D)	1,786	89,550	117,370
	N/A	N/A	N/A	7.2	5.4	4.8	7.8	N/A	N/A	5.6	N/A	6.7	10.3	10.4
Arts, entertainment, and recreation	115	133	290	300	174	(D)	115	163	(D)	(D)	330	419	17,187	24,033
	1.4	1.5	2.8	2.2	1.6	N/A	2.7	3.5	N/A	N/A	1.8	1.6	2	2.1
Accommodation and food services	294	414	315	417	398	(D)	304	380	(D)	(D)	1,005	1,767	54,452	78,157
	3.6	4.6		3.1	3.6	N/A	7	8.2	N/A	N/A	5.5	6.6	6.3	6.9
Other services	410	396	623	770	518	583	322	288	(D)	94	702	973	42,168	52,009
	5.1	4.4	5.9	5.7	4.7	4.5	7.5	6.2	N/A	3.6	3.9	3.6	4.9	4.6
Government and government enterprises	1,176	1,004	1,478	1,563	1,130	1,195	861	844	523	490	2,140	2,548	128,576	134,873
	14.6	11.2	14.1	11.6	10.2	9.3	19.9	18.2	22.5	18.8	11.8	9.5	14.8	12

Source: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.

N/A means data are not available or present.

Table A-6 (Part 4). Idaho Analysis Area Employment by Sector (2010 and 2021)

Sector	Minidoka County		Oneida County		Owyhee County		Payette County		Power County		Twin Falls County		Washington County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	8,925	11,608	2,062	2,654	4,212	5,164	9,380	10,955	4,365	4,893	44,368	55,421	4,538	4,689	868,718	1,125,054
Wage and salary employment	6,771	8,679	1,129	1,566	2,696	3,256	6,281	7,378	3,444	3,799	33,864	42,216	2,933	3,136	642,637	831,903
Proprietors employment	2,154	2,929	933	1,088	1,516	1,908	3,099	3,577	921	1,094	10,504	13,205	1,605	1,553	226,081	293,151
Farm proprietors employment	547	570	431	448	522	487	627	621	285	288	1,148	1,154	532	506	22,805	22,544
Nonfarm proprietors employment	1,607	2,359	502	640	994	1,421	2,472	2,956	636	806	9,356	12,051	1,073	1,047	203,276	270,607
Farm employment	1,376	1,490	507	528	1,133	1,236	985	1,046	780	884	2,238	2,474	689	692	37,294	38,894
Nonfarm employment	7,549	10,118	1,555	2,126	3,079	3,928	8,395	9,909	3,585	4,009	42,130	52,947	3,849	3,997	831,424	1,086,160
Private nonfarm employment	6,003	8,538	1,082	1,440	2,304	3,201	7,210	8,810	2,876	3,284	37,034	47,648	3,080	3,205	702,848	951,287
By Industry (Number of Jobs/Percentage of Total Employment)																
Forestry, fishing, and related activities	(D)	(D)	(D)	(D)	(D)	(D)	(D)	283	214	255	824	(D)	216	(D)	11,958	12,981
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.6	4.9	5.2	1.9	N/A	4.8	N/A	1.4	1.2
Mining (including quarrying and oil and gas extraction)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	28	19	16	117	(D)	19	(D)	4,428	4,579
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1	<1	<1	<1	N/A	<1	N/A	<1	<1
Utilities	59	45	1	7	(D)	(D)	101	116	(D)	11	224	223	(D)	(D)	2,954	3,347
	<1	<1	<1	<1	N/A	N/A	1.1	1.1	N/A	<1	<1	<1	N/A	N/A	<1	<1
Construction	515	721	68	(D)	233	384	610	845	100	146	2,267	3,233	223	268	53,502	88,220
	5.8	6.2	3.3	N/A	5.5	7.4	6.5	7.7	2.3	3	5.1	5.8	4.9	5.7	6.2	7.8
Manufacturing	953	1,375	44	64	196	199	1,174	1,362	1,084	1,071	3,254	5,131	486	668	58,472	77,093
	10.7	11.8	2.1	2.4	4.7	3.9	12.5	12.4	24.8	21.9	7.3	9.3	10.7	14.2	6.7	6.9
Wholesale trade	572	711	26	48	113	157	289	234	(D)	262	1,441	1,898	170	79	28,606	36,081
	6.4	6.1	1.3	1.8	2.7	3	3.1	2.1	N/A	5.4	3.2	3.4	3.7	1.7	3.3	3.2
Retail trade	673	932	188	266	328	429	730	898	272	232	5,724	6,397	408	440	98,083	119,168
	7.5	8	9.1	10	7.8	8.3	7.8	8.2	6.2	4.7	12.9	11.5	9	9.4	11.3	10.6
Transportation and warehousing	342	478	99	61	(D)	(D)	329	422	292	334	1,768	2,601	(D)	(D)	24,998	46,102
	3.8	4.1	4.8	2.3	N/A	N/A	3.5	3.9	6.7	6.8		4.7	N/A	N/A	2.9	4.1
Information	145	250	14	(D)	35	(D)	(D)	(D)	(D)	(D)	593	336	104	115	12,639	11,020
	1.6	2.2	<1	N/A	<1	N/A	N/A	N/A	N/A	N/A	1.3	<1	2.3	2.5	1.5	<1
Finance and insurance	178	244	(D)	99	(D)	67	359	405	66	78	1,712	1,900	100	104	37,341	50,029
	2.0	2.1	N/A	3.7	N/A	1.3	3.8	3.7	1.5	1.6	3.9	3.4	2.2	2.2	4.3	4.4

Sector	Minidoka County		Oneida County		Owyhee County		Payette County		Power County		Twin Falls County		Washington County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Real estate and rental and leasing	286	507	(D)	93	(D)	221	365	(D)	121	(D)	2,159	2,745	177	150	43,697	62,155
	3.2	4.4	N/A	3.5	N/A	4.3	3.9	N/A	2.8	N/A	4.9	5	3.9	3.2	5	5.5
Professional, scientific, and technical services	232	276	(D)	50	(D)	161	(D)	(D)	58	79	2,005	2,321	120	140	52,535	71,512
	2.6	2.4	N/A	1.9	N/A	3.1	N/A	N/A	1.3	1.6	4.5	4.2	2.6	3.0	6	6.4
Management of companies and enterprises	0	(D)	0	0	(D)	0	(D)	(D)	(D)	52	176	471	(D)	(D)	6,391	10,169
	0	N/A	0	0	N/A	0	N/A	N/A	N/A	1.1	<1	<1	N/A	N/A	<1	<1
Administrative and support and waste management and remediation services	104	(D)	(D)	56	142	188	485	(D)	(D)	62	2,983	3,922	(D)	(D)	49,332	64,161
	1.2	N/A	N/A	2.1	3.4	3.6	5.2	N/A	N/A	1.3	6.7	7.1	N/A	N/A	5.7	5.7
Educational services	(D)	(D)	6	12	(D)	(D)	(D)	116	(D)	(D)	394	603	(D)	(D)	14,555	23,101
	N/A	N/A	<1	<1	N/A	N/A	N/A	1.1	N/A	N/A	<1	1.1	N/A	N/A	1.7	2.1
Health care and social assistance	(D)	(D)	94	86	(D)	(D)	(D)	1,078	77	(D)	5,729	7,001	(D)	(D)	89,550	117,370
	N/A	N/A	4.6	3.2	N/A	N/A	N/A	9.8	1.8	N/A	12.9	12.6	N/A	N/A	10.3	10.4
Arts, entertainment, and recreation	65	(D)	(D)	27	47	67	95	137	(D)	(D)	534	810	58	65	17,187	24,033
	<1	N/A	N/A	1	1.1	1.3	1	1.3	N/A	N/A	1.2	1.5	1.3	1.4	2	2.1
Accommodation and food services	526	(D)	(D)	108	185	292	305	440	(D)	(D)	2,797	4,485	181	292	54,452	78,157
	5.9	N/A	N/A	4.1	4.4	5.7	3.3	4	N/A	N/A	6.3	8.1	4	6.2	6.3	6.9
Other services	465	626	99	(D)	176	(D)	641	748	166	184	2,333	2,662	196	188	42,168	52,009
	5.2	5.4	4.8	N/A	4.2	N/A	6.8	6.8	3.8	3.8	5.3	4.8	4.3	4	4.9	4.6
Government and government enterprises	1,546	1,580	473	686	775	727	1,185	1,099	709	725	5,096	5,299	769	792	128,576	134,873
	17.3	13.6	22.9	25.8	18.4	14.1	12.6	10	16.2	14.8	11.5	9.6	16.9	16.9	14.8	12

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.

N/A means data are not available or present.

Table A-7 (Part 1). Idaho Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Adams County		Bear Lake County		Bingham County		Blaine County		Bonneville County		Butte County		Camas County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	138,527	204,708	213,320	297,043	1,608,652	2,090,600	1,651,071	3,336,537	4,523,190	7,474,953	105,036	129,632	37,128	70,900	63,153,869	99,549,587
Population (persons)	3,962	4,625	5,977	6,545	45,785	8,876	21,316	24,766	104,735	127,930	2,912	2,654	1,114	1,139	1,571,266	1,900,923
Per capita personal income (dollars)	34,964	44,261	35,690	45,385	35,135	42,774	77,456	134,722	43,187	58,430	36,070	48,844	33,328	62,248	40,193	52,369
Earnings by place of work (thousands of dollars)	65,517	102,551	94,413	122,558	966,429	1,072,547	822,330	1,323,247	2,951,476	5,083,982	1,012,396	1,113,247	25,434	48,109	42,639,210	63,210,380
Wages and salaries (thousands of dollars)	40,722	70,418	63,124	73,047	609,601	696,914	571,042	775,451	1,890,022	2,815,285	870,148	960,043	16,036	21,771	28,732,738	42,991,642
Supplement to wages and salaries	12,425	17,018	20,656	22,473	171,721	182,135	131,517	153,204	479,238	648,109	136,140	143,861	4,536	5,102	7,488,742	9,844,072
Proprietors' income	12,371	15,115	10,633	27,038	185,107	193,498	119,771	394,592	582,216	1,620,588	6,107	9,343	4,862	21,236	6,417,730	10,374,666
Farm earnings	2,304	3,126	3,988	8,501	101,374	48,489	7,326	5,402	43,060	34,279	6,169	8,136	3,596	7,874	1,793,528	1,698,757
Nonfarm earnings	63,213	99,425	90,425	114,057	865,055	1,024,058	815,004	1,317,845	2,908,416	5,049,703	1,006,227	1,105,111	21,838	40,235	40,845,682	61,511,623
Private nonfarm earnings	42,921	77,527	52,014	72,907	648,197	795,181	706,017	1,216,870	2,505,504	4,583,219	980,506	1,091,070	14,617	33,368	32,707,721	52,501,122
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)																
Forestry, fishing, and related activities	4,408	4,630	(D)	(D)	(D)	33,925	2,234	1,382	(D)	(D)	(D)	(D)	(D)	(D)	481,435	598,877
	7	4.7	N/A	N/A	N/A	3.3	<1	<1	N/A	N/A	N/A	N/A	N/A	N/A	1.2	1
Mining (including quarrying and oil and gas extraction)	100	50	(D)	(D)	(D)	844	4,561	2,797	(D)	(D)	14	(D)	0	92	665,322	297,006
	<1	<1	N/A	N/A	N/A	<1	<1	<1	N/A	N/A	<1	N/A	<1	<1	1.6	<1
Utilities	(D)	1,132	(D)	(D)	8,344	8,730	3,604	3,383	4,332	10,343	-39	(145)	0	(D)	425,119	465,416
	N/A	1.1	N/A	N/A	<1	<1	<1	<1	<1	<1	<1	<1	<1	N/A	1	<1
Construction	4,930	9,217	2,442	5,481	65,730	94,779	87,710	200,720	199,005	320,583	1,454	3,829	(D)	5,145	2,532,365	5,440,744
	7.8	9.3	2.7	4.8	7.6	9.3	10.8	15.2	6.8	6.3	<1	<1	N/A	12.8	6.2	8.8
Manufacturing	1,395	7,326	2,370	5,250	147,864	150,967	35,565	27,801	125,226	439,492	1,815	3,079	(D)	(D)	4,337,779	6,448,370
	2.2	7.4	2.6	4.6	17.1	14.7	4.4	1.5	4.3	8.7	<1	<1	N/A	N/A	10.6	10.5
Wholesale trade	1,267	1,149	4,101	3,560	78,310	83,260	12,916	30,545	280,240	255,173	(D)	1,463	(D)	6,582	1,924,500	3,132,234
	2	1.2	4.5	3.1	9.1	8.1	1.6	2.3	9.6	5.1	N/A	<1	N/A	16.4	4.7	5.1
Retail trade	10,164	6,399	9,409	10,463	42,110	60,986	77,584	102,099	484,695	1,356,542	2,572	2,726	(D)	1,238	3,761,964	5,995,906
	16.1	6.4	10.4	9.2	4.9	6	9.5	7.7	16.7	26.9	<1	<1	N/A	3.1	9.2	9.7

Sector	Adams County		Bear Lake County		Bingham County		Blaine County		Bonneville County		Butte County		Camas County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Transportation and warehousing	(D)	1,401	(D)	(D)	22,721	36,862	17,508	18,076	75,982	126,459	(D)	2,015	78	(D)	1,334,862	2,116,934
	N/A	1.4	N/A	N/A	2.6	3.6	2.1	1.4	2.6	2.5	N/A	<1	<1	N/A	3.3	3.4
Information	873	(D)	1,062	983	1,895	(D)	24,450	28,801	70,988	40,780	(D)	1,747	230	(D)	742,415	831,822
	1.4	N/A	1.2	<1	<1	N/A	3	2.2	2.4	<1	N/A	<1	1.1	N/A	1.8	1.4
Finance and insurance	1,676	1,718	2,159	3,269	25,257	36,615	35,264	79,085	85,570	193,968	1,455	(D)	(D)	(D)	1,629,779	3,035,612
	2.7	1.7	2.4	2.9	2.9	3.6	4.3	6	2.9	3.8	<1	N/A	N/A	N/A	4	4.9
Real estate and rental and leasing	784	2,111	351	3,687	42,846	59,471	22,185	203,642	56,831	43,644	224	(D)	269	1,299	711,271	1,929,456
	1.2	2.1	<1	3.2	5	5.8	2.7	15.5	2	<1	<1	N/A	1.2	3.2	1.7	3.1
Professional, scientific, and technical services	3,657	5,454	(D)	(D)	(D)	(D)	111,102	145,076	228,834	289,913	959,268	(D)	804	2,981	3,338,212	5,109,316
	5.8	5.5	N/A	N/A	N/A	N/A	13.6	11	7.9	5.7	95.3	N/A	3.7	7.4	8.2	8.3
Management of companies and enterprises	0	-	55	147	(D)	(D)	(D)	7,206	16,985	15,917	(D)	(D)	(D)	(D)	717,968	1,000,906
	<1	0	<1	<1	N/A	N/A	N/A	<1	<1	<1	N/A	N/A	N/A	N/A	1.8	1.6
Administrative and support and waste management and remediation services	1,102	1,952	(D)	(D)	19,207	18,244	(D)	61,505	182,005	310,486	(D)	(D)	(D)	(D)	1,758,762	3,064,315
	1.7	2	N/A	N/A	2.2	1,8	N/A	4.7	6.3	6.1	N/A	N/A	N/A	N/A	4.3	5
Educational services	(D)	(D)	(D)	(D)	2,772	3,267	8,093	13,078	10,123	33,295	(D)	(D)	(D)	(D)	453,931	723,475
	N/A	N/A	N/A	N/A	<1	<1	1	1	<1	<1	N/A	N/A	N/A	N/A	1.1	1.2
Health care and social assistance	(D)	(D)	(D)	(D)	94,814	116,072	66,727	85,064	474,914	796,317	(D)	(D)	(D)	(D)	5,032,073	7,508,709
	N/A	N/A	N/A	N/A	11	11.3	8.2	6.5	16.3	15.8	N/A	N/A	N/A	N/A	12.3	12.2
Arts, entertainment, and recreation	3,879	14,965	486	476	1,120	4,220	22,366	30,677	10,970	15,941	85	463	(D)	(D)	289,847	534,948
	6.1	15.1	<1	<1	<1	<1	2.7	2.3	<1	<1	<1	<1	N/A	N/A	<1	<1
Accommodation and food services	1,212	2,385	3,493	5,016	11,276	21,897	84,047	111,873	83,805	184,133	1,200	2,201	(D)	(D)	1,141,603	2,312,250
	1.9	2.4	3.9	4.4	1.3	2.1	10.3	8.5	2.9	3.6	<1	<1	N/A	N/A	2.8	3.8
Other services (except government and government enterprises)	2,211	(D)	3,520	6,057	30,560	(D)	46,004	64,060	101,482	127,460	(D)	1,616	(D)	(D)	1,428,511	1,954,826
	3.5	N/A	3.9	5.3	3.5	N/A	5.6	4.9	3.5	2.5	N/A	<1	N/A	N/A	3.5	3.2
Government and government enterprises	20,293	21,898	38,410	41,150	216,859	228,877	108,988	1009,975	402,912	466,484	25,721	14,041	7,220	6,867	8,137,962	9,010,501
	32.1	22	42.5	36.1	25.1	22.4	13.4	7.7	13.9	9.2	2.6	1.3	33.1	17.1	19.9	14.6

Sources: BEA 2010b, 2021b

Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.

(N/A) means data are not available, or no information was given.

All 2010 dollar values were adjusted for inflation.

Table A-7 (Part 2). Idaho Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Caribou County		Cassia County		Clark County		Custer County		Elmore County		Fremont County		Gem County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	266,739	339,479	936,830	1,202,324	31,398	37,995	188,264	215,287	955,435	1,207,394	426,258	577,704	570,058	899,374	63,153,869	99,549,587
Population (persons)	6,968	7,111	23,091	25,164	979	792	4,357	4,428	27,155	28,827	13,236	13,592	16,698	19,792	1,571,266	1,900,923
Per capita personal income (dollars)	38,281	47,740	40,571	47,780	32,071	47,973	43,210	48,619	35,184	41,884	32,204	42,503	34,139	45,441	40,193	52,369
Earnings by place of work (thousands of dollars)	252,460	304,950	731,629	906,976	27,336	26,149	116,302	102,975	768,863	840,420	202,484	252,951	184,884	281,437	42,639,210	63,210,380
Wages and salaries (thousands of dollars)	180,877	224,839	389,993	554,570	16,821	16,628	78,720	63,936	518,443	563,244	118,804	152,321	120,818	187,768	28,732,738	42,991,642
Supplement to wages and salaries	52,523	58,732	107,627	136,161	4,945	4,655	22,121	18,904	194,330	207,511	37,035	42,296	35,904	50,082	7,488,742	9,844,072
Proprietors' income	19,060	21,379	234,009	216,245	5,570	4,866	15,461	20,135	56,091	69,665	46,645	58,334	28,162	43,587	6,417,730	10,374,666
Farm earnings	15,157	16,223	197,865	172,555	7,801	1,981	7,091	7,855	46,907	46,934	24,960	20,718	4,037	(7,846)	1,793,528	1,698,757
Nonfarm earnings	237,303	288,727	533,764	734,421	19,535	24,168	109,211	95,120	721,956	793,486	177,524	232,233	180,847	289,283	40,845,682	61,511,623
Private nonfarm earnings	198,859	250,886	438,566	646,875	10,342	16,911	80,051	68,129	207,536	309,739	110,632	170,102	131,112	228,710	32,707,721	52,501,122
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)																
Forestry, fishing, and related activities	(D)	(D)	26,653	25,256	(D)	(D)	(D)	2,041	(D)	8,041	(D)	(D)	(D)	(D)	481,435	598,877
	N/A	N/A	5	3.4	N/A		N/A	N/A	N/A	1	N/A	N/A	N/A	N/A	1.2	1
Mining (including quarrying and oil and gas extraction)	31,658	60,308	4,628	10,664	5	(D)	(D)	7,044	(D)	47	(D)	(D)	(D)	(D)	665,322	297,006
	13.3	20.9	<1	1.5	<1	N/A	N/A	7.4	N/A	<1	N/A	N/A	N/A	N/A	1.6	<1
Utilities	4,008	3,316	5,149	7,436	0	-	3,103	3,578	5,491	5,390	(D)	(D)	96	(D)	425,119	465,416
	1.7	1.1	<1	1	<1	N/A	2.8	3.8	<1	<1	N/A	N/A	<1	N/A	1	<1
Construction	(D)	25,596	30,890	55,958	(D)	(D)	5,783	11,172	22,199	28,637	29,945	34,648	19,103	41,112	2,532,365	5,440,744
	N/A	8.9	5.8	7.6	N/A	N/A	5.3	11.7	3.1	3.6	16.9	14.9	10.6	14.2	6.2	8.8
Manufacturing	(D)	89,971	75,997	101,624	(D)	(D)	159	(D)	20,156	41,273	2,943	11,183	10,390	22,244	4,337,779	6,448,370
	N/A	31.2	14.2	13.8	N/A	N/A	<1	N/A	2.8	5.2	1.7	4.8	5.7	7.7	10.6	10.5
Wholesale trade	5,675	9,733	28,353	40,482	(D)	3,989	1,243	2,413	5,197	7,509	(D)	(D)	8,664	11,497	1,924,500	3,132,234
	2.4	3.4	5.3	5.5	N/A	16.5	1.1	2.5	<1	<1	N/A	N/A	4.8	4	4.7	5.1
Retail trade	9,084	10,492	47,558	77,476	(D)	(D)	6,962	5,053	30,704	47,650	9,438	15,457	15,816	23,066	3,761,964	5,995,906
	3.8	3.6	8.9	10.5	N/A	N/A	6.4	5.3	4.3	6	5.3	6.7	8.7	9	9.2	9.7

Sector	Caribou County		Cassia County		Clark County		Custer County		Elmore County		Fremont County		Gem County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Transportation and warehousing	4,228	4,765	44,725	81,962	(D)	(D)	654	1,600	10,099	29,220	9,899	21,705	13,326	(D)	1,334,862	2,116,934
	1.8	1.7	8.4	11.2	N/A	N/A	<1	1.7	1.4	3.7	5.6	9.3	7.4	N/A	3.3	3.4
Information	1,315	(D)	6,851	7,720	(D)	(D)	2,401	3,147	6,654	4,695	(D)	(D)	518	2,033	742,415	831,822
	<1	N/A	1.3	1.1	N/A	N/A	2.2	3.3	<1	<1	N/A	N/A	<1	<1	1.8	1.4
Finance and insurance	3,491	3,430	14,625	22,580	2,055	(D)	1,178	(D)	11,449	13,954	4,454	(D)	4,652	8,075	1,629,779	3,035,612
	1.5	1.2	2.7	3.1	10.5	N/A	1.1	N/A	1.6	1.8	2.5	N/A	2.6	2.8	4	4.9
Real estate and rental and leasing	2,221	4,972	29,623	45,137	19	138	1,369	(D)	3,816	4,347	6,318	2,447	915	10,854	711,271	1,929,456
	<1	1.7	5.5	6.1	<1	<1	1.3	N/A	<1	<1	3.6	1.1	<1	3.8	1.7	3.1
Professional, scientific, and technical services	5,015	(D)	16,604	22,540	(D)	(D)	2,611	2,799	10,127	12,180	3,018	(D)	5,767	12,786	3,338,212	5,109,316
	2.1	N/A	3.1	3.1	N/A	N/A	2.4	2.9	1.4	1.5	1.7	N/A	3.2	4.4	8.2	8.3
Management of companies and enterprises	(D)	(D)	(D)	1,886	0	N/A	(D)	(D)	0	(D)	0	(D)	(D)	(D)	717,968	1,000,906
	N/A	N/A	N/A	<1	<1	N/A	N/A	N/A	<1	N/A	<1	N/A	N/A	N/A	1.8	1.6
Administrative and support and waste management and remediation services	(D)	5,636	(D)	12,395	(D)	(D)	(D)	(D)	10,298	(D)	2,643	7,186	(D)	(D)	1,758,762	3,064,315
	N/A	2	N/A	1.7	N/A	N/A	N/A	N/A	1.4	N/A	1.5	3.1	N/A	N/A	4.3	5
Educational services	(D)	(D)	(D)	1,877	(D)	(D)	8	6	5,158	4,116	(D)	(D)	(D)	1,930	453,931	723,475
	N/A	N/A	N/A	<1	N/A	N/A	<1	<1	<1	<1	N/A	N/A	N/A	<1	1.1	1.2
Health care and social assistance	(D)	(D)	(D)	84,739	(D)	(D)	3,057	(D)	23,250	52,502	(D)	(D)	(D)	36,443	5,032,073	7,508,709
	N/A	N/A	N/A	11.5	N/A	N/A	2.8	N/A	3.2	6.6	N/A	N/A	N/A	12.6	12.3	12.2
Arts, entertainment, and recreation	657	289	2,279	2,309	16	57	1,835	4,595	605	634	738	800	527	1,516	289,847	534,948
	<1	<1	<1	<1	<1	<1	1.7	4.8	<1	<1	<1	<1	<1	<1	<1	<1
Accommodation and food services	2,572	3,877	7,124	24,999	(D)	(D)	5,666	10,816	16,131	21,081	5,902	17,612	4,606	13,705	1,141,603	2,312,250
	1.1	1.3	1.3	3.4	N/A	N/A	5.2	11.4	2.2	2.7	3.3	7.6	2.5	4.7	2.8	3.8
Other services (except government and government enterprises)	5,262	(D)	17,672	19,835	297	868	1,969	2,018	18,756	20,842	5,377	9,585	8,987	12,974	1,428,511	1,954,826
	2.2	N/A	3.3	2.7	1.5	3.6	1.8	2.1	2.6	2.6	3	4.1	5	4.5	3.5	3.2
Government and government enterprises	38,444	37,841	95,198	87,546	9,193	7,257	29,160	26,991	514,421	483,747	66,892	62,131	49,734	60,573	8,137,962	9,010,501
	16.2	13.1	17.8	11.9	47.1	30	26.7	28.4	71.3	61	37.7	26.8	27.5	20.9	19.9	14.6

Sources: BEA 2010b, 2021b

Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.

(N/A) means data are not available, or no information was given.

All 2010 dollar values were adjusted for inflation.

Table A-7 (Part 3). Idaho Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Gooding County		Jefferson County		Jerome County		Lemhi County		Lincoln County		Madison County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	708,678	1,006,994	897,506	1,362,361	811,385	1,044,591	296,410	415,666	194,466	225,638	875,262	1,381,959	50,432,553	99,549,587
Population (persons)	19,373	15,772	32,850	32,202	28,088	24,662	9,954	8,162	6,515	5,282	47,382	53,881	1,571,266	1,900,923
Per capita personal income (dollars)	45,807	63,847	34,213	42,307	36,174	42,356	37,289	50,927	37,376	42,718	23,131	25,648	32,097	52,369
Earnings by place of work (thousands of dollars)	501,980	674,977	400,028	551,899	602,865	765,948	139,692	190,666	126,261	153,616	676,256	1,075,967	34,050,237	63,210,380
Wages and salaries (thousands of dollars)	235,409	293,699	213,356	327,207	341,113	465,298	95,501	123,023	60,044	75,853	469,277	715,502	22,944,997	42,991,642
Supplement to wages and salaries	62,472	74,530	63,837	84,386	89,517	112,022	29,679	34,166	18,487	22,120	128,212	187,754	5,980,257	9,844,072
Proprietors' income	204,098	306,748	122,835	140,306	172,236	188,628	14,511	33,477	47,731	55,643	78,766	172,711	5,124,983	10,374,666
Farm earnings	250,674	343,330	62,811	22,314	169,286	160,784	3,323	12,075	52,509	59,828	15,623	18,418	1,432,251	1,698,757
Nonfarm earnings	200,684	331,647	269,290	529,585	346,242	605,164	108,899	178,591	58,896	93,788	527,559	1,057,549	32,617,986	61,511,623
Private nonfarm earnings	153,593	280,028	215,049	456,605	300,036	537,827	63,371	116,272	34,865	64,930	435,917	907,932	26,119,284	52,501,122
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)														
Forestry, fishing, and related activities	(D)	(D)	20,137	23,002	27,959	27,752	(D)	(D)	(D)	7,279	(D)	8,789	384,458	598,877
	N/A	N/A	7.5	4.3	8.1	4.6	N/A	N/A	N/A	7.8	N/A	<1	1.2	1
Mining (including quarrying and oil and gas extraction)	(D)	(D)	129	1,462	0	181	(D)	(D)	0	N/A	(D)	902	531,304	297,006
	N/A	N/A	<1	<1	<1	<1	N/A	N/A	<1	N/A	N/A	<1	1.6	<1
Utilities	4,737	4,936	2,821	3,727	(D)	(D)	(D)	1,261	(D)	(D)	(D)	(D)	339,486	465,416
	2.4	1.5	1.0	<1	N/A	N/A	N/A	<1	N/A	N/A	N/A	N/A	1.0	<1
Construction	14,640	22,545	31,274	78,903	32,908	39,890	14,435	19,816	(D)	10,786	33,521	61,528	2,022,261	5,440,744
	7.3	6.8	11.6	14.9	9.5	6.6	13.3	11.1	N/A	11.5	6.4	5.8	6.2	8.8
Manufacturing	52,348	65,700	66,949	82,946	76,925	126,934	4,395	4,901	(D)	12,946	39,427	59,730	3,464,004	6,448,370
	26.1	19.8	24.9	15.7	22.2	21	4.0	2.7	N/A	13.8	7.5	5.6	10.6	10.5
Wholesale trade	13,389	11,296	15,378	27,293	(D)	(D)	2,423	1,594	(D)	(D)	53,458	(D)	1,536,841	3,132,234
	6.7	3.4	5.7	5.2	N/A	N/A	2.2	<1	N/A	N/A	10.1	N/A	4.7	5.1
Retail trade	13,544	15,737	19,399	48,736	37,172	60,433	11,578	12,772	2,682	(D)	51,005	95,483	3,004,178	5,995,906
	6.7	4.7	7.2	9.2	10.7	10	10.6	7.2	4.6	N/A	9.7	9	9.2	9.7

Sector	Gooding County		Jefferson County		Jerome County		Lemhi County		Lincoln County		Madison County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Transportation and warehousing	15,090	13,203	22,240	31,569	69,758	65,841	(D)	6,528	3,014	7,378	(D)	(D)	1,065,976	2,116,934
	7.5	4	8.3	6	20.1	10.9	N/A	3.7	5.1	7.9	N/A	N/A	3.3	3.4
Information	1,118	(D)	928	3,061	5,196	(D)	1,408	1,023	(D)	(D)	3,863	11,021	592,868	831,822
	<1	N/A	<1	<1	1.5	N/A	1.3	<1	N/A	N/A	<1	1	1.8	1.4
Finance and insurance	4,760	6,377	6,103	15,404	6,720	7,211	2,810	2,392	(D)	380	18,186	27,149	1,301,487	3,035,612
	2.4	1.9	2.3	2.9	1.9	1.2	2.6	1.3	N/A	<1	3.4	2.6	4.0	4.9
Real estate and rental and leasing	3,008	(D)	23,910	25,076	4,091	(D)	880	5,625	(D)	(D)	14,527	21,599	567,997	1,929,456
	1.5	N/A	8.9	4.7	1.2	N/A	<1	3.1	N/A	N/A	2.8	2	1.7	3.1
Professional, scientific, and technical services	10,822	9,867	(D)	(D)	10,961	12,288	7,500	17,021	(D)	2,916	40,773	77,149	2,665,784	5,109,316
	5.4	3	N/A	N/A	3.2	2	6.9	9.5	N/A	3.1	7.7	7.3	8.2	8.3
Management of companies and enterprises	1,957	2,061	(D)	(D)	1,405	3,613	1,875	(D)	0	N/A	(D)	668	573,345	1,000,906
	<1	<1	N/A	N/A	<1	<1	1.7	N/!	<1	N/A	N/A	<1	1.8	1.6
Administrative and support and waste management and remediation services	1,364	2,947	5,884	19,806	7,917	22,358	3,689	(D)	(D)	3,698	(D)	54,163	1,404,488	3,064,315
	<1	<1	2.2	3.7	2.3	3.7	3.4	N/A	N/A	3.9	N/A	5.1	4.3	5
Educational services	412	(D)	(D)	1,501	2,933	5,888	362	(D)	(D)	55	(D)	192,556	362,494	723,475
	<1	N/A	N/A	<1	<1	1	<1	N/A	N/A	<1	N/A	18.2	1.1	1.2
Health care and social assistance	(D)	(D)	(D)	29,202	28,092	34,446	9,406	(D)	(D)	6,218	(D)	78,089	4,018,444	7,508,709
	N/A	N/A	N/A	5.5	8.1	5.7	8.6	N/A	N/A	6.6	N/A	7.4	12.3	12.2
Arts, entertainment, and recreation	2,135	1,944	2,811	3,175	6,862	(D)	1,732	3,847	(D)	(D)	2,791	5,126	231,462	534,948
	1.1	<1	1.0	<1	2.0	N/A	1.6	2.2	N/A	N/A	<1	<1	<1	<1
Accommodation and food services	3,843	10,232	3,970	20,084	6,550	(D)	4,640	6,871	(D)	(D)	16,692	55,857	911,646	2,312,250
	1.9	3.1	1.5	3.8	1.9	N/A	4.3	3	N/A	N/A	3.2	5.3	2.8	3.8
Other services (except government and government enterprises)	16,220	16,894	15,699	21,886	18,292	18,208	8,518	8,226	(D)	1,917	16,081	30,368	1,140,761	1,954,826
	8.1	5.1	5.8	4.1	5.3	3	7.8	4.6	N/A	2	3.0	2.9	3.5	3.2
Government and government enterprises	58,969	51,619	67,923	72,980	57,861	67,337	57,012	62,319	30,093	28,858	114,758	149,617	6,498,702	9,010,501
	29.4	15.6	25.2	13.8	16.7	11.1	52.4	34.9	51.1	30.8	21.8	14.1	19.9	14.6

Sources: BEA 2010b, 2021b

Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.

(N/A) means data are not available, or no information was given.

All 2010 dollar values were adjusted for inflation.

Table A-7 (Part 4). Idaho Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Minidoka County		Oneida County		Owyhee County		Payette County		Power County		Twin Falls County		Washington County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	718,637	993,973	148,992	206,973	367,907	539,240	861,513	1,206,728	288,501	342,097	2,905,383	4,208,749	375,904	448,112	63,153,869	99,549,587
Population (persons)	20,094	21,955	4,291	4,611	11,470	12,336	22,659	26,350	7,879	7,950	77,587	92,243	10,181	10,898	1,571,266	1,900,923
Per capita personal income (dollars)	35,764	45,273	34,722	44,887	32,075	43,713	38,021	45,796	36,617	43,031	37,447	45,627	36,922	41,119	40,193	52,369
Earnings by place of work (thousands of dollars)	457,366	592,488	61,014	84,947	189,763	251,881	438,140	518,844	244,548	270,618	1,966,442	2,788,797	167,489	173,763	42,639,210	63,210,380
Wages and salaries (thousands of dollars)	267,670	389,200	34,494	51,391	98,247	131,294	248,847	327,055	149,215	188,485	1,279,861	1,826,437	99,545	122,186	28,732,738	42,991,642
Supplement to wages and salaries	74,726	100,306	11,657	16,844	28,164	34,571	69,542	81,979	44,011	49,881	344,439	440,910	30,895	34,367	7,488,742	9,844,072
Proprietors' income	114,970	102,982	14,863	16,712	63,351	86,016	119,751	109,810	51,322	32,252	342,142	521,450	37,049	17,210	6,417,730	10,374,666
Farm earnings	70,728	68,075	8,951	10,327	69,759	79,907	46,115	45,789	56,332	37,219	143,556	165,869	22,451	6,261	1,793,528	1,698,757
Nonfarm earnings	386,638	524,413	52,063	74,620	120,004	171,974	392,025	473,055	188,216	233,399	1,822,886	2,622,928	145,037	167,502	40,845,682	61,511,623
Private nonfarm earnings	309,401	428,502	31,165	44,469	81,258	136,006	332,904	417,343	152,099	197,203	1,541,402	2,318,674	103,735	124,211	32,707,721	52,501,122
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)																
Forestry, fishing, and related activities	(D)	(D)	(D)	(D)	(D)	(D)	(D)	13,869	8,193	12,605	42,867	(D)	6,540	(D)	481,435	598,877
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.9	4.4	5.4	2.4	N/A	4.5	N/A	1.2	1
Mining (including quarrying and oil and gas extraction)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	618	0	112	1,286	(D)	34	(D)	665,322	297,006
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1	<1	<1	<1	N/A	<1	N/A	1.6	<1
Utilities	6,525	6,097	1	7	(D)	(D)	12,120	17,939	(D)	1,489	25,870	29,110	(D)	(D)	425,119	465,416
	1.7	1.2	<1	N/A	N/A	N/A	3.1	3.8	N/A	<1	1.4	1.1	N/A	N/A	1	<1
Construction	23,209	41,108	1,130	(D)	8,925	20,469	31,222	40,503	4,046	6,336	104,738	164,035	8,724	10,455	2,532,365	5,440,744
	6	7.8	2.2	N/A	7.4	11.9	8	8.6	2.1	2.7	5.7	6.3	6	6.2	6.2	8.8
Manufacturing	73,052	97,832	1,008	1,369	9,349	11,072	62,327	75,981	76,404	88,591	183,849	344,765	20,155	36,878	4,337,779	6,448,370
	18.9	18.7	1.9	1.8	7.8	6.4	15.9	16.1	40.6	38	10.1	13.1	13.9	22	10.6	10.5
Wholesale trade	35,297	52,782	1,744	3,581	8,346	11,535	13,350	15,350	(D)	19,633	85,431	131,274	7,935	4,332	1,924,500	3,132,234
	9.1	10.1	3.4	4.8	7	6.7	3.4	3.2	N/A	8.4	4.7	5	5.5	2.6	4.7	5.1

Sector	Minidoka County		Oneida County		Owyhee County		Payette County		Power County		Twin Falls County		Washington County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Retail trade	23,128	35,012	3,773	5,653	9,864	10,730	13,965	26,280	5,519	7,564	181,846	237,976	11,100	12,654	3,761,964	5,995,906
	6	6.7	7.2	7.6	8.2	6.2	3.6	5.6	2.9	3.2	10	9.1	7.7	7.6	9.2	9.7
Transportation and warehousing	37,179	26,435	5,254	2,045	(D)	(D)	18,787	22,151	14,541	19,469	91,019	115,361	(D)	(D)	1,334,862	2,116,934
	9.6	5	10.1	2.7	N/A	N/A	4.8	4.7	7.7	8.3	5	4.4	N/A	N/A	3.3	3.4
Information	7,393	15,865	697	(D)	3,430	(D)	(D)	(D)	(D)	(D)	33,768	19,454	6,304	8,082	742,415	831,822
	1.9	3	1.3	N/A	2.9	N/A	N/A	N/A	N/A	N/A	1.9	<1	4.3	4.8	1.8	1.4
Finance and insurance	5,706	6,040	(D)	5,131	(D)	1,588	19,346	19,199	2,335	3,803	86,034	86,138	3,392	3,219	1,629,779	3,035,612
	1.5	1.2	N/A	6.9	N/A	<1	4.9	4.1	1.2	1.6	4.7	3.3	2.3	1.9	4	4.9
Real estate and rental and leasing	11,751	26,043	(D)	2,337	(D)	10,439	14,689	(D)	8,299	(D)	47,156	92,489	4,013	3,500	711,271	1,929,456
	3	5	N/A	3.1	N/A	6.1	3.7	N/A	4.4	N/A	2.6	3.5	2.8	2.1	1.7	3.1
Professional, scientific, and technical services	7,559	10,620	(D)	1,549	(D)	10,430	(D)	(D)	2,138	3,038	92,186	131,483	4,964	6,360	3,338,212	5,109,316
	2	2	N/A	2.1	N/A	6.1	N/A	N/A	1.1	1.3	5.1	5	3.4	3.8	8.2	8.3
Management of companies and enterprises	0	(D)	0	N/A	(D)	N/A	(D)	(D)	(D)	2,045	11,285	36,692	(D)	(D)	717,968	1,000,906
	<1	N/A	<1	N/A	N/A	N/A	N/A	N/A	N/A	<1	<1	1.4	N/A	N/A	1.8	1.6
Administrative and support and waste management and remediation services	877	(D)	(D)	1,302	5,308	7,778	12,435	(D)	(D)	866	70,265	125,821	(D)	(D)	1,758,762	3,064,315
	<1	N/A	N/A	1,7	4.4	4.5	3.2	N/A	N/A	<1	3.9	4.8	N/A	N/A	4.3	5
Educational services	(D)	(D)	182	125	(D)	(D)	(D)	3,090	(D)	(D)	9,174	12,830	(D)	(D)	453,931	723,475
	N/A	N/A	<1	<1	N/A	N/A	N/A	<1	N/A	N/A	<1	<1	N/A	N/A	1.1	1.2
Health care and social assistance	(D)	(D)	2,335	3,801	(D)	(D)	(D)	69,441	2,985	(D)	330,401	521,594	(D)	(D)	5,032,073	7,508,709
	N/A	N/A	4.5	5.1	N/A	N/A	N/A	14.7	1.6	N/A	18.1	19.9	N/A	N/A	12.3	12.2
Arts, entertainment, and recreation	1,097	(D)	(D)	447	378	708	979	2,587	(D)	(D)	5,529	9,523	944	1,280	289,847	534,948
	<1	N/A	N/A	<1	<1	<1	<1	<1	N/A	N/A	<1	<1	<1	<1	<1	<1
Accommodation and food services	9,119	(D)	(D)	1,788	2,309	5,604	3,973	9,446	(D)	(D)	56,844	129,171	2,297	5,063	1,141,603	2,312,250
	2.4	N/A	N/A	2.4	1.9	3.3	1	2	N/A	N/A	3.1	4.9	1.6	3.3	2.8	3.8
Other services (except government and government enterprises)	13,950	21,737	1,732	(D)	6,003	(D)	20,241	26,320	6,085	6,278	81,854	92,006	5,522	5,559	1,428,511	1,954,826
	3.6	4.1	3.3	N/A	5	N/A	5.2	5.6	3.2	2.7	4.5	3.5	3.8	3.3	3.5	3.2

Sector	Minidoka County		Oneida County		Owyhee County		Payette County		Power County		Twin Falls County		Washington County		State of Idaho	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Government and government enterprises	77,237	95,911	20,899	30,151	38,746	35,968	59,121	55,712	36,117	36,196	281,483	304,254	41,303	43,291	8,137,962	9,010,501
	20	18.3	40.1	40.4	32.3	20.9	15.1	11.8	19.2	15.5	15.4	11.6	28.5	25.8	19.9	14.6

Sources: BEA 2010b, 2021b
Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.
All 2010 dollar values were adjusted for inflation.

Table A-8 (Part 1). Montana Analysis Area Employment by Sector (2010 and 2021)

Sector	Beaverhead County		Big Horn County		Blaine County		Carbon County		Carter County		Chouteau County		Custer County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	5,723	6,304	6,014	5,159	2,680	2,482	5,214	5,958	795	892	2,769	2,701	7,566	7,637	616,344	709,342
Wage and salary employment	3,837	4,179	4,684	4,013	1,655	1,521	2,698	3,039	375	394	1,521	1,484	5,742	5,585	447,230	507,125
Proprietors employment	1,886	2,125	1,330	1,146	1,025	961	2,516	2,919	420	498	1,248	1,217	1,824	2,052	169,114	202,217
Farm proprietors employment	317	306	506	410	486	435	641	650	257	256	554	526	352	337	24,067	23,037
Nonfarm proprietors employment	1,569	1,819	824	736	539	526	1,875	2,269	163	242	694	691	1,472	1,715	145,047	179,180
Farm employment	529	562	635	565	590	551	723	764	328	361	748	760	447	451	28,828	28,955
Nonfarm employment	5,194	5,742	5,379	4,594	2,090	1,931	4,491	5,194	467	531	2,021	1,941	7,119	7,186	587,516	680,387
Private nonfarm employment	4,171	4,678	3,017	2,837	1,328	1,261	3,841	4,578	338	404	1,502	1,467	5,899	6,063	490,410	584,573
By Industry (Number of Jobs/Percentage of Total Employment)																
Forestry, fishing, and related activities	(D)	179	(D)	(D)	(D)	(D)	(D)	246	(D)	(D)	142	(D)	(D)	(D)	7,122	8,193
	N/A	2.8	N/A	N/A	N/A	N/A	N/A	4.1	N/A	N/A	5.1	N/A	N/A	N/A	1.2	1.2
Mining (including quarrying and oil and gas extraction)	(D)	155	609	417	(D)	32	125	99	(D)	1	25	(D)	(D)	(D)	11,092	9,581
	N/A	2.5	10.1	8.1	N/A	1.3	2.4	1.7	N/A	<1	<1	N/A	N/A	N/A	1.8	1.4
Utilities	(D)	(D)	(D)	(D)	(D)	(D)	29	25	(D)	(D)	9	10	(D)	(D)	3,163	2,993
	N/A	N/A	N/A	N/A	N/A	N/A	<1	<1	N/A	N/A	<1	<1	N/A	N/A	<1	<1
Construction	353	461	102	(D)	112	(D)	459	570	(D)	(D)	116	84	478	396	40,842	55,366
	6.2	7.3	1.7	N/A	4.2	N/A	8.8	9.6	N/A	N/A	4.2	3.1	6.3	5.2	6.6	7.8
Manufacturing	99	135	61	(D)	45	(D)	94	143	11	9	48	65	95	122	19,857	25,703
	1.7	2.1	1	N/A	1.7	N/A	1.8	2.4	1.4	1	1.7	2.4	1.3	1.6	3.2	3.6
Wholesale trade	177	201	(D)	(D)	87	58	89	111	(D)	(D)	72	75	206	244	17,517	19,577
	3.1	3.2	N/A	N/A	3.2	2.3	1.7	1.9	N/A	N/A	2.6	2.8	2.7	3.2	2.8	2.8
Retail trade	587	648	401	407	222	255	399	463	44	41	207	211	977	1,052	70,321	77,062
	10.3	10.3	6.7	7.9	8.3	10.3	7.7	7.8	5.5	4.6	7.5	7.8	12.9	13.8	11.4	10.9
Transportation and warehousing	(D)	(D)	121	146	(D)	(D)	99	127	(D)	(D)	55	54	(D)	(D)	17,434	24,342
	N/A	N/A	2	2.8	N/A	N/A	1.9	2.1	N/A	N/A	2	2	N/A	N/A	2.8	3.4
Information	53	43	23	20	(D)	(D)	50	36	(D)	(D)	(D)	14	117	79	9,096	7,633
	<1	<1	<1	<1	N/A	N/A	1	<1	N/A	N/A	N/A	<1	1.5	1	1.5	1.1
Finance and insurance	185	175	113	101	(D)	(D)	126	148	(D)	27	131	112	381	456	25,097	29,912
	3.2	2.8	1.9	2	N/A	N/A	2.4	2.5	N/A	3	4.7	4.1	5	6	4.1	4.2

Sector	Beaverhead County		Big Horn County		Blaine County		Carbon County		Carter County		Chouteau County		Custer County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Real estate and rental and leasing	401	391	72	95	(D)	(D)	389	424	11	(D)	101	124	241	355	30,470	43,224
	7.0	6.2	1.2	1.8	N/A	N/A	7.5	7.1	1.4	N/A	3.6	4.6	3.2	4.6	4.9	6.1
Professional, scientific, and technical services	203	228	146	125	(D)	64	273	(D)	(D)	(D)	72	(D)	290	(D)	33,696	42,756
	3.5	3.6	2.4	2.4	N/A	2.6	5.2	N/A	N/A	N/A	2.6	N/A	3.8	N/A	5.5	6
Management of companies and enterprises	0	0	(D)	(D)	1	0	(D)	(D)	0	0	0	0	43	(D)	1,995	2,966
	0	0	N/A	N/A	<1	0	N/A	N/A	0	0	0	0	0.6	N/A	<1	<1
Administrative and support and waste management and remediation services	140	137	(D)	(D)	49	31	(D)	211	(D)	10	23	(D)	148	299	26,578	28,489
	2.4	2.2	N/A	N/A	1.8	1.2	N/A	3.5	N/A	1.1	<1	N/A	2	3.9	4.3	4
Educational services	(D)	45	(D)	(D)	(D)	(D)	46	49	5	5	(D)	(D)	60	(D)	7,873	9,529
	N/A	<1	N/A	N/A	N/A	N/A	<1	<1	<1	<1	N/A	N/A	<1	N/A	1.3	1.3
Health care and social assistance	(D)	645	(D)	(D)	(D)	(D)	318	339	(D)	(D)	(D)	(D)	1,059	(D)	68,410	79,590
	N/A	10.2	N/A	N/A	N/A	N/A	6.1	5.7	N/A	N/A	N/A	N/A	14	N/A	11.1	11.2
Arts, entertainment, and recreation	188	191	129	141	24	32	271	295	10	16	39	37	164	215	18,628	21,488
	3.3	3	2.1	2.7	<1	1.3	5.2	5	1.3	1.8	1.4	1.4	2.2	2.8	3	3
Accommodation and food services	543	586	303	328	76	64	532	645	33	24	143	125	712	721	49,396	60,521
	9.5	9.3	5	6.4	2.8	2.6	10.2	10.8	4.2	2.7	5.2	4.6	9.4	9.4	8	8.5
Other services	261	362	194	168	141	140	265	371	(D)	(D)	(D)	114	375	418	31,823	35,648
	4.6	5.7	3.2	3.3	5.3	5.6	5.1	6.2	N/A	N/A	N/A	4.2	5	5.5	5.2	5
Government and government enterprises	1,023	1,064	2,362	1,757	762	670	650	616	129	127	519	474	1,220	1,123	97,106	95,814
	17.9	16.9	39.3	34.1	28.4	27.0	12.5	10.3	16.2	14.2	18.7	17.5	16.1	14.7	15.8	13.5

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

Table A-8 (Part 2). Montana Analysis Area Employment by Sector (2010 and 2021)

Sector	Dawson County		Fallon County		Fergus County		Garfield County		Madison County		McCone County		Musselshell County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	5,320	5,069	2,359	2,156	7,354	7,541	773	869	5,640	7,005	1,275	1,263	2,218	2,251	616,344	709,342
Wage and salary employment	3,978	3,804	1,616	1,391	4,783	4,863	364	402	3,563	4,528	662	638	1,343	1,359	447,230	507,125
Proprietors employment	1,342	1,265	743	765	2,571	2,678	409	467	2,077	2,477	613	625	875	892	169,114	202,217
Farm proprietors employment	380	368	248	244	732	717	221	236	476	473	379	364	317	297	24,067	23,037
Nonfarm proprietors employment	962	897	495	521	1,839	1,961	188	231	1,601	2,004	234	261	558	595	145,047	179,180
Farm employment	446	451	302	315	859	873	275	299	634	678	436	437	356	342	28,828	28,955
Nonfarm employment	4,874	4,618	2,057	1,841	6,495	6,668	498	570	5,006	6,327	839	826	1,862	1,909	587,516	680,387
Private nonfarm employment	4,008	3,814	1,775	1,556	5,408	5,689	351	398	4,436	5,778	651	671	1,552	1,632	490,410	584,573
By Industry (Number of Jobs/Percentage of Total Employment)																
Forestry, fishing, and related activities	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	163	179	(D)	(D)	50	(D)	7,122	8,193
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.9	2.6	N/A	N/A	2.3	N/A	1.2	1.2
Mining (including quarrying and oil and gas extraction)	(D)	127	381	245	(D)	(D)	14	0	102	210	18	(D)	293	(D)	11,092	9,581
	N/A	2.5	16.2	11.4	N/A	N/A	1.8	0	1.8	3.0	1.4	N/A	13.2	N/A	1.8	1.4
Utilities	(D)	(D)	(D)	(D)	(D)	(D)	0	1	15	(D)	(D)	(D)	(D)	(D)	3,163	2,993
	N/A	N/A	N/A	N/A	N/A	N/A	0	<1	<1	N/A	N/A	N/A	N/A	N/A	<1	<1
Construction	172	155	218	157	654	758	(D)	33	615	592	65	46	168	169	40,842	55,366
	3.2	3.1	9.2	7.3	8.9	10.1	N/A	3.8	10.9	8.5	5.1	3.6	7.6	7.5	6.6	7.8
Manufacturing	65	65	33	30	346	453	(D)	15	134	190	(D)	18	51	41	19,857	25,703
	1.2	1.3	1.4	1.4	4.7	6.0	N/A	1.7	2.4	2.7	N/A	1.4	2.3	1.8	3.2	3.6
Wholesale trade	233	(D)	(D)	(D)	330	320	(D)	(D)	44	(D)	81	97	38	56	17,517	19,577
	4.4	N/A	N/A	N/A	4.5	4.2	N/A	N/A	<1	N/A	6.4	7.7	1.7	2.5	2.8	2.8
Retail trade	577	640	199	250	693	744	65	(D)	402	475	77	72	176	195	70,321	77,062
	10.8	12.6	8.4	11.6	9.4	9.9	8.4	N/A	7.1	6.8	6	5.7	7.9	8.7	11.4	10.9
Transportation and warehousing	(D)	555	183	122	(D)	(D)	(D)	(D)	139	95	(D)	(D)	(D)	(D)	17,434	24,342
	N/A	10.9	7.8	5.7	N/A	N/A	N/A	N/A	2.5	1.4	N/A	N/A	N/A	N/A	2.8	3.4

Sector	Dawson County		Fallon County		Fergus County		Garfield County		Madison County		McCone County		Musselshell County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Information	100	77	25	18	93	82	(D)	(D)	21	39	(D)	(D)	20	19	9,096	7,633
	1.9	1.5	1.1	<1	1.3	1.1	N/A	N/A	<1	<1	N/A	N/A	<1	<1	1.5	1.1
Finance and insurance	175	148	(D)	73	300	343	(D)	(D)	157	170	(D)	(D)	(D)	(D)	25,097	29,912
	3.3	2.9	N/A	3.4	4.1	4.5	N/A	N/A	2.8	2.4	N/A	N/A	N/A	N/A	4.1	4.2
Real estate and rental and leasing	117	150	(D)	101	316	372	14	27	284	429	(D)	(D)	(D)	(D)	30,470	43,224
	2.2	3.0	N/A	4.7	4.3	4.9	1.8	3.1	5	6.1	N/A	N/A	N/A	N/A	4.9	6.1
Professional, scientific, and technical services	127	136	48	55	(D)	(D)	9	(D)	(D)	292	(D)	(D)	55	66	33,696	42,756
	2.4	2.7	2	2.6	N/A	N/A	1.2	N/A	N/A	4.2	N/A	N/A	2.5	2.9	5.5	6
Management of companies and enterprises	(D)	(D)	0	0	(D)	(D)	0	0	(D)	0	0	0	7	0	1,995	2,966
	N/A	N/A	0	0	N/A	N/A	0	0	N/A	0	0	0	<1	0	<1	<1
Administrative and support and waste management and remediation services	(D)	(D)	34	31	179	(D)	10	(D)	183	154	12	(D)	48	35	26,578	28,489
	N/A	N/A	1.4	1.4	2.4	N/A	1.3	N/A	3.2	2.2	0.9	N/A	2.2	1.6	4.3	4.0
Educational services	9	(D)	9	8	(D)	18	6	1	30	(D)	6	5	8	7	7,873	9,529
	<1	N/A	<1	<1	N/A	<1	<1	<1	<1	N/A	<1	<1	<1	0.3	1.3	1.3
Health care and social assistance	738	(D)	159	121	(D)	805	(D)	18	210	(D)	(D)	(D)	161	180	68,410	79,590
	13.9	N/A	6.7	5.6	N/A	10.7	N/A	2.1	3.7	N/A	N/A	N/A	7.3	8.0	11.1	11.2
Arts, entertainment, and recreation	127	80	(D)	(D)	122	145	(D)	(D)	505	878	10	6	(D)	40	18,628	21,488
	2.4	1.6	N/A	N/A	1.7	1.9	N/A	N/A	9.0	12.5	<1	<1	N/A	1.8	3	3
Accommodation and food services	408	384	(D)	(D)	606	547	(D)	(D)	993	1,436	30	32	(D)	74	49,396	60,521
	7.7	7.6	N/A	N/A	8.2	7.3	N/A	N/A	17.6	20.5	2.4	2.5	N/A	3.3	8	8.5
Other services	289	272	136	109	348	319	(D)	(D)	246	246	49	43	201	157	31,823	35,648
	5.4	5.4	5.8	5.1	4.7	4.2	N/A	N/A	4.4	3.5	3.8	3.4	9.1	7.0	5.2	5.0
Government and government enterprises	866	804	282	285	1,087	979	147	172	570	549	188	155	310	277	97,106	95,814
	16.3	15.9	12	13.2	14.8	13.0	19	19.8	10.1	7.8	14.7	12.3	14	12.3	15.8	13.5

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

Table A-8 (Part 3). Montana Analysis Area Employment by Sector (2010 and 2021)

Sector	Petroleum County		Phillips County		Powder River County		Prairie County		Roosevelt County		Rosebud County		Stillwater County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	292	325	2,662	2,507	1,090	1,152	643	642	5,318	5,010	5,806	4,879	4,958	5,893	616,344	709,342
Wage and salary employment	167	151	1,572	1,426	554	587	348	327	3,840	3,665	4,546	3,740	3,123	3,863	447,230	507,125
Proprietors employment	125	174	1,090	1,081	536	565	295	315	1,478	1,345	1,260	1,139	1,835	2,030	169,114	202,217
Farm proprietors employment	84	86	436	412	254	250	140	151	566	511	392	371	533	503	24,067	23,037
Nonfarm proprietors employment	41	88	654	669	282	315	155	164	912	834	868	768	1,302	1,527	145,047	179,180
Farm employment	116	129	536	534	319	330	175	189	637	594	500	512	604	583	28,828	28,955
Nonfarm employment	176	196	2,126	1,973	771	822	468	453	4,681	4,416	5,306	4,367	4,354	5,310	587,516	680,387
Private nonfarm employment	112	138	1,679	1,604	558	607	277	264	2,833	2,662	3,454	2,719	3,843	4,787	490,410	584,573
By Industry (Number of Jobs/Percentage of Total Employment)																
Forestry, fishing, and related activities	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	81	(D)	7,122	8,193
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.6	N/A	1.2	1.2
Mining (including quarrying and oil and gas extraction)	(D)	(D)	(D)	(D)	(D)	(D)	14	8	65	80	529	(D)	(D)	(D)	11,092	9,581
	N/A	N/A	N/A	N/A	N/A	N/A	2.2	1.2	1.2	1.6	9.1	N/A	N/A	N/A	1.8	1.4
Utilities	0	1	20	21	2	4	(D)	1	31	33	(D)	301	23	15	3,163	2,993
	0	<1	<1	<1	<1	<1	N/A	<1	<1	<1	N/A	6.2	<1	<1	<1	<1
Construction	4	(D)	164	159	(D)	(D)	(D)	14	234	191	273	370	(D)	399	40,842	55,366
	1.4	N/A	6.2	6.3	N/A	N/A	N/A	2.2	4.4	3.8	4.7	7.6	N/A	6.8	6.6	7.8
Manufacturing	0	2	42	57	(D)	(D)	(D)	11	79	56	47	30	286	281	19,857	25,703
	0	<1	1.6	2.3	N/A	N/A	N/A	1.7	1.5	1.1	<1	<1	5.8	4.8	3.2	3.6
Wholesale trade	0	3	57	(D)	(D)	(D)	(D)	(D)	83	76	(D)	15	64	81	17,517	19,577
	0	<1	2.1	N/A	N/A	N/A	N/A	N/A	1.6	1.5	N/A	<1	1.3	1.4	2.8	2.8
Retail trade	(D)	(D)	258	287	108	132	29	37	497	491	431	303	405	510	70,321	77,062
	N/A	N/A	9.7	11.4	9.9	11.5	4.5	5.8	9.3	9.8	7.4	6.2	8.2	8.7	11.4	10.9
Transportation and warehousing	(D)	(D)	137	(D)	(D)	(D)	17	(D)	131	131	135	93	70	81	17,434	24,342
	N/A	N/A	5.1	N/A	N/A	N/A	2.6	N/A	2.5	2.6	2.3	1.9	1.4	1.4	2.8	3.4

Sector	Petroleum County		Phillips County		Powder River County		Prairie County		Roosevelt County		Rosebud County		Stillwater County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Information	(D)	(D)	25	(D)	(D)	(D)	8	3	56	41	68	64	24	21	9,096	7,633
	N/A	N/A	<1	N/A	N/A	N/A	1.2	<1	1.1	<1	1.2	1.3	<1	<1	1.5	1.1
Finance and insurance	0	0	85	83	(D)	(D)	(D)	(D)	157	141	88	93	113	108	25,097	29,912
	0	0	3.2	3.3	N/A	N/A	N/A	N/A	3	2.8	1.5	1.9	2.3	1.8	4.1	4.2
Real estate and rental and leasing	5	10	87	98	(D)	53	(D)	(D)	72	121	89	72	191	325	30,470	43,224
	1.7	3.1	3.3	3.9	N/A	4.6	N/A	N/A	1.4	2.4	1.5	1.5	3.9	5.5	4.9	6.1
Professional, scientific, and technical services	3	5	(D)	61	(D)	(D)	20	18	103	(D)	94	(D)	196	218	33,696	42,756
	1	1.5	N/A	2.4	N/A	N/A	3.1	2.8	1.9	N/A	1.6	N/A	4.0	3.7	5.5	6
Management of companies and enterprises	0	0	1	0	0	(D)	0	0	0	(D)	0	(D)	(D)	(D)	1,995	2,966
	0	0	<1	0	0	N/A	0	0	0	N/A	0	N/A	N/A	N/A	<1	<1
Administrative and support and waste management and remediation services	(D)	5	(D)	(D)	(D)	10	8	8	113	82	115	(D)	(D)	(D)	26,578	28,489
	N/A	1.5	N/A	N/A	N/A	0.9	1.2	1.2	2.1	1.6	2.0	N/A	N/A	N/A	4.3	4
Educational services	1	0	(D)	8	6	5	5	1	17	(D)	(D)	12	22	(D)	7,873	9,529
	<1	0	N/A	<1	<1	<1	<1	<1	<1	N/A	N/A	<1	<1	N/A	1.3	1.3
Health care and social assistance	(D)	10	(D)	211	(D)	12	5	(D)	542	(D)	(D)	(D)	292	(D)	68,410	79,590
	N/A	3.1	N/A	8.4	N/A	1	<1	N/A	10.2	N/A	N/A	N/A	5.9	N/A	11.1	11.2
Arts, entertainment, and recreation	(D)	(D)	(D)	23	23	18	7	(D)	(D)	69	149	89	121	95	18,628	21,488
	N/A	N/A	N/A	<1	2.1	1.6	1.1	N/A	N/A	1.4	2.6	1.8	2.4	1.6	3	3
Accommodation and food services	(D)	8	(D)	193	70	59	29	(D)	311	309	309	208	246	275	49,396	60,521
	N/A	2.5	N/A	7.7	6.4	5.1	4.5	N/A	5.8	6.2	5.3	4.3	5.0	4.7	8	8.5
Other services	(D)	(D)	150	143	42	41	30	24	220	215	165	157	188	212	31,823	35,648
	N/A	N/A	5.6	5.7	3.9	3.6	4.7	3.7	4.1	4.3	2.8	3.2	3.8	3.6	5.2	5.0
Government and government enterprises	64	58	447	369	213	215	191	189	1,848	1,754	1,852	1,648	511	523	97,106	95,814
	21.9	17.8	16.8	14.7	19.5	18.7	29.7	29.4	34.7	35.0	31.9	33.8	10.3	8.9	15.8	13.5

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

Table A-8 (Part 4). Montana Analysis Area Employment by Sector (2010 and 2021)

Sector	Sweet Grass County		Treasure County		Valley County		Wibaux County		Yellowstone County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	8,925	11,608	2,062	2,654	4,212	5,164	9,380	10,955	4,365	4,893	44,368	55,421
Wage and salary employment	6,771	8,679	1,129	1,566	2,696	3,256	6,281	7,378	3,444	3,799	33,864	42,216
Proprietors employment	2,154	2,929	933	1,088	1,516	1,908	3,099	3,577	921	1,094	10,504	13,205
Farm proprietors employment	547	570	431	448	522	487	627	621	285	288	1,148	1,154
Nonfarm proprietors employment	1,607	2,359	502	640	994	1,421	2,472	2,956	636	806	9,356	12,051
Farm employment	1,376	1,490	507	528	1,133	1,236	985	1,046	780	884	2,238	2,474
Nonfarm employment	7,549	10,118	1,555	2,126	3,079	3,928	8,395	9,909	3,585	4,009	42,130	52,947
Private nonfarm employment	6,003	8,538	1,082	1,440	2,304	3,201	7,210	8,810	2,876	3,284	37,034	47,648
By Industry (Number of Jobs/Percentage of Total Employment)												
Forestry, fishing, and related activities	(D)	(D)	11	(D)	(D)	(D)	(D)	(D)	329	515	7,122	8,193
	N/A	N/A	2.8	N/A	N/A	N/A	N/A	N/A	<1	<1	1.2	1.2
Mining (including quarrying and oil and gas extraction)	(D)	(D)	0	0	(D)	(D)	(D)	(D)	1,500	1,145	11,092	9,581
	N/A	N/A	0	0	N/A	N/A	N/A	N/A	1.5	1	1.8	1.4
Utilities	(D)	(D)	(D)	(D)	37	34	(D)	(D)	331	278	3,163	2,993
	N/A	N/A	N/A	N/A	<1	<1	N/A	N/A	<1	<1	<1	<1
Construction	201	269	(D)	(D)	231	238	(D)	9	6,408	8,467	40,842	55,366
	8.1	9.3	N/A	N/A	5.1	5.1	N/A	1.5	6.4	7.4	6.6	7.8
Manufacturing	83	123	(D)	4	54	35	11	(D)	3,325	4,024	19,857	25,703
	3.3	4.3	N/A	1	1.2	<1	1.6	N/A	3.3	3.5	3.2	3.6
Wholesale trade	37	27	30	26	158	136	(D)	(D)	5,698	5,867	17,517	19,577
	1.5	<1	7.7	6.6	3.5	2.9	N/A	N/A	5.7	5.2	2.8	2.8
Retail trade	194	206	(D)	(D)	488	377	29	(D)	12,896	12,944	70,321	77,062
	7.8	7.1	N/A	N/A	10.8	8.1	4.1	N/A	12.8	11.4	11.4	10.9
Transportation and warehousing	(D)	(D)	(D)	(D)	148	189	34	(D)	3,907	6,092	17,434	24,342
	N/A	N/A	N/A	N/A	3.3	4.1	4.9	N/A	3.9	5.4	2.8	3.4
Information	(D)	11	(D)	3	80	75	(D)	(D)	1,581	1,204	9,096	7,633
	N/A	<1	N/A	<1	1.8	1.6	N/A	N/A	1.6	1.1	1.5	1.1
Finance and insurance	69	81	(D)	(D)	(D)	146	24	25	4,564	5,762	25,097	29,912
	2.8	2.8	N/A	N/A	N/A	3.1	3.4	4.2	4.5	5.1	4.1	4.2
Real estate and rental and leasing	131	205	9	12	(D)	173	14	15	4,780	6,642	30,470	43,224
	5.3	7.1	2.3	3.0	N/A	3.7	2	2.5	4.8	5.8	4.9	6.1
Professional, scientific, and technical services	91	111	(D)	(D)	154	130	(D)	(D)	6,105	6,699	33,696	42,756
	3.7	3.8	N/A	N/A	3.4	2.8	N/A	N/A	6.1	5.9	5.5	6

Sector	Sweet Grass County		Treasure County		Valley County		Wibaux County		Yellowstone County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Management of companies and enterprises	(D)	8	0	0	(D)	0	0	0	427	741	1,995	2,966
	N/A	<1	0	0	N/A	0	0	0	<1	<1	<1	<1
Administrative and support and waste management and remediation services	(D)	55	(D)	5	(D)	163	(D)	8	6,213	5,843	26,578	28,489
	N/A	1.9	N/A	1.3	N/A	3.5	N/A	1.3	6.2	5.1	4.3	4
Educational services	(D)	(D)	1	1	(D)	(D)	1	1	1,276	1,546	7,873	9,529
	N/A	N/A	<1	<1	N/A	N/A	<1	<1	1.3	1.4	1.3	1.3
Health care and social assistance	(D)	(D)	(D)	(D)	(D)	(D)	(D)	6	13,731	15,557	68,410	79,590
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1	13.7	13.7	11.1	11.2
Arts, entertainment, and recreation	76	71	(D)	3	59	41	(D)	5	2,761	3,113	18,628	21,488
	3.1	2.5	N/A	<1	1.3	<1	N/A	<1	2.7	2.7	3	3
Accommodation and food services	157	212	(D)	(D)	313	401	(D)	41	8,245	9,825	49,396	60,521
	6.3	7.3	N/A	N/A	6.9	8.6	N/A	6.9	8.2	8.6	8	8.5
Other services	144	153	17	14	192	181	21	17	5,276	6,053	31,823	35,648
	5.8	5.3	4.4	3.5	4.2	3.9	3	2.9	5.2	5.3	5.2	5
Government and government enterprises	389	220	79	66	779	787	114	141	9,798	10,033	97,106	95,814
	15.7	7.6	20.3	16.7	17.2	16.9	16.3	23.7	9.7	8.8	15.8	13.5

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

Table A-9 (Part 1). Montana Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Beaverhead County		Big Horn County		Blaine County		Carbon County		Carter County		Chouteau County		Custer County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	371,543	518,390	398,993	473,150	215,852	237,985	446,260	647,725	42,318	56,198	219,021	232,423	517,237	602,175	45,156,400	62,886,699
Population (persons)	9,254	9,524	12,912	12,957	6,513	6,980	10,054	10,847	1,163	1,428	5,815	5,916	11,705	11,916	990,863	1,104,271
Per capita personal income (dollars)	40,149	54,430	30,900	36,517	33,142	34,095	44,386	59,715	36,388	39,354	37,665	39,287	44,189	50,535	45,573	56,949
Earnings by place of work (thousands of dollars)	210,457	275,065	293,840	276,320	124,259	106,879	153,812	204,761	18,334	27,408	106,441	91,287	359,129	370,658	29,752,893	38,034,685
Wages and salaries (thousands of dollars)	141,315	180,581	208,452	197,217	62,456	62,296	91,820	123,212	11,077	15,069	50,902	55,372	244,206	241,366	19,419,036	26,086,727
Supplement to wages and salaries	41,482	49,440	59,467	60,244	20,920	20,865	26,718	31,486	3,704	4,734	15,080	15,759	64,586	61,488	5,234,925	6,251,082
Proprietors' income	27,661	45,044	25,921	18,859	40,883	23,718	35,274	50,063	3,553	7,605	40,459	20,156	50,336	67,804	5,098,932	5,696,876
Farm earnings	13,186	21,189	14,557	12,206	33,923	20,969	207	8,840	4,379	7,169	32,782	20,083	4,668	(220)	707,154	437,583
Nonfarm earnings	197,271	253,876	279,283	264,114	90,336	85,910	153,605	195,921	13,955	20,239	73,658	68,204	354,460	370,878	29,045,739	37,597,102
Private nonfarm earnings	136,070	184,140	148,120	139,669	40,965	39,406	116,926	157,333	8,661	14,298	49,616	45,872	272,614	294,084	22,587,303	30,772,471
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)																
Forestry, fishing, and related activities	(D)	4,231	(D)	(D)	(D)	(D)	(D)	14,952	(D)	(D)	4,938	(D)	(D)	(D)	201,152	282,376
	N/A	1.7	N/A	N/A	N/A	N/A	N/A	7.6	N/A	N/A	6.7	N/A	N/A	N/A	<1	<1
Mining (including quarrying and oil and gas extraction)	(D)	16,225	61,009	40,025	(D)	971	5,979	3,359	(D)	60	11	(D)	(D)	(D)	1,213,872	933,503
	N/A	6.4	21.8	15.2	N/A	1.1	3.9	1.7	N/A	<1	<1	N/A	N/A	N/A	4.2	2.5
Utilities	(D)	(D)	(D)	(D)	(D)	(D)	3,544	3,279	(D)	(D)	396	281	(D)	(D)	397,152	390,355
	N/A	N/A	N/A	N/A	N/A	N/A	2.3	1.7	N/A	N/A	<1	<1	N/A	N/A	1.4	1
Construction	15,007	(D)	5,213	(D)	4,623	(D)	21,296	25,592	(D)	(D)	5,638	2,495	50,129	26,434	2,322,189	3,494,985
	7.6	N/A	1.9	N/A	5.1	N/A	13.9	13.1	N/A	N/A	7.7	3.7	14.1	7.1	8	9.3
Manufacturing	2,523	4,099	3,101	(D)	659	(D)	2,720	3,403	95	15	1,130	2,277	3,107	4,867	1,193,679	1,688,847
	1.3	1.6	1.1	N/A	<1	N/A	1.8	1.7	<1	<1	1.5	3.3	<1	1.3	4.1	4.5
Wholesale trade	6,117	10,708	(D)	(D)	3,534	2,710	3,481	4,852	(D)	(D)	4,425	5,055	9,356	13,640	1,124,741	1,556,606
	3.1	4.2	N/A	N/A	3.9	3.2	2.3	2.5	N/A	N/A	6	7.4	2.6	3.7	3.9	4.1

Sector	Beaverhead County		Big Horn County		Blaine County		Carbon County		Carter County		Chouteau County		Custer County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Retail trade	17,629	31,468	9,258	14,515	8,921	10,749	8,822	10,355	1,081	2,023	6,140	7,568	33,121	52,361	2,823,559	3,333,510
	8.9	12.4	3.3	5.5	9.9	12.5	5.7	5.3	7.7	10	8.3	11.1	9.3	14.1	9.7	8.9
Transportation and warehousing	(D)	(D)	5,595	7,173	(D)	(D)	6,063	6,854	(D)	(D)	2,284	1,738	(D)	(D)	1,141,695	1,421,264
	N/A	N/A	2	2.7	N/A	N/A	3.9	3.5	N/A	N/A	3.1	2.5	N/A	N/A	3.9	3.8
Information	2,397	1,713	1,547	810	(D)	(D)	2,027	1,078	(D)	(D)	(D)	224	4,466	4,257	566,122	591,752
	1.2	<1	<1	<1	N/A	N/A	1.3	<1	N/A	N/A	N/A	<1	1.3	1.1	1.9	1.6
Finance and insurance	8,727	9,365	4,970	3,628	(D)	(D)	4,142	5,143	(D)	40	4,380	3,296	20,794	26,829	1,338,206	1,790,781
	4.4	3.7	1.8	1.4	N/A	N/A	2.7	2.6	N/A	<1	5.9	4.8	5.9	7.2	4.6	4.8
Real estate and rental and leasing	8,855	8,682	1,394	2,026	(D)	(D)	2,520	10,566	95	(D)	1,246	2,093	2,005	8,798	545,074	1,353,015
	4.5	3.4	<1	<1	N/A	N/A	1.6	5.4	<1	N/A	1.7	3.1	<1	2.4	1.9	3.6
Professional, scientific, and technical services	6,186	8,269	5,805	4,799	(D)	2,640	10,059	(D)	(D)	(D)	2,193	(D)	11,274	(D)	1,834,809	2,879,811
	3.1	3.3	2.1	1.8	N/A	3.1	6.5	N/A	N/A	N/A	3	N/A	3.2	N/A	6.3	7.7
Management of companies and enterprises	0	-	(D)	(D)	11	N/A	(D)	(D)	0	N/A	0	0	3,620	(D)	153,953	272,776
	<1	0	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	<1	0	1	N/A	<1	<1
Administrative and support and waste management and remediation services	3,677	2,659	(D)	(D)	1,218	554	(D)	6,573	(D)	143	431	(D)	3,290	14,893	902,514	1,208,555
	1.9	1.	N/A	N/A	1.3	<1	N/A	3.4	N/A	<1	<1	N/A	<1	4	3.1	3.2
Educational services	(D)	924	(D)	(D)	(D)	(D)	640	804	54	76	(D)	(D)	1,297	(D)	193,934	283,652
	N/A	<1	N/A	N/A	N/A	N/A	<1	<1	<1	<1	N/A	N/A	<1	N/A	<1	<1
Health care and social assistance	(D)	34,758	(D)	(D)	(D)	(D)	14,589	17,198	(D)	(D)	(D)	(D)	52,331	(D)	4,026,765	5,409,554
	N/A	13.7	N/A	N/A	N/A	N/A	9.5	8.8	N/A	N/A	N/A	N/A	14.8	N/A	13.9	14.4
Arts, entertainment, and recreation	2,042	4,299	2,835	3,387	249	296	5,224	5,107	169	266	922	944	3,012	3,476	373,117	559,347
	1	1.7	1	1.3	<1	<1	3.4	2.6	1.2	1.3	1.3	1.4	<1	<1	1.3	1.5
Accommodation and food services	8,795	12,444	7,607	8,940	925	793	11,296	17,456	561	474	1,797	2,185	15,577	20,338	1,088,374	1,932,422
	4.5	4.9	2.7	3.4	1	<1	7.4	8.9	4	2.3	2.4	3.2	4.4	5.5	3.7	5.1
Other services (except government and government enterprises)	6,752	8,586	7,744	5,956	3,951	3,779	7,505	10,050	(D)	(D)	(D)	3,144	13,725	19,679	1,146,396	1,389,360
	3.4	3.4	2.8	2.3	4.4	4.4	4.9	5.1	N/A	N/A	N/A	4.6	3.9	5.3	3.9	3.7

Sector	Beaverhead County		Big Horn County		Blaine County		Carbon County		Carter County		Chouteau County		Custer County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Government and government enterprises	61,201	69,736	131,163	124,445	49,371	46,504	36,679	38,588	5,294	5,941	24,042	22,332	81,847	76,794	6,458,437	6,824,631
	31	27.5	47	47.1	54.7	54.1	23.9	19.7	37.9	29.4	32.6	32.8	23.1	20.7	22.2	18.2

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

Table A-9 (Part 2). Montana Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Dawson County		Fallon County		Fergus County		Garfield County		Madison County		McCone County		Musselshell County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	386,334	422,572	160,762	148,330	492,033	542,339	44,998	45,174	335,784	664,035	76,599	80,485	188,369	242,613	45,156,400	62,886,699
Population (persons)	8,961	8,904	2,894	3,017	11,594	11,617	1,190	1,209	7,690	8,917	1,747	1,718	4,557	4,896	990,863	1,104,271
Per capita personal income (dollars)	43,112	47,459	55,550	49,165	42,439	46,685	37,814	37,365	43,665	74,468	43,846	46,848	41,337	49,553	45,573	56,949
Earnings by place of work (thousands of dollars)	251,041	244,642	145,942	104,808	296,260	304,991	26,717	19,423	201,340	370,509	53,296	44,566	96,871	95,222	29,752,893	38,034,685
Wages and salaries (thousands of dollars)	170,703	172,469	94,229	72,194	179,393	214,669	9,913	14,324	138,498	271,448	24,917	28,682	60,947	64,155	19,419,036	26,086,727
Supplement to wages and salaries	48,022	45,942	21,769	17,667	51,258	56,089	3,452	4,675	35,645	51,974	7,491	7,873	15,309	64,155	5,234,925	6,251,082
Proprietors' income	32,315	26,231	29,944	14,947	65,609	34,233	13,351	424	27,196	47,087	20,887	8,011	20,616	15,018	5,098,932	5,696,876
Farm earnings	10,493	8,821	3,568	4,847	21,387	(15,864)	13,165	(220)	10,003	8,370	19,588	7,087	4,185	2,072	707,154	437,583
Nonfarm earnings	240,549	235,821	142,374	99,961	274,873	320,855	13,552	19,643	191,337	362,139	33,708	37,479	92,686	93,150	29,045,739	37,597,102
Private nonfarm earnings	193,791	191,606	126,499	82,507	212,244	260,918	6,993	10,992	160,736	329,734	26,680	29,906	78,433	78,986	22,587,303	30,772,471

Sector	Dawson County		Fallon County		Fergus County		Garfield County		Madison County		McCone County		Musselshell County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)																
Forestry, fishing, and related activities	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	3,803	4,305	(D)	(D)	1,906	(D)	201,152	282,376
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2	1.2	N/A	N/A	2.1	N/A	<1	<1
Mining (including quarrying and oil and gas extraction)	(D)	9,737	43,816	25,905	(D)	(D)	1	N/A	5,049	15,324	3	(D)	33,009	(D)	1,213,872	933,503
	N/A	4.1	30.8	25.9	N/A	N/A	<1	N/A	2.6	4.2	<1	N/A	35.6	N/A	4.2	2.5
Utilities	(D)	(D)	(D)	(D)	(D)	(D)	14	47	1,314	(D)	(D)	(D)	(D)	(D)	397,152	390,355
	N/A	N/A	N/A	N/A	N/A	N/A	<1	<1	<1	N/A	N/A	N/A	N/A	N/A	1.4	1
Construction	9,200	6,994	23,483	9,028	43,285	55,839	(D)	1,574	23,726	35,800	3,256	2,480	9,262	8,994	2,322,189	3,494,985
	3.8	3	16.5	9	15.7	17.4	N/A	8	12.4	9.6	9.7	6.6	10	9.7	8	9.3
Manufacturing	2,363	2,665	972	972	16,918	26,177	(D)	259	3,888	6,720	(D)	213	1,279	696	1,193,679	1,688,847
	<1	<1	<1	1	6.2	<1	N/A	1.3	2	1.9	N/A	<1	1.4	<1	4.1	4.5
Wholesale trade	11,195	(D)	(D)	(D)	17,166	19,799	(D)	(D)	1,816	(D)	5,455	6,418	2,260	2,758	1,124,741	1,556,606
	4.7	N/A	N/A	N/A	6.2	6.2	N/A	N/A	<1	N/A	16.2	17.1	2.4	3	3.9	4.1
Retail trade	20,204	21,519	5,670	5,614	21,936	22,636	1,544	(D)	7,354	16,998	1,830	1,492	4,800	4,511	2,823,559	3,333,510
	8.4	9.1	4	5.6	8	7.1	11.4	N/A	3.8	4.7	5.4	4	5.2	4.8	9.7	8.9
Transportation and warehousing	(D)	47,209	17,106	13,750	(D)	(D)	(D)	(D)	6,416	6,713	(D)	(D)	(D)	(D)	1,141,695	1,421,264
	N/A	20	12	13.8	N/A	N/A	N/A	N/A	3.4	1.9	N/A	N/A	N/A	N/A	3.9	3.8
Information	6,782	6,066	1,637	633	3,425	2,621	(D)	(D)	438	12,231	(D)	(D)	2,252	1,118	566,122	591,752
	2.8	2.6	1.1	<1	1.2	<1	N/A	N/A	<1	3.4	N/A	N/A	2.4	1.2	1.9	1.6
Finance and insurance	6,217	6,139	(D)	2,817	12,094	15,472	(D)	(D)	6,386	14,148	(D)	(D)	(D)	(D)	1,338,206	1,790,781
	2.6	2.6	N/A	2.8	4.4	4.8	N/A	N/A	3.3	3.9	N/A	N/A	N/A	N/A	4.6	4.8
Real estate and rental and leasing	3,578	4,535	(D)	538	4,119	11,980	128	466	6,304	9,011	(D)	(D)	(D)	(D)	545,074	1,353,015
	1.5	1.9	N/A	<1	1.5	3.7	<1	2.4	3.3	2.5	N/A	N/A	N/A	N/A	1.9	3.6
Professional, scientific, and technical services	4,150	6,992	2,563	2,109	(D)	(D)	138	(D)	(D)	16,162	(D)	(D)	1,163	2,223	1,834,809	2,879,811
	1.7	3	1.8	2.1	N/A	N/A	1	N/A	N/A	4.5	N/A	N/A	1.3	2.4	6.3	7.7
Management of companies and enterprises	(D)	(D)	0	0	(D)	(D)	0	N/A	(D)	0	0	N/A	631	N/A	153,953	272,776
	N/A	N/A	<1	0	N/A	N/A	<1	N/A	N/A	0	<1	N/A	<1	N/A	<1	<1
Administrative and support and waste management and remediation services	(D)	(D)	1,548	777	4,586	(D)	144	(D)	5,366	3,882	190	(D)	1,356	476	902,514	1,208,555
	N/A	N/A	1.1	<1	1.7	N/A	1.1	N/A	2.8	1.1	<1	N/A	1.5	<1	3.1	3.2
Educational services	160	(D)	213	100	(D)	489	70	37	806	(D)	70	82	232	55	193,934	283,652
	<1	N/A	<1	<1	N/A	<1	<1	<1	<1	N/A	<1	<1	<1	<1	<1	<1

Sector	Dawson County		Fallon County		Fergus County		Garfield County		Madison County		McCone County		Musselshell County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Health care and social assistance	36,594	(D)	8,582	7,247	(D)	45,045	(D)	613	10,454	(D)	(D)	(D)	7,552	9,550	4,026,765	5,409,554
	15.2	N/A	6	7.2	N/A	14	N/A	3.1	5.5	N/A	N/A	N/A	8.1	10.3	13.9	14.4
Arts, entertainment, and recreation	2,647	1,779	(D)	(D)	1,334	1,631	(D)	(D)	28,202	93,100	128	53	(D)	252	373,117	559,347
	1.1	<1	N/A	N/A	<1	<1	N/A	N/A	14.7	25.7	<1	<1	N/A	<1	1.3	1.5
Accommodation and food services	8,332	9,720	(D)	(D)	10,435	13,359	(D)	(D)	34,308	70,176	382	526	(D)	1,550	1,088,374	1,932,422
	3.5	4.1	N/A	N/A	3.8	4.2	N/A	N/A	17.9	19.4	1.1	1.4	N/A	1.7	3.7	5.1
Other services (except government and government enterprises)	10,684	7,601	7,630	4,284	12,505	10,345	(D)	(D)	7,139	5,901	1,657	1,373	5,979	3,773	1,146,396	1,389,360
	4.4	3.2	5.4	4.3	4.5	3.2	N/A	N/A	3.7	1.6	4.9	3.7	6.5	4.1	3.9	3.7
Government and government enterprises	46,758	44,215	15,875	17,454	62,628	59,937	6,559	8,651	30,601	32,405	7,028	7,573	14,253	14,164	6,458,437	6,824,631
	19.4	18.7	11.2	17.5	22.8	18.7	48.4	44	16	8.9	20.8	20.2	15.4	15.2	22.2	18.2

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

Table A-9 (Part 3). Montana Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Petroleum County		Phillips County		Powder River County		Prairie County		Roosevelt County		Rosebud County		Stillwater County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	16,773	16,350	170,208	188,331	57,566	67,805	46,834	53,682	404,010	467,547	394,938	434,318	412,494	587,107	45,156,400	62,886,699
Population (persons)	489	519	4,259	4,192	1,739	1,702	1,183	1,091	10,440	10,821	9,231	8,124	9,091	9,044	990,863	1,104,271
Per capita personal income (dollars)	34,300	31,503	39,964	44,926	33,103	39,838	39,590	49,204	38,698	43,207	42,784	53,461	45,374	64,917	45,573	56,949
Earnings by place of work (thousands of dollars)	10,002	6,331	92,917	84,496	28,093	33,893	18,741	21,592	248,313	248,572	325,925	291,453	270,997	371,500	29,752,893	38,034,685
Wages and salaries (thousands of dollars)	4,815	4,821	54,664	53,660	15,669	20,389	11,975	13,765	147,893	161,681	237,082	217,772	197,023	289,750	19,419,036	26,086,727
Supplement to wages and salaries	1,608	4,821	16,798	53,660	5,183	20,389	4,345	13,765	45,349	161,681	71,125	217,772	45,031	289,750	5,234,925	26,086,727
Proprietors' income	3,579	(100)	21,455	15,179	7,240	7,292	2,421	2,808	55,071	39,791	17,718	8,959	28,943	21,623	5,098,932	5,696,876
Farm earnings	3,739	919	12,293	11,007	-228	3,730	49	1,430	30,361	19,745	11,980	8,573	7,406	4,478	707,154	437,583
Nonfarm earnings	6,262	5,412	80,623	73,489	28,321	30,163	18,692	20,162	217,952	228,827	313,945	282,880	263,591	367,022	29,045,739	37,597,102
Private nonfarm earnings	3,748	2,734	55,647	50,313	18,507	19,063	8,302	7,198	109,023	116,668	208,522	174,238	236,829	337,553	22,587,303	30,772,471
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)																
Forestry, fishing, and related activities	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	1,362	(D)	201,152	282,376
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1	N/A	<1	<1
Mining (including quarrying and oil and gas extraction)	(D)	(D)	(D)	(D)	(D)	(D)	14	82	2,421	3,997	55,679	(D)	(D)	(D)	1,213,872	933,503
	N/A	N/A	N/A	N/A	N/A	N/A	<1	<1	1.1	1.7	17.7	N/A	N/A	N/A	4.2	2.5
Utilities	5	18	1,788	2,329	19	61	(D)	18	3,112	4,021	(D)	46,830	2,161	1,846	397,152	390,355
	<1	<1	2.2	3.2	<1	<1	N/A	<1	1.4	1.8	N/A	16.6	<1	<1	1.4	1
Construction	173	(D)	7,051	6,727	(D)	(D)	(D)	818	16,506	8,634	17,813	27,946	(D)	17,494	2,322,189	3,494,985
	2.8	N/A	8.7	9.2	N/A	N/A	N/A	4.1	7.6	3.8	5.7	9.9	N/A	4.8	8	9.3
Manufacturing	0	23	1,150	1,678	(D)	(D)	(D)	144	2,575	2,236	945	416	15,941	13,307	1,193,679	1,688,847
	<1	<1	1.4	2.3	N/A	N/A	N/A	<1	1.2	1	<1	<1	6	3.6	4.1	4.5
Wholesale trade	0	13	2,556	(D)	(D)	(D)	(D)	(D)	5,192	5,969	(D)	174	4,443	4,833	1,124,741	1,556,606
	<1	<1	3.2	N/A	N/A	N/A	N/A	N/A	2.4	2.6	N/A	<1	1.7	1.3	3.9	4.1

Sector	Petroleum County		Phillips County		Powder River County		Prairie County		Roosevelt County		Rosebud County		Stillwater County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Retail trade	(D)	(D)	6,418	7,505	2,408	4,500	848	968	15,229	22,349	10,187	7,528	7,354	12,400	2,823,559	3,333,510
	N/A	N/A	8	10.2	8.5	14.9	4.5	4.8	7	9.8	3.2	2.7	2.8	3.4	9.7	8.9
Transportation and warehousing	(D)	(D)	8,271	(D)	(D)	(D)	869	(D)	8,743	10,630	12,479	9,122	2,904	2,873	1,141,695	1,421,264
	N/A	N/A	10.3	N/A	N/A	N/A	4.6	N/A	4	4.6	4	3.2	1.1	<1	3.9	3.8
Information	(D)	(D)	731	(D)	(D)	(D)	533	158	2,496	1,674	5,115	4,424	1,485	693	566,122	591,752
	N/A	N/A	<1	N/A	N/A	N/A	2.9	<1	1.1	<1	1.6	1.6	<1	<1	1.9	1.6
Finance and insurance	0	N/A	3,644	3,336	(D)	(D)	(D)	(D)	5,790	5,389	3,459	3,294	2,874	1,416	1,338,206	1,790,781
	<1	N/A	4.5	4.5	N/A	N/A	N/A	N/A	2.7	2.4	1.1	1.2	1.1	<1	4.6	4.8
Real estate and rental and leasing	73	102	1,997	1,660	(D)	61	(D)	(D)	761	542	808	653	1,191	5,820	545,074	1,353,015
	1.2	1.9	2.5	2.3	N/A	<1	N/A	N/A	<1	<1	<1	<1	<1	1.6	1.9	3.6
Professional, scientific, and technical services	80	30	(D)	1,948	(D)	(D)	1,061	1,163	2,582	(D)	1,833	(D)	9,571	8,333	1,834,809	2,879,811
	1.3	<1	N/A	2.7	N/A	N/A	5.7	5.8	1.2	N/A	<1	N/A	3.6	2.3	6.3	7.7
Management of companies and enterprises	0	N/A	6	N/A	0	(D)	0	N/A	0	(D)	0	(D)	(D)	(D)	153,953	272,776
	<1	N/A	<1	N/A	<1	N/A	<1	N/A	<1	N/A	<1	N/A	N/A	N/A	<1	<1
Administrative and support and waste management and remediation services	(D)	10	(D)	(D)	(D)	127	179	94	2,831	2,118	2,697	(D)	(D)	(D)	902,514	1,208,555
	N/A	<1	N/A	N/A	N/A	<1	<1	<1	1.3	<1	<1	N/A	N/A	N/A	3.1	3.2
Educational services	26	N/A	(D)	13	136	63	93	45	73	(D)	(D)	N/A	308	(D)	193,934	283,652
	<1	N/A	N/A	<1	<1	<1	<1	<1	<1	N/A	N/A	N/A	<1	N/A	<1	<1
Health care and social assistance	(D)	188	(D)	9,407	(D)	548	204	(D)	22,986	(D)	(D)	(D)	8,820	(D)	4,026,765	5,409,554
	N/A	3.5	N/A	12.8	N/A	1.8	1.1	N/A	10.5	N/A	N/A	N/A	3.3	N/A	13.9	14.4
Arts, entertainment, and recreation	(D)	(D)	(D)	466	457	628	109	(D)	(D)	1,430	3,287	1,460	2,014	2,653	373,117	559,347
	N/A	N/A	N/A	<1	1.6	2.1	<1	N/A	N/A	<1	1	<1	<1	<1	1.3	1.5
Accommodation and food services	(D)	5	(D)	2,970	1,072	1,014	361	(D)	6,394	6,709	4,357	3,664	4,696	6,038	1,088,374	1,932,422
	N/A	<1	N/A	4	3.8	3.4	1.9	N/A	2.9	2.9	1.4	1.3	1.8	1.6	3.7	5.1
Other services (except government and government enterprises)	(D)	(D)	4,757	4,176	1,241	1,314	661	685	8,456	6,978	4,851	6,089	4,906	6,289	1,146,396	1,389,360
	N/A	N/A	5.9	5.7	4.4	4.4	3.5	3.4	3.9	3	1.5	2.2	1.9	1.7	3.9	3.7

Sector	Petroleum County		Phillips County		Powder River County		Prairie County		Roosevelt County		Rosebud County		Stillwater County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Government and government enterprises	2,515	2,678	24,976	23,176	9,814	11,100	10,390	12,964	108,929	112,159	105,423	108,642	26,762	29,469	6,458,437	6,824,631
	40.2	49.5	31	31.5	34.7	36.8	55.6	64.3	50	49	33.6	38.4	10.2	8	22.2	18.2

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given

Table A-9 (Part 4). Montana Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Sweet Grass County		Treasure County		Valley County		Wibaux County		Yellowstone County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	147,615	215,383	34,685	38,174	328,366	426,146	42,912	45,676	7,342,028	9,930,988	45,156,400	62,886,699
Population (persons)	3,617	3,723	716	768	7,383	7,537	1,008	934	148,451	167,146	990,863	1,104,271
Per capita personal income (dollars)	40,812	57,852	48,442	49,706	44,476	56,541	42,571	48,904	49,457	59,415	45,573	56,949
Earnings by place of work (thousands of dollars)	88,445	127,682	15,956	17,710	194,482	251,161	25,325	22,888	5,446,780	6,963,050	29,752,893	38,034,685
Wages and salaries (thousands of dollars)	63,525	98,180	6,748	8,396	123,119	149,817	12,039	11,744	3,803,424	4,945,455	19,419,036	26,086,727
Supplement to wages and salaries	16,213	98,180	2,248	8,396	36,166	149,817	3,806	11,744	953,042	4,945,455	5,234,925	26,086,727
Proprietors' income	8,707	7,801	6,960	6,708	35,197	59,312	9,481	7,140	690,315	890,270	5,098,932	5,696,876
Farm earnings	2,593	3,897	5,390	8,151	23,865	44,596	3,570	3,619	14,855	8,902	707,154	437,583
Nonfarm earnings	91,038	131,579	10,566	9,559	170,617	206,565	21,755	19,269	5,431,925	6,954,148	29,045,739	37,597,102
Private nonfarm earnings	72,332	119,091	7,539	6,800	122,612	153,599	16,947	11,792	4,703,956	6,184,009	22,587,303	30,772,471

Sector	Sweet Grass County		Treasure County		Valley County		Wibaux County		Yellowstone County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)												
Forestry, fishing, and related activities	(D)	(D)	525	(D)	(D)	(D)	(D)	(D)	5,951	24,405	201,152	282,376
	N/A	N/A	5	N/A	N/A	N/A	N/A	N/A	<1	<1	<1	<1
Mining (including quarrying and oil and gas extraction)	(D)	(D)	0	N/A	(D)	N/A	(D)	(D)	147,617	172,074	1,213,872	933,503
	N/A	N/A	<1	N/A	N/A	N/A	N/A	N/A	2.7	2.5	4.2	2.5
Utilities	(D)	(D)	(D)	(D)	3,555	3,841	(D)	(D)	42,769	36,517	397,152	390,355
	N/A	N/A	N/A	N/A	2.1	1.9	N/A	N/A	<1	<1	1.4	1
Construction	11,484	12,665	(D)	(D)	9,299	11,640	(D)	993	440,607	565,853	2,322,189	3,494,985
	12.6	9.6	N/A	N/A	5.5	5.6	N/A	5.2	8.1	8.1	8	9.3
Manufacturing	3,083	4,628	(D)	25	1,729	1,024	215	(D)	312,943	407,865	1,193,679	1,688,847
	3.4	3.5	N/A	<1	1	<1	<1	N/A	5.8	5.9	4.1	4.5
Wholesale trade	2,218	1,528	1,235	1,525	8,218	8,833	(D)	(D)	395,488	517,014	1,124,741	1,556,606
	2.4	1.2	11.7	16	4.8	4.3	N/A	N/A	7.3	7.4	3.9	4.1
Retail trade	4,869	5,011	(D)	(D)	15,431	11,475	1,380	(D)	440,051	518,990	2,823,559	3,333,510
	5.3	3.8	N/A	N/A	9	5.6	6.3	N/A	8.1	7.5	9.7	8.9
Transportation and warehousing	(D)	(D)	(D)	(D)	16,957	18,784	3,372	(D)	256,677	363,984	1,141,695	1,421,264
	N/A	N/A	N/A	N/A	9.9	9.1	15.5	N/A	4.7	5.2	3.9	3.8
Information	(D)	449	(D)	26	4,641	4,276	(D)	(D)	109,048	86,459	566,122	591,752
	N/A	<1	N/A	<1	2.7	2.1	N/A	N/A	2	1.2	1.9	1.6
Finance and insurance	2,180	2,756	(D)	(D)	(D)	8,358	629	432	293,700	368,412	1,338,206	1,790,781
	2.4	2.1	N/A	N/A	N/A	4	2.9	2.2	5.4	5.3	4.6	4.8
Real estate and rental and leasing	1,569	4,155	205	200	(D)	3,640	341	452	139,598	323,268	545,074	1,353,015
	1.7	3.2	1.9	2.1	N/A	1.8	1.6	2.3	2.6	4.6	1.9	3.6
Professional, scientific, and technical services	2,512	5,051	(D)	(D)	5,033	7,476	(D)	(D)	415,063	553,331	1,834,809	2,879,811
	2.8	3.8	N/A	N/A	2.9	3.6	N/A	N/A	7.6	8	6.3	7.7
Management of companies and enterprises	(D)	425	0	N/A	(D)	N/A	0	N/A	35,745	65,296	153,953	272,776
	N/A	<1	<1	N/A	N/A	N/A	<1	N/A	<1	<1	<1	<1
Administrative and support and waste management and remediation services	(D)	1,349	(D)	62	(D)	7,033	(D)	142	214,827	268,185	902,514	1,208,555
	N/A	1	N/A	<1	N/A	3.4	N/A	<1	4	3.9	3.1	3.2
Educational services	(D)	(D)	16	10	(D)	(D)	36	29	32,471	47,570	193,934	283,652
	N/A	N/A	<1	<1	N/A	N/A	<1	<1	<1	<1	<1	<1
Health care and social assistance	(D)	(D)	(D)	(D)	(D)	(D)	(D)	425	978,412	1,243,338	4,026,765	5,409,554
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.2	18	19.9	13.9	14.4
Arts, entertainment, and recreation	803	1,319	(D)	27	991	961	(D)	67	53,348	71,642	373,117	559,347
	<1	1	N/A	<1	<1	<1	N/A	<1	<1	1	1.3	1.5

Sector	Sweet Grass County		Treasure County		Valley County		Wibaux County		Yellowstone County		State of Montana	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Accommodation and food services	3,201	4,933	(D)	(D)	5,335	12,477	(D)	770	191,651	292,385	1,088,374	1,932,422
	3.5	3.7	N/A	N/A	3.1	6	N/A	4	3.5	4.2	3.7	5.1
Other services (except government and government enterprises)	3,449	4,315	465	359	4,276	5,437	657	617	197,990	257,421	1,146,396	1,389,360
	3.8	3.3	4.4	3.8	2.5	2.6	3	3.2	3.6	3.7	3.9	3.7
Government and government enterprises	18,706	12,488	3,028	2,759	48,005	52,966	4,809	7,477	727,968	770,139	6,458,437	6,824,631
	20.5	9.5	28.7	28.9	28.1	25.6	22.1	38.8	13.4	11.1	22.2	18.2

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

Table A-10 (Part 1). Nevada Analysis Area Employment by Sector (2010 and 2021)

Sector	Churchill County		Elko County		Eureka County		Humboldt County		Lander County		State of Nevada	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	11,946	13,314	26,706	28,005	4,715	4,662	10,161	9,914	3,694	4,204	1,478,054	1,875,709
Wage and salary employment	9,151	10,451	21,930	22,729	4,427	4,361	8,142	8,146	3,118	3,668	1,153,901	1,409,465
Proprietors employment	2,795	2,863	4,776	5,276	288	301	2,019	1,768	576	536	324,153	466,244
Farm proprietors employment	575	505	439	402	78	69	266	254	96	95	3,254	2,982
Nonfarm proprietors employment	2,220	2,358	4,337	4,874	210	232	1,753	1,514	480	441	320,899	463,262
Farm employment	777	693	675	605	157	140	536	522	164	165	5,354	5,028
Nonfarm employment	11,169	12,621	26,031	27,400	4,558	4,522	9,625	9,392	3,530	4,039	1,472,700	1,870,681
Private nonfarm employment	8,211	9,276	22,126	23,639	4,339	4,304	8,117	7,800	2,975	3,479	1,303,611	1,693,540
By Industry (Number of Jobs/Percentage of Total Employment)												
Forestry, fishing, and related activities	(D)	(D)	(D)	250	(D)	(D)	(D)	141	(D)	(D)	1,585	1,937
	N/A	N/A	N/A	<1	N/A	N/A	N/A	1.4	N/A	N/A	<1	<1
Mining (including quarrying and oil and gas extraction)	(D)	134	2,261	2,449	3,868	(D)	1,926	2,095	1,662	(D)	17,025	18,132
	N/A	1	8.5	8.7	82	N/A	19	21.1	45	N/A	1.2	1
Utilities	115	87	106	155	78	77	(D)	118	(D)	(D)	4,542	4,526
	1	<1	<1	<1	1.7	1.7	N/A	1.2	N/A	N/A	<1	<1
Construction	635	949	1,878	1,830	(D)	(D)	710	384	(D)	(D)	75,642	120,249
	5.3	7.1	7	6.5	N/A	N/A	7	3.9	N/A	N/A	5.1	6.4
Manufacturing	332	604	272	259	12	(D)	297	320	(D)	(D)	41,664	66,978
	2.8	4.5	1	<1	<1	N/A	2.9	3.2	N/A	N/A	2.8	3.6
Wholesale trade	202	182	954	1,356	(D)	7	139	177	(D)	(D)	37,488	43,982
	1.7	1.4	3.6	4.8	N/A	<1	1.4	1.8	N/A	N/A	2.5	2.3
Retail trade	1,138	1,374	2,778	3,318	56	(D)	1,154	1,241	290	321	152,353	185,306
	9.5	10.3	10.4	11.8	1.2	N/A	11.4	12.5	7.9	7.6	10.3	9.9

Sector	Churchill County		Elko County		Eureka County		Humboldt County		Lander County		State of Nevada	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Transportation and warehousing	823	947	731	884	(D)	(D)	(D)	358	210	85	53,215	137,427
	6.9	7.1	2.7	3.2	N/A	N/A	N/A	3.6	5.7	2	3.6	7.3
Information	128	90	189	138	(D)	4	93	63	7	(D)	17,692	21,137
	1.1	<1	<1	<1	N/A	<1	<1	<1	<1	N/A	1.2	1.1
Finance and insurance	343	331	644	598	(D)	(D)	177	128	(D)	(D)	83,023	103,909
	2.9	2.5	2.4	2.1	N/A	N/A	1.7	1.3	N/A	N/A	5.6	5.5
Real estate and rental and leasing	468	464	867	1,061	(D)	(D)	227	283	(D)	81	94,364	110,419
	3.9	3.5	3.2	3.8	N/A	N/A	2.2	2.9	N/A	1.9	6.4	5.9
Professional, scientific, and technical services	389	503	843	1,078	23	(D)	(D)	(D)	(D)	(D)	81,695	109,638
	3.3	3.8	3.2	3.8	<1	N/A	N/A	N/A	N/A	N/A	5.5	5.8
Management of companies and enterprises	5	5	304	303	(D)	0	(D)	(D)	0	0	21,738	32,573
	<1	<1	1.1	1.1	N/A	0	N/A	N/A	0	0	1.5	1.7
Administrative and support and waste management and remediation services	638	593	800	852	(D)	(D)	437	262	(D)	(D)	95,137	132,423
	5.3	4.5	3	3	N/A	N/A	4.3	2.6	N/A	N/A	6.4	7.1
Educational services	85	(D)	(D)	162	(D)	7	(D)	(D)	10	8	13,960	21,845
	<1	N/A	N/A	<1	N/A	<1	N/A	N/A	<1	<1	<1	1.2
Health care and social assistance	1,047	(D)	1,642	1,916	(D)	10	(D)	(D)	44	39	109,665	160,792
	8.8	N/A	6.1	6.8	N/A	<1	N/A	N/A	1.2	<1	7.4	8.6
Arts, entertainment, and recreation	450	413	715	640	11	6	166	170	(D)	(D)	46,697	55,322
	3.8	3.1	2.7	2.3	<1	<1	1.6	1.7	N/A	N/A	3.2	2.9
Accommodation and food services	705	774	5,495	4,919	59	57	1,059	1,029	(D)	(D)	290,878	276,961
	5.9	5.8	20.6	17.6	1.3	1.2	10.4	10.4	N/A	N/A	19.7	14.8
Other services	578	582	1,315	1,471	44	(D)	431	464	87	147	65,248	89,984
	4.8	4.4	4.9	5.3	0.9	N/A	4.2	4.7	2.4	3.5	4.4	4.8
Government and government enterprises	2,958	3,345	3,905	3,761	219	218	1,508	1,592	555	560	169,089	177,141
	24.8	25.1	14.6	13.4	4.6	4.7	14.8	16.1	15	13.3	11.4	9.4

Sources: BEA 2010a, 2021a

Note: All percentages are rounded to the nearest tenth.

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

Table A-10 (Part 2). Nevada Analysis Area Employment by Sector (2010 and 2021)

Sector	Lincoln County		Nye County		Pershing County		Washoe County		White Pine County		State of Nevada	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	2,109	2,406	14,938	17,889	2,175	2,641	250,062	306,029	6,076	5,513	1,478,054	1,875,709
Wage and salary employment	1,532	1,701	11,061	13,254	1,693	2,091	191,013	232,803	4,085	4,427	1,153,901	1,409,465
Proprietors employment	577	705	3,877	4,635	482	550	59,049	73,226	1,991	1,086	324,153	466,244
Farm proprietors employment	135	141	155	130	120	111	407	357	121	124	3,254	2,982
Nonfarm proprietors employment	442	564	3,722	4,505	362	439	58,642	72,869	1,870	962	320,899	463,262
Farm employment	212	229	245	177	230	215	514	474	194	192	5,354	5,028
Nonfarm employment	1,897	2,177	14,693	17,712	1,945	2,426	249,548	305,555	5,882	5,321	1,472,700	1,870,681
Private nonfarm employment	1,265	1,556	12,622	15,676	1,214	1,742	220,473	276,563	4,381	4,073	1,303,611	1,693,540
By Industry (Number of Jobs/Percentage of Total Employment)												
Forestry, fishing, and related activities	(D)	(D)	(D)	95	(D)	(D)	215	312	(D)	(D)	1,585	1,937
	N/A	N/A	N/A	0.5	N/A	N/A	0.1	0.1	N/A	N/A	<1	<1
Mining (including quarrying and oil and gas extraction)	34	(D)	1,035	1,235	354	885	1,648	1,181	(D)	1,417	17,025	18,132
	1.6	N/A	6.9	6.9	16.3	33.5	<1	<1	N/A	25.7	1.2	1
Utilities	(D)	(D)	109	228	(D)	0	542	541	(D)	(D)	4,542	4,526
	N/A	N/A	0.7	1.3	N/A	0	<1	<1	N/A	N/A	<1	<1
Construction	(D)	(D)	624	988	25	(D)	12,011	22,322	169	183	75,642	120,249
	N/A	N/A	4.2	5.5	1.1	N/A	4.8	7.3	2.8	3.3	5.1	6.4
Manufacturing	(D)	(D)	189	259	89	(D)	11,578	15,447	54	50	41,664	66,978
	N/A	N/A	1.3	1.4	4.1	N/A	4.6	5	<1	<1	2.8	3.6
Wholesale trade	(D)	21	167	209	(D)	(D)	9,824	10,821	75	(D)	37,488	43,982
	N/A	0.9	1.1	1.2	N/A	N/A	3.9	3.5	1.2	N/A	2.5	2.3
Retail trade	244	(D)	1,793	2,365	191	212	25,917	29,485	558	564	152,353	185,306
	11.6	N/A	12	13.2	8.8	8	10.4	9.6	9.2	10.2	10.3	9.9

Sector	Lincoln County		Nye County		Pershing County		Washoe County		White Pine County		State of Nevada	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Transportation and warehousing	42	(D)	247	482	44	(D)	11,413	23,030	(D)	109	53,215	137,427
	2	N/A	1.7	2.7	2	N/A	4.6	7.5	N/A	2	3.6	7.3
Information	(D)	29	134	194	(D)	(D)	3,234	3,657	39	21	17,692	21,137
	N/A	1.2	<1	1.1	N/A	N/A	1.3	1.2	<1	<1	1.2	1.1
Finance and insurance	69	74	480	454	(D)	35	14,356	16,389	109	92	83,023	103,909
	3.3	3.1	3.2	2.5	N/A	1.3	5.7	5.4	1.8	1.7	5.6	5.5
Real estate and rental and leasing	55	83	777	867	(D)	(D)	18,110	22,298	984	169	94,364	110,419
	2.6	3.4	5.2	4.8	N/A	N/A	7.2	7.3	16.2	3.1	6.4	5.9
Professional, scientific, and technical services	286	(D)	1,769	1,862	49	61	16,833	21,167	116	(D)	81,695	109,638
	13.6	N/A	11.8	10.4	2.3	2.3	6.7	6.9	1.9	N/A	5.5	5.8
Management of companies and enterprises	(D)	0	45	60	(D)	(D)	3,920	4,231	41	(D)	21,738	32,573
	N/A	0	<1	<1	N/A	N/A	1.6	1.4	<1	N/A	1.5	1.7
Administrative and support and waste management and remediation services	(D)	(D)	1,005	1,239	(D)	(D)	15,155	20,710	119	165	95,137	132,423
	N/A	N/A	6.7	6.9	N/A	N/A	6.1	6.8	2	3	6.4	7.1
Educational services	8	(D)	(D)	(D)	(D)	9	3,009	3,952	(D)	13	13,960	21,845
	<1	N/A	N/A	N/A	N/A	<1	1.2	1.3	N/A	<1	<1	1.2
Health care and social assistance	70	(D)	(D)	(D)	(D)	(D)	23,455	29,244	(D)	209	109,665	160,792
	3.3	N/A	N/A	N/A	N/A	N/A	9.4	9.6	N/A	3.8	7.4	8.6
Arts, entertainment, and recreation	(D)	(D)	710	715	11	(D)	8,417	8,235	56	62	46,697	55,322
	N/A	N/A	4.8	4	<1	N/A	3.4	2.7	<1	1.1	3.2	2.9
Accommodation and food services	(D)	(D)	1,509	1,697	148	(D)	29,452	29,589	536	537	290,878	276,961
	N/A	N/A	10.1	9.5	6.8	N/A	11.8	9.7	8.8	9.7	19.7	14.8
Other services	(D)	(D)	830	1,090	73	83	11,384	13,952	181	160	65,248	89,984
	N/A	N/A	5.6	6.1	3.4	3.1	4.6	4.6	3	2.9	4.4	4.8
Government and government enterprises	632	621	2,071	2,036	731	684	29,075	28,992	1,501	1,248	169,089	177,141
	30	25.8	13.9	11.4	33.6	25.9	11.6	9.5	24.7	22.6	11.4	9.4

Sources: BEA 2010a, 2021a

Note: All percentages are rounded to the nearest tenth.

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

Table A-11 (Part 1). Nevada Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Churchill County		Elko County		Eureka County		Humboldt County		Lander County		State of Nevada	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	1,045,616	1,407,718	2,526,098	2,844,208	81,408	2,844,208	850,755	945,297	334,080	420,418	126,861,149	189,308,244
Population (persons)	24,820	25,723	49,109	53,915	1,985	53,915	16,588	17,648	5,800	5,798	2,701,967	3,143,991
Per capita personal income (dollars)	42,128	54,726	51,438	52,754	41,012	52,754	51,287	53,564	57,599	72,511	46,952	60,213
Earnings by place of work (thousands of dollars)	691,119	867,906	1,737,203	1,769,968	556,653	561,959	726,249	684,448	316,902	385,183	89,557,454	117,154,278
Wages and salaries (thousands of dollars)	469,384	592,207	1,220,117	1,356,519	452,224	464,229	494,531	517,152	233,796	297,028	63,062,442	84,993,156
Supplement to wages and salaries	153,886	184,610	306,393	306,601	95,679	90,661	132,109	131,763	57,604	66,685	16,119,324	19,168,471
Proprietors' income	67,849	91,089	210,694	106,848	8,749	7,069	99,609	35,533	25,501	21,470	10,375,688	12,992,651
Farm earnings	16,356	29,692	22,595	17,945	3,256	4,787	29,838	7,183	4,256	14,357	181,052	183,317
Nonfarm earnings	674,763	838,214	1,714,608	1,752,023	553,397	557,172	696,411	677,265	312,645	370,826	89,376,402	116,970,961
Private nonfarm earnings	415,207	522,523	1,396,479	1,447,371	535,999	539,648	572,254	533,904	269,484	325,343	73,135,025	100,121,248
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)												
Forestry, fishing, and related activities	(D)	(D)	(D)	4,792	(D)	(D)	(D)	4,687	(D)	(D)	25,259	32,921
	N/A	N/A	N/A	<1	N/A	N/A	N/A	<1	N/A	N/A	<1	<1
Mining (including quarrying and oil and gas extraction)	(D)	4,984	257,123	286,046	505,769	(D)	223,934	256,227	199,327	(D)	1,555,806	1,902,870
	N/A	<1	15	16.3	91.4	N/A	32.2	37.8	63.8	N/A	1.7	1.6
Utilities	18,933	13,116	12,601	21,122	13,122	13,069	(D)	20,348	(D)	(D)	705,186	699,228
	2.8	1.6	<1	1.2	2.4	2.4	N/A	3	N/A	N/A	<1	<1
Construction	37,286	75,550	224,168	160,279	(D)	(D)	80,856	24,925	(D)	(D)	8,579,831	10,028,444
	5.5	9	13.1	9.1	N/A	N/A	11.6	3.7	N/A	N/A	9.6	8.6

Sector	Churchill County		Elko County		Eureka County		Humboldt County		Lander County		State of Nevada	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Manufacturing	20,856	57,362	15,765	13,671	6	(D)	18,205	22,496	(D)	(D)	3,095,377	5,749,340
	3.1	6.8	<1	<1	<1	N/A	2.6	3.3	N/A	N/A	3.5	4.9
Wholesale trade	7,957	14,789	89,795	144,108	(D)	7	10,415	16,026	(D)	(D)	3,087,708	4,297,271
	1.2	1.8	5.2	8.2	N/A	<1	1.5	2.4	N/A	N/A	3.5	3.7
Retail trade	47,235	47,800	111,966	130,709	3,283	(D)	68,691	47,329	20,469	12,320	5,970,063	8,561,779
	7	5.7	6.5	7.5	<1	N/A	9.9	7	6.5	7.5	6.7	7.3
Transportation and warehousing	77,361	86,223	60,814	61,873	(D)	(D)	(D)	30,083	14,681	7,402	3,657,820	6,219,710
	11.5	10.3	3.5	3.5	N/A	N/A	N/A	4.4	4.7	2	4.1	5.3
Information	8,734	5,894	10,371	7,394	(D)	263	4,497	3,392	988	(D)	1,951,646	2,648,163
	1.3	<1	<1	<1	N/A	<1	<1	<1	<1	N/A	2.2	2.3
Finance and insurance	14,167	14,075	22,225	25,583	(D)	(D)	4,372	4,427	(D)	(D)	3,029,518	5,408,498
	2.1	1.7	1.3	1.5	N/A	N/A	<1	<1	N/A	N/A	3.4	4.6
Real estate and rental and leasing	3,528	12,753	18,806	17,407	(D)	(D)	3,988	3,901	(D)	1,629	943,646	2,661,141
	<1	1.5	1.1	1	N/A	N/A	<1	<1	N/A	<1	1.1	2.3
Professional, scientific, and technical services	18,075	29,499	47,501	64,536	467	(D)	(D)	(D)	(D)	(D)	6,378,194	8,637,282
	2.7	5.6	2.8	4.5	<1	N/A	N/A	N/A	N/A	N/A	7.1	8.6
Management of companies and enterprises	311	794	54,082	79,763	(D)	N/A	(D)	(D)	0	N/A	2,717,043	4,841,375
	<1	<1	3.2	5.5	N/A	N/A	N/A	N/A	<1	N/A	3	4.8
Administrative and support and waste management and remediation services	33,240	26,286	26,630	37,767	(D)	(D)	21,462	10,132	(D)	(D)	3,709,803	5,498,172
	4.9	3.1	1.6	2.2	N/A	N/A	3.1	1.5	N/A	N/A	4.2	4.7
Educational services	3,227	(D)	(D)	3,775	(D)	30	(D)	(D)	178	137	678,968	979,134
	<1	N/A	N/A	<1	N/A	<1	N/A	N/A	<1	<1	<1	<1
Health care and social assistance	60,634	(D)	102,271	116,835	(D)	30	(D)	(D)	2,913	1,388	7,906,142	11,228,471
	9	N/A	6	7	N/A	<2	N/A	N/A	<1	<1	8.8	9.6
Arts, entertainment, and recreation	26,209	15,709	80,308	16,615	1,915	189	5,854	3,907	(D)	(D)	2,291,151	3,467,806
	3.9	1.9	4.7	<1	<1	<1	<1	<1	N/A	N/A	2.6	3
Accommodation and food services	14,829	26,792	200,633	195,880	1,021	1,001	31,251	39,165	(D)	(D)	14,004,096	13,589,399
	2.2	3.2	11.7	11.2	<1	<1	4.5	5.8	N/A	N/A	15.7	11.6
Other services (except government and government enterprises)	20,809	19,243	56,062	59,216	751	(D)	17,997	23,308	4,782	9,789	2,847,767	3,670,244
	3.1	2.3	3.3	3.4	<1	N/A	2.6	3.4	1.5	2.6	3.2	3.1

Sector	Churchill County		Elko County		Eureka County		Humboldt County		Lander County		State of Nevada	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Government and government enterprises	259,556	315,691	318,129	304,652	17,397	17,524	124,156	143,361	43,161	45,483	16,241,376	16,849,713
	38.5	37.7	18.6	17.4	3.1	3.1	17.8	21.2	13.8	12.3	18.2	14.4

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.

Table A-11 (Part 2). Nevada Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Lincoln County		Nye County		Pershing County		Washoe County		White Pine County		State of Nevada	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	183,352	241,041	1,817,973	2,287,433	199,032	267,534	23,193,051	35,246,181	484,890	516,409	126,861,149	189,308,244
Population (persons)	5,333	4,525	43,932	53,450	6,736	6,741	422,183	493,392	10,017	9,182	2,701,967	3,143,991
Per capita personal income (dollars)	34,380	53,269	41,382	42,796	29,548	39,688	54,936	71,436	48,407	56,241	46,952	60,213
Earnings by place of work (thousands of dollars)	109,690	124,265	1,039,611	2,287,433	131,255	190,461	15,833,956	20,077,626	378,205	394,944	89,557,454	117,154,278
Wages and salaries (thousands of dollars)	68,970	78,272	625,223	753,277	89,514	144,050	10,188,037	14,546,215	223,264	282,365	63,062,442	84,993,156
Supplement to wages and salaries	25,590	26,744	164,358	179,460	32,369	40,376	2,794,286	3,233,297	76,582	79,354	16,119,324	19,168,471
Proprietors' income	15,131	19,249	250,029	151,629	9,372	6,035	2,851,633	2,298,114	78,359	33,225	10,375,688	12,992,651
Farm earnings	1,271	14,856	37,153	39,155	10,334	12,480	10,576	14,358	1,992	10,140	181,052	183,317
Nonfarm earnings	108,419	109,409	1,002,458	1,045,211	120,922	177,981	15,823,380	384,804	376,213	183,317	89,376,402	116,970,961
Private nonfarm earnings	61,093	62,405	825,141	895,543	60,877	119,742	13,073,857	268,747	241,037	116,970,961	73,135,025	100,121,248
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)												
Forestry, fishing, and related activities	(D)	(D)	(D)	2,516	(D)	(D)	1,230	4,577	(D)	(D)	25,259	32,921
	N/A	N/A	N/A	<1	N/A	N/A	<1	<1	N/A	N/A	<1	<1
Mining (including quarrying and oil and gas extraction)	629	(D)	103,288	141,117	33,086	97,951	92,950	49,839	(D)	160,370	1,555,806	1,902,870
	<1	N/A	10.3	13.5	27.4	55	<1	<1	N/A	41.7	1.7	1.6

Sector	Lincoln County		Nye County		Pershing County		Washoe County		White Pine County		State of Nevada	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Utilities	(D)	(D)	17,321	34,582	(D)	N/A	90,165	88,439	(D)	(D)	705,186	699,228
	N/A	N/A	1.7	3.3	N/A	N/A	<1	<1	N/A	N/A	<1	<1
Construction	(D)	(D)	29,504	49,383	602	(D)	1,440,852	2,152,457	21,056	19,719	8,579,831	10,028,444
	N/A	N/A	2.9	4.7	<1	N/A	9.1	10.7	5.6	5.1	9.6	8.6
Manufacturing	(D)	(D)	7,033	18,090	3,303	(D)	921,157	1,279,737	725	980	3,095,377	5,749,340
	N/A	N/A	<1	1.7	2.7	N/A	5.8	6.4	<1	<1	3.5	4.9
Wholesale trade	(D)	463	7,786	10,516	(D)	(D)	792,398	986,909	3,779	(D)	3,087,708	4,297,271
	N/A	<1	<1	1	N/A	N/A	5	4.9	1	N/A	3.5	3.7
Retail trade	11,551	(D)	225,854	93,746	6,820	5,290	901,792	1,297,884	46,136	15,954	5,970,063	8,561,779
	10.7	N/A	22.5	9	5.6	3	5.7	6.5	12.3	4.1	6.7	7.3
Transportation and warehousing	3,307	(D)	14,373	36,494	2,239	(D)	753,073	1,401,811	(D)	9,277	3,657,820	6,219,710
	3.1	N/A	1.4	3.5	1.9	N/A	4.8	7	N/A	2.4	4.1	5.3
Information	(D)	2,243	6,460	10,293	(D)	(D)	597,314	417,008	1,528	1,427	1,951,646	2,648,163
	N/A	2.1	<1	1	N/A	N/A	3.8	2.1	<1	<1	2.2	2.3
Finance and insurance	2,295	2,267	7,396	10,005	(D)	616	636,871	1,082,367	4,016	3,371	3,029,518	5,408,498
	2.1	2.1	<1	1	N/A	<1	4	5.4	1.1	<1	3.4	4.6
Real estate and rental and leasing	382	226	3,936	15,496	(D)	(D)	126,032	250,235	-179	2,160	943,646	2,661,141
	<1	<1	<1	1.5	N/A	N/A	<1	1.2	<1	<1	1.1	2.3
Professional, scientific, and technical services	21,487	(D)	184,622	191,487	1,544	1,701	1,214,916	1,893,203	2,553	(D)	6,378,194	8,637,282
	19.8	N/A	18.4	18.3	1.3	1.4	7.7	10.9	<1	N/A	7.1	8.6
Management of companies and enterprises	(D)	N/A	2,437	1,757	(D)	(D)	460,610	727,211	3,485	(D)	2,717,043	4,841,375
	N/A	N/A	<1	<1	N/A	N/A	2.9	4.2	<1	N/A	3	4.8
Administrative and support and waste management and remediation services	(D)	(D)	78,035	78,698	(D)	(D)	589,615	1,063,768	2,766	5,713	3,709,803	5,498,172
	N/A	N/A	7.8	7.5	N/A	N/A	3.7	5.3	<1	1.5	4.2	4.7
Educational services	11	(D)	(D)	(D)	(D)	2	114,799	164,178	(D)	50	678,968	979,134
	<1	N/A	N/A	N/A	N/A	<1	<1	<1	N/A	<1	<1	<1
Health care and social assistance	2,628	(D)	(D)	(D)	(D)	(D)	1,762,921	2,172,356	(D)	8,643	7,906,142	11,228,471
	2.4	N/A	N/A	N/A	N/A	N/A	11.1	10.8	N/A	2.2	8.8	9.6
Arts, entertainment, and recreation	(D)	(D)	20,609	34,751	1,493	(D)	1,040,008	399,923	23,945	2,490	2,291,151	3,467,806
	N/A	N/A	2.1	3.3	1.2	N/A	6.6	2	6.4	<1	2.6	3
Accommodation and food services	(D)	(D)	39,105	48,157	2,915	(D)	1,018,057	1,226,612	13,492	17,692	14,004,096	13,589,399
	N/A	N/A	3.9	4.6	2.4	N/A	6.4	6.1	3.6	4.6	15.7	11.6
Other services (except government and government enterprises)	(D)	(D)	23,795	30,928	2,606	1,535	519,095	666,499	7,259	6,079	2,847,767	3,670,244
	N/A	N/A	2.4	3	2.2	<1	3.3	3.3	1.9	1.6	3.2	3.1

Sector	Lincoln County		Nye County		Pershing County		Washoe County		White Pine County		State of Nevada	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Government and government enterprises	47,326	47,004	177,317	149,668	60,045	58,239	2,749,522	2,738,255	135,176	116,057	16,241,376	16,849,713
	43.7	43	17.7	14.3	49.7	32.7	17.4	13.6	35.9	30.2	18.2	14.4

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.

Table A-12. North Dakota Analysis Area Employment by Sector (2010 and 2021)

Sector	Bowman County		Slope County		State of North Dakota	
	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	2,428	2,228	486	470	503,813	566,374
Wage and salary employment	1,572	1,453	211	156	392,040	434,811
Proprietors employment	856	775	275	314	111,773	131,563
Farm proprietors employment	306	278	196	184	26,923	22,987
Nonfarm proprietors employment	550	497	79	130	84,850	108,576
Farm employment	366	350	226	222	31,652	29,425
Nonfarm employment	2,062	1,878	260	248	472,161	536,949
Private nonfarm employment	1,797	1,603	224	207	387,382	447,439
By Industry (Number of Jobs/Percentage of Total Employment)						
Forestry, fishing, and related activities	(D)	(D)	(D)	(D)	4,401	4,887
	N/A	N/A	N/A	N/A	<1	<1
Mining (including quarrying and oil and gas extraction)	129	50	67	(D)	13,858	18,022
	5.3	2.2	13.8	N/A	2.8	3.2
Utilities	(D)	(D)	1	1	3,502	3,388
	N/A	N/A	<1	<1	<1	<1
Construction	161	(D)	6	7	29,925	34,650
	6.6	N/A	1.2	1.5	5.9	6.1
Manufacturing	31	(D)	3	7	23,815	27,786
	1.3	N/A	<1	1.5	4.7	4.9
Wholesale trade	201	198	(D)	3	22,116	23,976
	8.3	8.9	N/A	<1	4.4	4.2
Retail trade	260	232	6	12	53,725	56,544
	10.7	10.4	1.2	2.6	10.7	10
Transportation and warehousing	(D)	(D)	(D)	14	16,793	25,417
	N/A	N/A	N/A	3.0	3.3	4.5

Sector	Bowman County		Slope County		State of North Dakota	
	2010	2021	2010	2021	2010	2021
Information	34	17	2	3	8,152	6,496
	1.4	<1	<1	<1	1.6	1.1
Finance and insurance	(D)	(D)	9	14	24,416	28,261
	N/A	N/A	1.9	3	4.8	5
Real estate and rental and leasing	(D)	(D)	7	15	16,761	26,852
	N/A	N/A	1.4	3.2	3.3	4.7
Professional, scientific, and technical services	69	86	(D)	8	18,884	23,214
	2.8	3.9	N/A	1.7	3.7	4.1
Management of companies and enterprises	(D)	(D)	0	0	4,517	4,590
	N/A	N/A	0	0	<1	<1
Administrative and support and waste management and remediation services	(D)	(D)	6	8	16,413	18,147
	N/A	N/A	1.2	1.7	3.3	3.2
Educational services	11	11	(D)	3	5,786	6,540
	<1	<1	N/A	<1	1.1	1.2
Health care and social assistance	259	267	4	6	59,475	69,282
	10.7	12	<1	1.3	11.8	12.2
Arts, entertainment, and recreation	(D)	25	3	5	7,080	9,389
	N/A	1.1	<1	1.1	1.4	1.7
Accommodation and food services	(D)	134	(D)	(D)	32,902	34,974
	N/A	6	N/A	N/A	6.5	6.2
Other services	111	131	(D)	(D)	24,861	25,024
	4.6	5.9	N/A	N/A	4.9	4.4
Government and government enterprises	265	275	36	41	84,779	89,510
	10.9	12.3	7.4	8.7	16.8	15.8

Sources: BEA 2010a, 2021a
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.

Table A-13. North Dakota Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Bowman County		Slope County		State of North Dakota	
	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	217,582	223,731	64,116	55,386	37,418,041	50,002,860
Population (persons)	3,142	2,903	731	690	675,054	774,948
Per capita personal income (dollars)	69,249	77,069	87,710	80,270	55,429	64,524
Earnings by place of work (thousands of dollars)	139,327	130,222	50,698	31,588	28,755,681	36,463,231
Wages and salaries (thousands of dollars)	66,803	64,191	13,782	8,241	18,460,145	24,245,559
Supplement to wages and salaries	15,006	15,293	2,493	2,035	4,458,848	5,707,439
Proprietors' income	57,518	50,738	34,423	21,312	5,836,687	6,510,233
Farm earnings	36,604	29,994	32,497	16,191	2,658,021	2,799,968
Nonfarm earnings	102,723	100,228	18,201	15,397	26,097,660	33,663,263
Private nonfarm earnings	88,809	85,557	16,937	13,444	20,650,976	27,373,788
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)						
Forestry, fishing, and related activities	(D)	(D)	(D)	(D)	163,720	172,947
	N/A	N/A	N/A	N/A	<1	<1
Mining (including quarrying and oil and gas extraction)	10,739	4,212	7,086	(D)	1,343,011	1,914,580
	10.5	4.2	38.9	N/A	5.1	5.7
Utilities	(D)	(D)	-24	(185)	462,965	525,295
	N/A	N/A	<1	-1.2	1.8	1.6
Construction	12,139	(D)	619	615	2,294,695	2,576,881
	11.8	N/A	3.4	4	8.8	7.7
Manufacturing	1,545	(D)	63	225	1,639,806	2,358,421
	1.5	N/A	<1	1.5	6.3	7
Wholesale trade	16,707	18,447	(D)	1,023	1,834,880	2,238,107
	16.3	18.4	N/A	6.6	7	6.6
Retail trade	8,932	8,070	661	1,352	1,822,570	2,227,319
	8.7	8.1	3.6	8.8	7	6.6
Transportation and warehousing	(D)	(D)	(D)	784	1,205,636	1,821,656
	N/A	N/A	N/A	5.1	4.6	5.4
Information	1,390	138	187	(22)	640,038	627,386
	1.4	<1	1	<-1	2.5	1.3
Finance and insurance	(D)	(D)	94	84	1,272,817	1,748,208
	N/A	N/A	<1	<1	4.9	5.2

Sector	Bowman County		Slope County		State of North Dakota	
	2010	2021	2010	2021	2010	2021
Real estate and rental and leasing	(D)	(D)	73	315	723,300	1,069,593
	N/A	N/A	<1	<1	2.8	<1
Professional, scientific, and technical services	3,528	4,599	(D)	222	1,128,010	1,602,197
	3.4	4.6	N/A	1.4	4.3	4.8
Management of companies and enterprises	(D)	(D)	0	N/A	418,491	519,749
	N/A	N/A	<1	N/A	1.6	1.5
Administrative and support and waste management and remediation services	(D)	(D)	109	380	531,624	780,464
	N/A	N/A	<1	2.5	2	2.3
Educational services	258	170	(D)	64	146,655	183,430
	<1	<1	N/A	<1	<1	<1
Health care and social assistance	12,318	14,332	144	169	3,297,522	4,746,838
	12	14.3	<1	1.1	12.6	14.1
Arts, entertainment, and recreation	(D)	333	28	61	105,846	178,155
	N/A	<1	<1	<1	<1	<1
Accommodation and food services	(D)	2,770	(D)	(D)	672,207	995,010
	N/A	2.8	N/A	N/A	2.6	3
Other services (except government and government enterprises)	4,949	5,624	(D)	(D)	947,184	1,087,552
	4.8	5.6	N/A	N/A	3.6	3.2
Government and government enterprises	13,914	14,671	1,265	1,953	5,446,684	6,289,475
	13.5	14.6	6.9	12.7	20.9	18.7

Sources: BEA 2010b, 2021b

Note: All percentages are rounded to the nearest tenth.

All 2010 dollar values were adjusted for inflation.

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

Table A-14 (Part 1). Oregon Analysis Area Employment by Sector (2010 and 2021)

Sector	Baker County		Crook County		Deschutes County		Grant County		State of Oregon	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	8,518	8,759	9,036	11,217	90,538	130,681	3,778	3,863	2,174,324	2,559,454
Wage and salary employment	5,600	5,988	5,955	7,401	62,259	89,924	2,557	2,642	1,676,367	1,952,352
Proprietors employment	2,918	2,771	3,081	3,816	28,279	40,757	1,221	1,221	497,957	607,102
Farm proprietors employment	614	632	565	572	1,304	1,310	372	381	34,460	34,950
Nonfarm proprietors employment	2,304	2,139	2,516	3,244	26,975	39,447	849	840	463,497	572,152
Farm employment	906	953	773	781	1,617	1,677	486	501	67,704	69,840
Nonfarm employment	7,612	7,806	8,263	10,436	88,921	129,004	3,292	3,362	2,106,620	2,489,614
Private nonfarm employment	6,395	6,645	7,057	9,113	80,104	119,197	2,223	2,331	1,818,680	2,201,646
By Industry (Number of Jobs/Percentage of Total Employment)										
Forestry, fishing, and related activities	(D)	(D)	245	(D)	760	980	221	(D)	29,117	32,073
	N/A	N/A	2.7	N/A	<1	<1	5.8	N/A	1.3	1.3
Mining (including quarrying and oil and gas extraction)	(D)	(D)	48	(D)	311	278	20	(D)	4,836	4,442
	N/A	N/A	<1	N/A	<1	<1	<1	N/A	<1	<1
Utilities	75	118	(D)	(D)	318	348	(D)	(D)	4,863	5,199
	<1	1.3	N/A	N/A	<1	<1	N/A	N/A	<1	<1
Construction	432	479	495	1,296	6,170	11,503	209	(D)	102,550	150,262
	5.1	5.5	5.5	11.6	6.8	8.8	5.5	N/A	4.7	5.9
Manufacturing	573	680	786	828	4,318	6,795	(D)	(D)	176,802	201,963
	6.7	7.8	8.7	7.4	4.8	5.2	N/A	N/A	8.1	7.9
Wholesale trade	114	119	753	373	1,846	2,930	53	49	80,544	81,845
	1.3	1.4	8.3	3.3	2	2.2	1.4	1.3	3.7	3.2
Retail trade	998	1,106	828	982	11,532	14,930	364	388	227,763	259,680
	11.7	12.6	9.2	8.8	12.7	11.4	9.6	10.0	10.5	10.1
Transportation and warehousing	248	220	(D)	(D)	1,365	4,026	(D)	(D)	61,071	123,175
	2.9	2.5	N/A	N/A	1.5	3.1	N/A	N/A	2.8	4.8
Information	94	66	51	412	1,811	2,248	49	67	40,248	43,247
	1.1	<1	<1	3.7	2	1.7	1.3	1.7	1.9	1.7

Sector	Baker County		Crook County		Deschutes County		Grant County		State of Oregon	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Finance and insurance	269	221	214	185	4,111	5,903	84	74	90,623	101,551
	3.2	2.5	2.4	1.6	4.5	4.5	2.2	1.9	4.2	4.0
Real estate and rental and leasing	390	414	461	665	6,955	9,270	(D)	100	102,732	125,673
	4.6	4.7	5.1	5.9	7.7	7.1	N/A	2.6	4.7	4.9
Professional, scientific, and technical services	313	336	293	592	6,307	10,665	98	119	131,571	176,991
	3.7	3.8	3.2	5.3	7	8.2	2.6	3.1	6.1	6.9
Management of companies and enterprises	58	28	93	44	331	1,311	0	(D)	31,608	50,637
	<1	<1	1	<1	<1	1	0	N/A	1.5	2
Administrative and support and waste management and remediation services	208	253	296	454	5,482	6,825	120	(D)	111,105	129,993
	2.4	2.9	3.3	4	6.1	5.2	3.2	N/A	5.1	5.1
Educational services	51	(D)	71	108	1,414	2,009	(D)	8	53,197	49,509
	<1	N/A	<1	<1	1.6	1.5	N/A	<1	2.4	1.9
Health care and social assistance	1,020	(D)	697	880	10,817	16,390	(D)	228	252,065	308,939
	12	N/A	7.7	7.8	11.9	12.5	N/A	5.9	11.6	12.1
Arts, entertainment, and recreation	(D)	99	145	161	3,084	4,070	(D)	74	52,546	57,662
	N/A	1.1	1.6	1.4	3.4	3.1	N/A	1.9	2.4	2.3
Accommodation and food services	(D)	637	518	833	7,950	11,327	(D)	217	153,331	173,376
	N/A	7.3	5.7	7.4	8.8	8.7	N/A	5.6	7.1	6.8
Other services	531	466	514	639	5,222	7,389	169	174	112,108	125,429
	6.2	5.3	5.7	5.7	5.8	5.7	4.5	4.5	5.2	4.9
Government and government enterprises	1,217	1,161	1,206	1,323	8,817	9,807	1,069	1,031	287,940	287,968
	14.3	13.3	13.3	11.8	9.7	7.5	28.3	26.7	13.2	11.3

Sources: BEA 2010a, 2021a

Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.

Table A-14 (Part 2). Oregon Analysis Area Employment by Sector (2010 and 2021)

Sector	Harney County		Lake County		Malheur County		Union County		State of Oregon	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	4,166	4,413	3,809	3,947	17,199	17,561	14,350	14,827	2,174,324	2,559,454
Wage and salary employment	2,677	2,920	2,533	2,742	13,622	13,888	10,275	10,776	1,676,367	1,952,352
Proprietors employment	1,489	1,493	1,276	1,205	3,577	3,673	4,075	4,051	497,957	607,102
Farm proprietors employment	469	490	334	336	1,099	1,104	830	847	34,460	34,950
Nonfarm proprietors employment	1,020	1,003	942	869	2,478	2,569	3,245	3,204	463,497	572,152
Farm employment	787	866	610	630	2,141	2,254	1,065	1,119	67,704	69,840
Nonfarm employment	3,379	3,547	3,199	3,317	15,058	15,307	13,285	13,708	2,106,620	2,489,614
Private nonfarm employment	2,298	2,507	2,188	2,174	11,629	12,028	10,857	11,492	1,818,680	2,201,646
By Industry (Number of Jobs/Percentage of Total Employment)										
Forestry, fishing, and related activities	170	180	(D)	(D)	(D)	(D)	(D)	(D)	29,117	32,073
	4.1	4.1	N/A	N/A	N/A	N/A	N/A	N/A	1.3	1.3
Mining (including quarrying and oil and gas extraction)	28	22	(D)	(D)	(D)	(D)	(D)	(D)	4,836	4,442
	<1	<1	N/A	N/A	N/A	N/A	N/A	N/A	<1	<1
Utilities	(D)	(D)	(D)	(D)	32	45	(D)	(D)	4,863	5,199
	N/A	N/A	N/A	N/A	<1	<1	N/A	N/A	<1	<1
Construction	(D)	213	164	178	367	458	711	850	102,550	150,262
	N/A	4.8	4.3	4.5	2.1	2.6	5	5.7	4.7	5.9
Manufacturing	(D)	41	201	250	1,028	1,133	1,156	1,364	176,802	201,963
	N/A	<1	5.3	6.3	6	6.5	8.1	9.2	8.1	7.9
Wholesale trade	51	71	67	56	767	525	256	(D)	80,544	81,845
	1.2	1.6	1.8	1.4	4.5	3.0	1.8	N/A	3.7	3.2
Retail trade	452	505	389	346	2,159	2,564	1,798	1,827	227,763	259,680
	10.8	11.4	10.2	8.8	12.6	14.6	12.5	12.3	10.5	10.1
Transportation and warehousing	(D)	(D)	(D)	(D)	463	488	(D)	512	61,071	123,175
	N/A	N/A	N/A	N/A	2.7	2.8	N/A	3.5	2.8	4.8
Information	31	20	(D)	25	132	87	158	130	40,248	43,247
	<1	<1	N/A	<1	<1	<1	1.1	<1	1.9	1.7

Sector	Harney County		Lake County		Malheur County		Union County		State of Oregon	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Finance and insurance	78	58	48	50	350	336	479	494	90,623	101,551
	1.9	1.3	1.3	1.3	2	1.9	3.3	3.3	4.2	4
Real estate and rental and leasing	116	143	120	142	444	521	435	514	102,732	125,673
	2.8	3.2	3.2	3.6	2.6	3	3	3.5	4.7	4.9
Professional, scientific, and technical services	(D)	131	105	122	379	415	465	664	131,571	176,991
	N/A	3	2.8	3.1	2.2	2.4	3.2	4.5	6.1	6.9
Management of companies and enterprises	(D)	0	(D)	0	(D)	57	66	75	31,608	50,637
	N/A	0	N/A	0	N/A	<1	<1	<1	1.5	2.0
Administrative and support and waste management and remediation services	117	124	(D)	90	(D)	411	358	418	111,105	129,993
	2.8	2.8	N/A	2.3	N/A	2.3	2.5	2.8	5.1	5.1
Educational services	(D)	(D)	(D)	17	80	(D)	102	83	53,197	49,509
	N/A	N/A	N/A	<1	<1	N/A	<1	<1	2.4	1.9
Health care and social assistance	(D)	(D)	(D)	153	1,950	(D)	1,969	1,963	252,065	308,939
	N/A	N/A	N/A	3.9	11.3	N/A	13.7	13.2	11.6	12.1
Arts, entertainment, and recreation	(D)	32	25	(D)	112	(D)	275	260	52,546	57,662
	N/A	<1	<1	N/A	<1	N/A	1.9	1.8	2.4	2.3
Accommodation and food services	(D)	349	248	(D)	1,136	(D)	964	974	153,331	173,376
	N/A	7.9	6.5	N/A	6.6	N/A	6.7	6.6	7.1	6.8
Other services	203	196	172	190	772	783	718	710	112,108	125,429
	4.9	4.4	4.5	4.8	4.5	4.5	5	4.8	5.2	4.9
Government and government enterprises	1,081	1,040	1,011	1,143	3,429	3,279	2,428	2,216	287,940	287,968
	25.9	23.6	26.5	29	19.9	18.7	16.9	14.9	13.2	11.3

Sources: BEA 2010a, 2021a

Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.

Table A-15 (Part 1). Oregon Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Baker County		Crook County		Deschutes County		Grant County		State of Oregon	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	582,232	810,465	749,567	1,305,173	6,902,317	13,873,903	280,106	369,927	173,174,835	261,546,508
Population (persons)	16,126	16,847	20,878	25,739	157,697	204,801	7,466	7,272	3,837,611	4,246,155
Per capita personal income (dollars)	36,105	48,107	35,902	50,708	43,770	67,743	37,517	50,870	45,126	61,596
Earnings by place of work (thousands of dollars)	301,821	381,282	383,710	674,451	4,068,909	8,470,243	151,652	185,981	124,668,782	178,777,570
Wages and salaries (thousands of dollars)	214,392	260,615	269,772	466,459	2,818,266	5,224,799	101,129	120,530	88,738,555	126,291,390
Supplement to wages and salaries	70,061	83,293	78,715	118,207	770,130	1,246,968	39,292	47,284	23,523,615	30,493,856
Proprietors' income	15,195	37,374	7,691	89,785	24,135	1,998,476	5,004	18,167	81,335	21,992,324
Farm earnings	5,565	14,908	1,860	5,905	15,694	14,522	1,335	3,640	1,315,858	1,461,517
Nonfarm earnings	307,386	366,374	385,570	668,546	4,084,604	8,484,765	152,987	182,341	123,352,924	177,316,053
Private nonfarm earnings	217,289	(D)	289,698	(D)	3,376,445	49,181	73,589	(D)	99,057,914	1,851,520
By Industry (Total Income/Percentage of Total Nonfarm Income)										
Forestry, fishing, and related activities	(D)	(D)	12,212	(D)	18,027	49,181	6,751	(D)	1,380,411	1,851,520
	N/A	N/A	3.2	<1	<1	N/A	4.4	5	1.1	
Mining (including quarrying and oil and gas extraction)	(D)	(D)	854	(D)	6,872	5,652	177	(D)	122,696	166,013
	N/A	N/A	<1	N/A	<1	<1	<1	N/A	<1	<1
Utilities	9,160	16,467	(D)	(D)	40,928	48,538	(D)	(D)	681,407	1,071,517
	3	4.5	N/A	N/A	1	<1	N/A	N/A	<1	<1
Construction	15,080	18,820	17,449	113,717	235,235	1,274,736	11,827	(D)	6,662,320	12,849,056
	4.9	5.1	4.5	17	5.8	15	7.7	N/A	5.4	7.2
Manufacturing	32,518	41,989	38,947	48,705	252,786	453,159	(D)	(D)	15,388,320	18,808,215
	10.6	11.5	10.1	7.3	6.2	5.3	N/A	N/A	12.5	10.6
Wholesale trade	4,184	5,145	63,952	23,232	117,509	263,742	2,228	2,245	7,572,878	8,255,686
	1.4	1.4	16.6	3.5	2.9	3.1	1.5	1.2	6.1	4.7
Retail trade	25,943	34,671	19,022	27,590	387,348	588,210	9,835	9,860	8,535,431	11,605,989
	8.4	9.5	4.9	4.1	9.5	6.9	6.4	5.4	6.9	6.5

Sector	Baker County		Crook County		Deschutes County		Grant County		State of Oregon	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Transportation and warehousing	12,571	13,185	(D)	(D)	65,858	155,348	(D)	(D)	3,986,429	5,944,344
	4.1	3.6	N/A	N/A	1.6	1.8	N/A	N/A	3.2	3.4
Information	6,449	3,561	2,843	108,373	119,487	252,075	3,266	4,383	3,479,281	5,258,138
	2.1	1	<1	16.2	2.9	3	2.1	2.4	2.8	3
Finance and insurance	8,082	6,087	6,167	10,163	214,438	379,337	3,626	3,154	6,058,482	7,752,690
	2.6	1.7	1.6	1.5	5.2	4.5	2.4	1.7	4.9	4.4
Real estate and rental and leasing	2,870	10,074	3,092	20,157	90,947	554,891	(D)	4,848	1,384,823	6,380,389
	<1	2.7	<1	3	2.2	6.5	N/A	2.7	1.1	3.6
Professional, scientific, and technical services	10,866	13,069	8,748	27,816	274,179	749,586	2,537	4,512	8,848,550	14,467,197
	3.5	3.6	2.3	4.2	6.7	8.8	1.7	2.5	7.2	8.2
Management of companies and enterprises	2,719	(69)	5,845	1,905	28,178	118,816	0	(D)	3,567,995	9,025,320
	<1	<1	1.5	<1	<1	1.4	<1	N/A	2.9	5.1
Administrative and support and waste management and remediation services	4,340	9,971	7,478	22,167	203,908	322,819	2,794	(D)	4,472,827	6,670,856
	1.4	2.7	1.9	3.3	5	3.8	1.8	N/A	3.6	3.8
Educational services	1,491	(D)	1,471	2,538	36,449	63,387	(D)	57	1,729,919	1,930,682
	<1	N/A	<1	<1	<1	<1	N/A	<1	1.4	1.1
Health care and social assistance	46,848	(D)	36,447	52,789	837,289	1,399,662	(D)	9,265	15,726,462	21,549,412
	15.2	N/A	9.5	7.9	20.5	16.5	N/A	5.1	12.7	12.2
Arts, entertainment, and recreation	(D)	954	1,684	1,134	50,707	105,942	(D)	2,015	867,453	1,687,718
	N/A	<1	<1	<1	1.2	1.2	N/A	1.1	<1	1
Accommodation and food services	(D)	18,454	10,516	36,061	207,924	471,343	(D)	4,763	3,865,630	7,068,289
	N/A	5	2.7	5.4	5.1	5.6	N/A	2.6	3.1	4
Other services (except government and government enterprises)	16,706	12,302	18,357	24,937	188,375	310,177	5,628	5,661	4,726,598	6,004,113
	5.4	3.4	4.8	3.7	4.6	3.7	3.7	3.1	3.8	3.4
Government and government enterprises	90,096	95,372	95,872	120,545	708,159	918,164	79,397	88,819	24,295,009	28,968,909
	29.3	26	24.9	18	17.3	10.8	51.9	48.7	19.7	16.3

Sources: BEA 2010b, 2021b

Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.
All 2010 dollar values were adjusted for inflation.

Table A-15 (Part 2). Oregon Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Harney County		Lake County		Malheur County		Union County		State of Oregon	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	259,534	373,121	274,573	389,518	898,960	1,233,592	987,132	1,311,986	173,174,835	261,546,508
Population (persons)	7,406	7,575	7,880	8,276	31,364	31,693	25,715	26,212	3,837,611	4,246,155
Per capita personal income (dollars)	35,044	49,257	34,845	47,066	28,663	38,923	38,388	50,053	45,126	61,596
Earnings by place of work (thousands of dollars)	141,442	212,815	154,886	208,732	730,320	882,336	614,040	722,893	124,668,782	178,777,570
Wages and salaries (thousands of dollars)	101,457	121,528	104,577	126,055	509,566	592,114	415,336	506,981	88,738,555	126,291,390
Supplement to wages and salaries	37,835	46,171	38,217	49,840	173,009	194,947	135,842	155,902	23,523,615	30,493,856
Proprietors' income	10,798	45,116	4,305	32,837	15,359	95,275	10,390	60,010	81,335	21,992,324
Farm earnings	213	27,818	7,203	22,023	21,527	54,823	1,703	9,612	1,315,858	1,461,517
Nonfarm earnings	141,655	184,997	147,683	186,709	708,793	827,513	615,743	713,281	123,352,924	177,316,053
Private nonfarm earnings	63,193	9,239	70,731	(D)	454,488	(D)	444,957	(D)	99,057,914	1,851,520
By Industry (Total income/percent of total nonfarm income)										
Forestry, fishing, and related activities	3,950	9,239	(D)	(D)	(D)	(D)	(D)	(D)	1,380,411	1,851,520
	2.8	N/A	N/A	N/A	N/A	N/A	N/A	1	1.1	1
Mining (including quarrying and oil and gas extraction)	45	38	(D)	(D)	(D)	(D)	(D)	(D)	122,696	166,013
	<1	<1	N/A	N/A	N/A	N/A	N/A	N/A	<1	<1
Utilities	(D)	(D)	(D)	(D)	2,128	4,727	(D)	(D)	681,407	1,071,517
	N/A	N/A	N/A	N/A	<1	<1	N/A	N/A	<1	<1
Construction	(D)	7,687	8,678	8,887	17,390	21,075	40,218	45,071	6,662,320	12,849,056
	N/A	4.2	5.9	4.8	2.5	2.5	6.5	6.3	5.4	7.2
Manufacturing	(D)	511	10,024	12,882	48,975	71,216	70,469	91,796	15,388,320	18,808,215
	N/A	<1	6.8	6.9	6.9	8.6	11.4	129	12.5	10.6
Wholesale trade	1,759	4,335	3,285	3,433	38,594	30,555	13,477	(D)	7,572,878	8,255,686
	1.2	2.3	2.2	1.8	5.4	3.7	2.2	N/A	6.1	4.7
Retail trade	11,926	17,455	10,848	9,903	72,247	96,018	51,823	60,842	8,535,431	11,605,989
	8.4	9.4	7.3	5.3	10.2	11.6	8.4	8.5	6.9	6.5

Sector	Harney County		Lake County		Malheur County		Union County		State of Oregon	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Transportation and warehousing	(D)	(D)	(D)	(D)	23,570	26,854	(D)	37,986	3,986,429	5,944,344
	N/A	N/A	N/A	N/A	3.3	3.2	N/A	5.3	3.2	3.4
Information	1,722	726	(D)	1,778	5,714	4,867	7,483	6,766	3,479,281	5,258,138
	1.2	<1	N/A	1	<1	<1	1.2	<1	2.8	3
Finance and insurance	2,491	1,779	1,585	2,186	16,475	15,723	16,627	16,534	6,058,482	7,752,690
	1.8	1	1.1	1.2	2.3	1.9	2.7	2.3	4.9	4.4
Real estate and rental and leasing	1,335	2,191	1,266	5,724	6,271	23,381	7,592	15,552	1,384,823	6,380,389
	<1	1.2	<1	3.1	<1	1.8	1.2	2.2	1.1	3.6
Professional, scientific, and technical services	(D)	4,243	3,563	3,898	17,407	19,245	16,729	27,247	8,848,550	14,467,197
	N/A	2.3	2.4	2.1	2.5	2.3	2.7	3.8	7.2	8.2
Management of companies and enterprises	(D)	N/A	(D)	N/A	(D)	927	3,548	7,280	3,567,995	9,025,320
	N/A	N/A	N/A	N/A	N/A	<1	<1	1	2.9	5.1
Administrative and support and waste management and remediation services	1,995	4,534	(D)	2,790	(D)	11,451	9,030	11,173	4,472,827	6,670,856
	1.4	2.5	N/A	1.5	N/A	1.4	1.5	1.6	3.6	3.8
Educational services	(D)	(D)	(D)	501	1,622	(D)	1,285	1,564	1,729,919	1,930,682
	N/A	N/A	N/A	<1	<1	N/A	<1	<1	1.4	1.1
Health care and social assistance	(D)	(D)	(D)	6,019	95,599	(D)	102,064	119,424	15,726,462	21,549,412
	N/A	N/A	N/A	3.2	13.5	N/A	16.6	16.7	12.7	12.2
Arts, entertainment, and recreation	(D)	455	94	(D)	1,191	(D)	1,733	4,056	867,453	1,687,718
	N/A	<1	<1	N/A	<1	N/A	<1	<1	<1	1
Accommodation and food services	(D)	15,785	3,732	(D)	25,484	(D)	19,465	26,361	3,865,630	7,068,289
	N/A	8.5	2.5	N/A	3.6	N/A	3.2	3.7	3.1	4
Other services (except government and government enterprises)	4,288	5,581	3,561	5,606	25,437	28,353	21,329	23,694	4,726,598	6,004,113
	3	3	2.4	3	3.6	3.4	3.5	3.3	3.8	3.4
Government and government enterprises	78,462	89,911	76,953	100,242	254,304	287,852	170,786	181,584	24,295,009	28,968,909
	55.4	48.6	52.1	53.7	35.9	24.8	27.7	25.5	19.7	16.3

Sources: BEA 2010b, 2021b

Note: (D) represents data not shown to avoid disclosure of confidential information; estimates are included in higher-level totals.
(N/A) means data are not available, or no information was given.
All 2010 dollar values were adjusted for inflation.

Table A-16. South Dakota Analysis Area Employment by Sector (2010 and 2021)

Sector	Butte County		Harding County		State of South Dakota	
	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	5,094	5,299	1,020	1,140	558,135	622,335
Wage and salary employment	2,997	2,962	551	550	423,052	462,954
Proprietors employment	2,097	2,337	469	590	135,083	159,381
Farm proprietors employment	545	511	212	207	27,400	25,473
Nonfarm proprietors employment	1,552	1,826	257	383	107,683	133,908
Farm employment	608	586	281	301	32,343	32,170
Nonfarm employment	4,486	4,713	739	839	525,792	590,165
Private nonfarm employment	3,752	4,040	599	722	440,023	503,470
By Industry (Number of Jobs/Percentage of Total Jobs)						
Forestry, fishing, and related activities	(D)	(D)	(D)	(D)	5,121	5,866
	N/A	N/A	N/A	N/A	<1	<1
Mining (including quarrying and oil and gas extraction)	(D)	(D)	(D)	40	2,216	2,143
	N/A	N/A	N/A	3.5	<1	<1
Utilities	23	20	(D)	(D)	2,170	2,111
	<1	<1	N/A	N/A	<1	<1
Construction	337	380	87	99	31,847	38,292
	6.6	7.2	8.5	8.7	5.7	6.2
Manufacturing	154	180	13	15	38,718	46,208
	3	3.4	1.3	1.3	6.9	7.4
Wholesale trade	159	201	(D)	(D)	19,792	22,931
	3.1	3.8	N/A	N/A	3.5	3.7
Retail trade	623	779	60	105	62,968	66,796
	12.2	14.7	5.9	9.2	11.3	10.7
Transportation and warehousing	277	174	32	62	15,047	19,188
	5.4	3.3	3.1	5.4	2.7	3.1
Information	18	25	(D)	(D)	7,640	6,418
	<1	<1	N/A	N/A	1.4	1
Finance and insurance	206	245	(D)	(D)	38,052	41,863
	4.0	4.6	N/A	N/A	6.8	6.7
Real estate and rental and leasing	194	288	29	68	19,319	29,574
	3.8	5.4	2.8	6.0	3.5	4.8
Professional, scientific, and technical services	166	188	(D)	(D)	19,350	25,389
	3.3	3.5	N/A	N/A	3.5	4.1

Sector	Butte County		Harding County		State of South Dakota	
	2010	2021	2010	2021	2010	2021
Management of companies and enterprises	0	(D)	0	0	3,943	5,943
	0	N/A	0	0	<1	1
Administrative and support and waste management and remediation services	135	(D)	(D)	(D)	18,691	19,916
	2.7	N/A	N/A	N/A	3.3	3.2
Educational services	(D)	21	38	(D)	10,448	10,327
	N/A	<1	3.7	N/A	1.9	1.7
Health care and social assistance	(D)	310	(D)	(D)	64,525	73,902
	N/A	5.9	N/A	N/A	11.6	11.9
Arts, entertainment, and recreation	94	79	(D)	(D)	11,302	12,643
	1.8	1.5	N/A	N/A	2	2
Accommodation and food services	344	383	(D)	(D)	40,155	43,681
	6.8	7.2	N/A	N/A	7.2	7
Other services	400	380	(D)	(D)	28,719	30,279
	7.9	7.2	N/A	N/A	5.1	4.9
Government and government enterprises	734	673	140	117	85,769	86,695
	14.4	12.7	13.7	10.3	15.4	13.9

Sources: BEA 2010a, 2021a
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

Table A-17. South Dakota Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Butte County		Harding County		State of South Dakota	
	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	370,562	479,774	54,176	80,170	42,330,863	57,717,754
Population (persons)	10,138	10,456	1,246	1,327	816,078	895,376
Per capita personal income (dollars)	36,552	45,885	43,480	60,414	51,872	64,462
Earnings by place of work (thousands of dollars)	186,319	203,113	39,810	51,581	29,532,513	38,919,395
Wages and salaries (thousands of dollars)	102,511	110,512	20,156	22,754	17,965,636	23,346,225
Supplement to wages and salaries	26,754	28,050	5,500	6,046	4,387,422	5,418,333
Proprietors' income	57,053	64,551	14,154	22,781	7,179,455	10,154,837
Farm earnings	8,965	12,598	8,062	16,661	2,166,912	3,479,442
Nonfarm earnings	177,354	190,515	31,748	34,920	27,365,601	35,439,953
Private nonfarm earnings	143,924	157,368	24,706	28,692	22,221,838	29,965,848
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)						
Forestry, fishing, and related activities	(D)	(D)	(D)	(D)	191,893	143,947
	N/A	N/A	N/A	N/A	<1	<1
Mining (including quarrying and oil and gas extraction)	(D)	(D)	(D)	4,379	79,677	109,970
	N/A	N/A	N/A	12.5	<1	<1
Utilities	2,081	1,444	(D)	(D)	246,683	282,289
	1.2	<1	N/A	N/A	<1	<1
Construction	16,292	19,276	5,670	6,634	1,878,663	2,657,325
	9.2	10.1	17.9	19	6.9	7.5
Manufacturing	5,887	8,565	136	114	2,411,355	3,464,611
	3.3	4.5	<1	<1	8.8	9.8
Wholesale trade	9,353	11,858	(D)	(D)	1,407,998	1,956,820
	5.3	6.2	N/A	N/A	5.1	5.5
Retail trade	20,161	23,520	2,691	2,778	2,222,038	2,526,073
	11.4	12.3	8.5	8	8.1	7.1
Transportation and warehousing	16,756	12,174	1,439	4,928	856,546	1,028,383
	9.4	6.4	4.5	14.1	3.1	2.9
Information	1,883	1,977	(D)	(D)	542,094	571,211
	1.1	1	N/A	N/A	2	1.6
Finance and insurance	8,570	6,224	(D)	(D)	3,404,504	4,160,892
	4.8	3.3	N/A	N/A	12.4	11.7

Sector	Butte County		Harding County		State of South Dakota	
	2010	2021	2010	2021	2010	2021
Real estate and rental and leasing	2,239	9,290	436	1,412	408,254	911,691
	1.3	<1	1.4	<1	1.5	<1
Professional, scientific, and technical services	7,400	8,673	(D)	(D)	1,150,879	1,718,557
	4.2	4.6	N/A	N/A	4.2	4.8
Management of companies and enterprises	0	(D)	0	N/A	473,515	729,863
	<1	N/A	<1	N/A	1.7	2.1
Administrative and support and waste management and remediation services	3,323	(D)	(D)	(D)	591,336	843,721
	1.9	N/A	N/A	N/A	2.2	2.4
Educational services	(D)	731	1,471	(D)	326,173	347,851
	N/A	<1	4.6	N/A	1.2	1
Health care and social assistance	(D)	15,031	(D)	(D)	4,032,738	5,828,012
	N/A	7.9	N/A	N/A	14.7	16.4
Arts, entertainment, and recreation	581	604	(D)	(D)	198,851	259,225
	<1	<1	N/A	N/A	<1	<1
Accommodation and food services	5,307	7,460	(D)	(D)	750,024	1,233,597
	3	3.9	N/A	N/A	2.7	3.5
Other services (except government and government enterprises)	16,659	14,558	(D)	(D)	1,048,616	1,191,810
	9.4	7.6	N/A	N/A	3.8	3.4
Government and government enterprises	33,430	33,147	7,043	6,228	5,143,762	5,474,105
	18.8	17.4	22.2	17.8	18.8	15.4

Sources: BEA 2010b, 2021b

Note: All percentages are rounded to the nearest tenth.

All 2010 dollar values were adjusted for inflation.

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

Table A-18 (Part 1). Utah Analysis Area Employment by Sector (2010 and 2021)

Sector	Beaver County		Box Elder County		Cache County		Carbon County		Daggett County		Duchesne County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	3,609	4,343	24,826	32,065	66,056	87,483	11,865	11,472	598	644	11,081	11,667	1,620,799	2,229,147
Wage and salary employment	2,609	3,017	18,366	23,687	50,265	65,712	9,513	8,919	438	453	7,871	8,199	1,235,051	1,688,168
Proprietors employment	1,000	1,326	6,460	8,378	15,791	21,771	2,352	2,553	160	191	3,210	3,468	385,748	540,979
Farm proprietors employment	208	229	1,014	1,080	1,040	1,077	274	291	42	45	876	931	15,262	15,766
Nonfarm proprietors employment	792	1,097	5,446	7,298	14,751	20,694	2,078	2,262	118	146	2,334	2,537	370,486	525,213
Farm employment	599	635	1,402	1,453	1,448	1,508	307	317	57	66	978	1,036	20,007	20,552
Nonfarm employment	3,010	3,708	23,424	30,612	64,608	85,975	11,558	11,155	541	578	10,103	10,631	1,600,792	2,208,595
Private nonfarm employment	2,266	2,940	20,640	27,379	53,678	73,691	9,411	8,970	307	409	8,168	8,173	1,366,353	1,937,761
By Industry (Number of Jobs/Percentage of Total Employment)														
Forestry, fishing, and related activities	(D)	(D)	137	182	230	283	(D)	36	(D)	(D)	(D)	(D)	3,313	4,358
	N/A	N/A	<1	<1	<1	<1	N/A	<1	N/A	N/A	N/A	N/A	<1	<1
Mining (including quarrying and oil and gas extraction)	68	(D)	87	78	103	104	913	802	(D)	1	1,790	1,366	14,668	11,812
	1.9	N/A	<1	<1	<1	<1	7.7	7	N/A	<1	16.2	11.7	<1	<1
Utilities	(D)	(D)	37	62	66	90	138	77	0	0	41	53	4,275	5,036
	N/A	N/A	<1	<1	<1	<1	1.2	<1	0	0	<1	<1	<1	<1
Construction	166	267	1,477	2,711	3,314	4,634	556	570	(D)	(D)	831	569	90,998	156,909
	4.6	6.1	5.9	8.5	5	5.3	4.7	5	N/A	N/A	7.5	4.9	5.6	7

Sector	Beaver County		Box Elder County		Cache County		Carbon County		Daggett County		Duchesne County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Manufacturing	86	229	5,939	7,233	10,645	14,390	364	455	(D)	4	222	249	118,121	155,858
	2.4	5.3	23.9	22.6	16.1	16.4	3.1	4	N/A	<1	2	2.1	7.3	7
Wholesale trade	(D)	(D)	593	790	990	1,578	495	314	1	5	170	202	49,833	61,996
	N/A	N/A	2.4	2.5	1.5	1.8	4.2	2.7	<1	<1	1.5	1.7	3.1	2.8
Retail trade	380	535	2,414	2,863	7,097	9,630	1,441	1,421	(D)	(D)	1,000	1,245	172,249	227,274
	10.5	12.3	9.7	8.9	10.7	11	12.1	12.4	N/A	N/A	9	10.7	10.6	10.2
Transportation and warehousing	240	182	1,502	2,236	1,242	2,106	500	418	(D)	(D)	889	694	50,900	97,325
	6.7	4.2	6.1	7	1.9	2.4	4.2	3.6	N/A	N/A	8	5.9	3.1	4.4
Information	(D)	8	157	117	788	711	89	52	(D)	3	208	(D)	34,345	46,605
	N/A	<1	<1	<1	1.2	<1	<1	<1	N/A	<1	1.9	N/A	2.1	2.1
Finance and insurance	(D)	107	878	1,087	3,043	4,088	368	339	0	(D)	240	265	111,543	159,236
	N/A	2.5	3.5	3.4	4.6	4.7	3.1	3	0	N/A	2.2	2.3	6.9	7.1
Real estate and rental and leasing	(D)	249	1,137	1,626	3,730	5,441	390	467	(D)	(D)	490	610	93,568	131,835
	N/A	5.7	4.6	5.1	5.6	6.2	3.3	4.1	N/A	N/A	4.4	5.2	5.8	5.9
Professional, scientific, and technical services	38	(D)	616	(D)	4,325	7,425	(D)	(D)	(D)	3	221	(D)	107,017	177,495
	1.1	N/A	2.5	N/A	6.5	8.5	N/A	N/A	N/A	<1	2	N/A	6.6	8
Management of companies and enterprises	1	(D)	74	(D)	435	872	(D)	(D)	0	(D)	(D)	(D)	22,682	33,989
	0	N/A	<1	N/A	<1	1	N/A	N/A	0	N/A	N/A	N/A	1.4	1.5
Administrative and support and waste management and remediation services	(D)	89	670	1,102	3,063	3,228	637	361	(D)	(D)	(D)	260	89,810	118,472
	N/A	2	2.7	3.4	4.6	3.7	5.4	3.1	N/A	N/A	N/A	2.2	5.5	5.3
Educational services	11	12	345	443	1,029	1,687	(D)	(D)	6	4	55	(D)	48,952	75,217
	<1	<1	1.4	1.4	1.6	1.9	N/A	N/A	1	<1	<1	N/A	3	3.4
Health care and social assistance	117	123	1,662	1,977	5,668	7,386	(D)	(D)	4	(D)	503	(D)	137,138	185,491
	3.2	2.8	6.7	6.2	8.6	8.4	N/A	N/A	<1	N/A	4.5	N/A	8.5	8.3
Arts, entertainment, and recreation	(D)	(D)	333	505	1,193	1,618	156	156	52	46	103	90	34,480	48,191
	N/A	N/A	1.3	1.6	1.8	1.8	1.3	1.4	8.7	7.1	<1	<1	2.1	2.2

Sector	Beaver County		Box Elder County		Cache County		Carbon County		Daggett County		Duchesne County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Accommodation and food services	(D)	(D)	1,325	1,773	3,447	4,585	770	784	96	124	407	625	99,679	135,066
	N/A	N/A	5.3	5.5	5.2	5.2	6.5	6.8	16.1	19.3	3.7	5.4	6.1	6.1
Other services	167	(D)	1,257	1,617	3,270	3,835	826	851	(D)	(D)	639	(D)	82,782	105,596
	4.6	N/A	5.1	5	5	4.4	7	7.4	N/A	N/A	5.8	N/A	5.1	4.7
Government and government enterprises	744	768	2,784	3,233	10,930	12,284	2,147	2,185	234	169	1,935	2,458	234,439	270,834
	20.6	17.7	11.2	<1	16.5	14	18.1	19	39.1	26.2	17.5	21.1	14.5	12.1

Sources: BEA 2010a, 2021a
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

Table A-18 (Part 2). Utah Analysis Area Employment by Sector (2010 and 2021)

Sector	Emery County		Garfield County		Grand County		Iron County		Juab County		Kane County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	5,594	5,100	3,427	3,576	6,456	8,801	22,222	32,095	4,775	5,991	4,381	5,727	1,620,799	2,229,147
Wage and salary employment	3,976	3,555	2,505	2,550	4,700	6,642	15,987	23,436	3,355	4,228	3,122	4,030	1,235,051	1,688,168
Proprietors employment	1,618	1,545	922	1,026	1,756	2,159	6,235	8,659	1,420	1,763	1,259	1,697	385,748	540,979
Farm proprietors employment	534	561	236	229	64	62	419	434	287	291	142	152	15,262	15,766
Nonfarm proprietors employment	1,084	984	686	797	1,692	2,097	5,816	8,225	1,133	1,472	1,117	1,545	370,486	525,213
Farm employment	575	599	293	283	97	98	731	785	374	383	159	169	20,007	20,552
Nonfarm employment	5,019	4,501	3,134	3,293	6,359	8,703	21,491	31,310	4,401	5,608	4,222	5,558	1,600,792	2,208,595

Sector	Emery County		Garfield County		Grand County		Iron County		Juab County		Kane County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Private nonfarm employment	4,081	3,634	2,521	2,727	5,406	7,620	17,121	26,081	3,625	4,697	3,482	4,785	1,366,353	1,937,761
By Industry (Number of Jobs/Percentage of Total Employment)														
Forestry, fishing, and related activities	(D)	(D)	(D)	(D)	(D)	(D)	218	346	(D)	(D)	(D)	(D)	3,313	4,358
	N/A	N/A	N/A	N/A	N/A	N/A	1	1.1	N/A	N/A	N/A	N/A	<1	<1
Mining (including quarrying and oil and gas extraction)	(D)	322	(D)	(D)	(D)	(D)	156	191	(D)	69	(D)	(D)	14,668	11,812
	N/A	6.3	N/A	N/A	N/A	N/A	<1	<1	N/A	1.2	N/A	N/A	<1	<1
Utilities	(D)	(D)	(D)	34	28	41	94	173	(D)	(D)	(D)	(D)	4,275	5,036
	N/A	N/A	N/A	1	<1	<1	<1	<1	N/A	N/A	N/A	N/A	<1	<1
Construction	603	516	137	128	429	512	1,205	2,857	471	540	214	311	90,998	156,909
	10.8	10.1	4	3.6	6.6	5.8	5.4	8.9	9.9	9	4.9	5.4	5.6	7
Manufacturing	61	50	67	(D)	87	171	1,453	2,512	668	955	(D)	168	118,121	155,858
	1.1	1	2	N/A	1.3	1.9	6.5	7.8	14	15.9	N/A	2.9	7.3	7
Wholesale trade	(D)	(D)	48	21	87	115	319	490	43	47	(D)	41	49,833	61,996
	N/A	N/A	1.4	<1	1.3	1.3	1.4	1.5	<1	<1	N/A	<1	3.1	2.8
Retail trade	611	686	236	272	854	990	2,647	3,621	406	480	456	571	172,249	227,274
	10.9	13.5	6.9	7.6	13.2	11.2	11.9	11.3	8.5	8	10.4	10	10.6	10.2
Transportation and warehousing	103	93	(D)	48	103	205	457	762	(D)	(D)	76	(D)	50,900	97,325
	1.8	1.8	N/A	1.3	1.6	2.3	2.1	2.4	N/A	N/A	1.7	N/A	3.1	4.4
Information	137	(D)	(D)	155	60	74	196	210	(D)	21	27	34	34,345	46,605
	2.4	N/A	N/A	4.3	<1	<1	<1	<1	N/A	<1	<1	<1	2.1	2.1
Finance and insurance	(D)	93	54	68	122	137	1,143	1,414	113	125	131	111	111,543	159,236
	N/A	1.8	1.6	1.9	1.9	1.6	5.1	4.4	2.4	2.1	3	1.9	6.9	7.1
Real estate and rental and leasing	(D)	(D)	95	146	370	649	1,422	2,134	181	233	271	443	93,568	131,835
	N/A	N/A	2.8	4.1	5.7	7.4	6.4	6.6	3.8	3.9	6.2	7.7	5.8	5.9

Sector	Emery County		Garfield County		Grand County		Iron County		Juab County		Kane County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Professional, scientific, and technical services	258	158	53	90	313	394	831	1,473	219	(D)	124	187	107,017	177,495
	4.6	3.1	1.5	2.5	4.8	4.5	3.7	4.6	4.6	N/A	2.8	3.3	6.6	8
Management of companies and enterprises	(D)	(D)	0	0	(D)	(D)	80	165	25	(D)	0	49	22,682	33,989
	N/A	N/A	0	0	N/A	N/A	<1	<1	<1	N/A	0	<1	1.4	1.5
Administrative and support and waste management and remediation services	(D)	(D)	(D)	59	(D)	(D)	1,264	1,446	79	260	114	218	89,810	118,472
	N/A	N/A	N/A	1.6	N/A	N/A	5.7	4.5	1.7	4.3	2.6	3.8	5.5	5.3
Educational services	(D)	(D)	(D)	(D)	118	153	323	543	(D)	(D)	(D)	11	48,952	75,217
	N/A	N/A	N/A	N/A	1.8	1.7	1.5	1.7	N/A	N/A	N/A	<1	3	3.4
Health care and social assistance	(D)	(D)	(D)	(D)	332	521	1,885	2,741	(D)	(D)	(D)	198	137,138	185,491
	N/A	N/A	N/A	N/A	5.1	5.9	8.5	8.5	N/A	N/A	N/A	3.5	8.5	8.3
Arts, entertainment, and recreation	34	44	(D)	68	359	590	502	695	(D)	64	97	348	34,480	48,191
	<1	<1	N/A	1.9	5.6	6.7	2.3	2.2	N/A	1.1	2.2	6.1	2.1	2.2
Accommodation and food services	290	325	(D)	1,095	1,432	2,254	1,698	2,759	(D)	389	876	1,158	99,679	135,066
	5.2	6.4	N/A	30.6	22.2	25.6	7.6	8.6	N/A	6.5	20	20.2	6.1	6.1
Other services	395	304	117	115	262	289	1,228	1,549	(D)	315	623	709	82,782	105,596
	7.1	6	3.4	3.2	4.1	3.3	5.5	4.8	N/A	5.3	14.2	12.4	5.1	4.7
Government and government enterprises	938	867	613	566	953	1,083	4,370	5,229	776	911	740	773	234,439	270,834
	16.8	17	17.9	15.8	14.8	12.3	19.7	16.3	16.3	15.2	16.9	13.5	14.5	12.1

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

Table A-18 (Part 3). Utah Analysis Area Employment by Sector (2010 and 2021)

Sector	Millard County		Morgan County		Piute County		Rich County		Sanpete County		Sevier County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	6,559	7,417	4,026	5,796	630	650	1,291	1,856	11,308	13,973	11,206	13,045	1,620,799	2,229,147
Wage and salary employment	4,580	5,110	2,124	3,028	335	307	724	1,089	7,149	9,354	8,269	9,662	1,235,051	1,688,168
Proprietors employment	1,979	2,307	1,902	2,768	295	343	567	767	4,159	4,619	2,937	3,383	385,748	540,979
Farm proprietors employment	624	650	263	252	106	118	118	124	786	787	596	590	15,262	15,766
Nonfarm proprietors employment	1,355	1,657	1,639	2,516	189	225	449	643	3,373	3,832	2,341	2,793	370,486	525,213
Farm employment	1,013	1,059	318	299	148	152	188	196	1,038	1,006	717	718	20,007	20,552
Nonfarm employment	5,546	6,358	3,708	5,497	482	498	1,103	1,660	10,270	12,967	10,489	12,327	1,600,792	2,208,595
Private nonfarm employment	4,454	5,316	3,238	4,839	334	371	895	1,433	7,606	9,780	8,740	10,335	1,366,353	1,937,761
By Industry (Number of Jobs/Percentage of Total Employment)														
Forestry, fishing, and related activities	(D)	158	(D)	(D)	(D)	(D)	(D)	(D)	138	210	(D)	(D)	3,313	4,358
	N/A	2.1	N/A	N/A	N/A	N/A	N/A	N/A	1.2	1.5	N/A	N/A	<1	<1
Mining (including quarrying and oil and gas extraction)	120	129	(D)	(D)	22	(D)	(D)	(D)	84	90	613	650	14,668	11,812
	1.8	1.7	N/A	N/A	3.5	N/A	N/A	N/A	<1	<1	5.5	5	<1	<1
Utilities	(D)	(D)	17	28	0	0	(D)	(D)	14	22	(D)	(D)	4,275	5,036
	N/A	N/A	<1	<1	0	0	N/A	N/A	<1	<1	N/A	N/A	<1	<1
Construction	284	278	436	837	32	(D)	(D)	149	682	966	523	647	90,998	156,909
	4.3	3.7	10.8	14.4	5.1	N/A	N/A	8	6	6.9	4.7	5	5.6	7
Manufacturing	230	304	249	241	15	(D)	(D)	39	692	1,480	437	610	118,121	155,858
	3.5	4.1	6.2	4.2	2.4	N/A	N/A	2.1	6.1	10.6	3.9	4.7	7.3	7
Wholesale trade	(D)	(D)	157	153	(D)	8	10	(D)	141	207	(D)	(D)	49,833	61,996
	N/A	N/A	3.9	2.6	N/A	1.2	<1	N/A	1.2	1.5	N/A	N/A	3.1	2.8
Retail trade	740	858	353	513	(D)	(D)	89	168	1,240	1,328	1,660	1,766	172,249	227,274
	11.3	11.6	8.8	8.9	N/A	N/A	6.9	9.1	11	9.5	14.8	13.5	10.6	10.2
Transportation and warehousing	157	218	23	56	32	(D)	(D)	(D)	241	269	1,058	1,126	50,900	97,325
	2.4	2.9	<1	1	5.1	N/A	N/A	N/A	2.1	1.9	9.4	8.6	3.1	4.4
Information	37	27	(D)	26	0	4	9	(D)	213	244	86	41	34,345	46,605
	<1	<1	N/A	<1	0	<1	<1	N/A	1.9	1.7	<1	<1	2.1	2.1
Finance and insurance	195	225	378	612	(D)	(D)	(D)	(D)	445	701	363	397	111,543	159,236
	3	3	9.4	10.6	N/A	N/A	N/A	N/A	3.9	5	3.2	3	6.9	7.1
Real estate and rental and leasing	188	272	367	659	16	(D)	(D)	(D)	880	657	416	523	93,568	131,835
	2.9	3.7	9.1	11.4	2.5	N/A	N/A	N/A	7.8	4.7	3.7	4	5.8	5.9

Sector	Millard County		Morgan County		Piute County		Rich County		Sanpete County		Sevier County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Professional, scientific, and technical services	(D)	(D)	190	453	(D)	(D)	(D)	(D)	(D)	434	308	525	107,017	177,495
	N/A	N/A	4.7	7.8	N/A	N/A	N/A	N/A	N/A	3.1	2.7	4	6.6	8
Management of companies and enterprises	(D)	(D)	(D)	(D)	0	0	(D)	(D)	(D)	68	38	72	22,682	33,989
	N/A	N/A	N/A	N/A	0	0	N/A	N/A	N/A	<1	<1	<1	1.4	1.5
Administrative and support and waste management and remediation services	337	591	(D)	(D)	10	(D)	26	115	220	317	268	371	89,810	118,472
	5.1	8	N/A	N/A	1.6	N/A	2	6.2	1.9	2.3	2.4	2.8	5.5	5.3
Educational services	(D)	(D)	(D)	114	8	5	(D)	20	(D)	(D)	(D)	(D)	48,952	75,217
	N/A	N/A	N/A	2	1.3	<1	N/A	1.1	N/A	N/A	N/A	N/A	3	3.4
Health care and social assistance	(D)	(D)	(D)	223	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	137,138	185,491
	N/A	N/A	N/A	3.8	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.5	8.3
Arts, entertainment, and recreation	(D)	79	(D)	111	14	(D)	(D)	82	161	202	87	125	34,480	48,191
	N/A	1.1	N/A	1.9	2.2	N/A	N/A	4.4	1.4	1.4	<1	1	2.1	2.2
Accommodation and food services	(D)	383	(D)	168	49	(D)	(D)	224	507	694	907	965	99,679	135,066
	N/A	5.2	N/A	2.9	7.8	N/A	N/A	12.1	4.5	5	8.1	7.4	6.1	6.1
Other services	342	353	(D)	325	(D)	(D)	97	122	648	717	599	686	82,782	105,596
	5.2	4.8	N/A	5.6	N/A	N/A	7.5	6.6	5.7	5.1	5.3	5.3	5.1	4.7
Government and government enterprises	1,092	1,042	470	658	148	127	208	227	2,664	3,187	1,749	1,992	234,439	270,834
	16.6	14	11.7	11.4	23.5	19.5	16.1	12.2	23.6	22.8	15.6	15.3	14.5	12.1

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

Table A-18 (Part 4). Utah Analysis Area Employment by Sector (2010 and 2021)

Sector	Summit County		Tooele County		Uintah County		Wasatch County		Wayne County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	33,294	44,134	21,319	27,493	18,017	18,038	10,973	20,375	1,737	1,940	1,620,799	2,229,147
Wage and salary employment	21,945	28,767	16,562	20,548	14,086	13,322	6,305	11,776	1,129	1,199	1,235,051	1,688,168
Proprietors employment	11,349	15,367	4,757	6,945	3,931	4,716	4,668	8,599	608	741	385,748	540,979
Farm proprietors employment	532	521	388	422	995	1,055	394	394	166	154	15,262	15,766
Nonfarm proprietors employment	10,817	14,846	4,369	6,523	2,936	3,661	4,274	8,205	442	587	370,486	525,213
Farm employment	633	613	500	546	1,130	1,200	451	459	207	193	20,007	20,552
Nonfarm employment	32,661	43,521	20,819	26,947	16,887	16,838	10,522	19,916	1,530	1,747	1,600,792	2,208,595
Private nonfarm employment	29,959	40,611	15,999	22,439	13,916	13,654	9,199	17,782	1,224	1,473	1,366,353	1,937,761
By Industry (Number of Jobs/Percentage of Total Employment)												
Forestry, fishing, and related activities	141	(D)	(D)	(D)	90	102	(D)	(D)	(D)	(D)	3,313	4,358
	<1	N/A	N/A	N/A	<1	<1	N/A	N/A	N/A	N/A	<1	<1
Mining (including quarrying and oil and gas extraction)	243	185	151	(D)	3,184	1,481	134	(D)	(D)	(D)	14,668	11,812
	<1	<1	<1	N/A	17.7	8.2	1.2	N/A	N/A	N/A	<1	<1
Utilities	59	(D)	(D)	48	149	157	(D)	29	(D)	(D)	4,275	5,036
	<1	N/A	N/A	<1	<1	<1	N/A	<1	N/A	N/A	<1	<1
Construction	1,959	2,962	971	1,845	1,127	1,112	1,051	2,490	135	251	90,998	156,909
	5.9	6.7	4.6	6.7	6.3	6.2	9.6	12.2	7.8	12.9	5.6	7
Manufacturing	833	1,198	1,568	3,038	238	358	295	628	35	(D)	118,121	155,858
	2.5	2.7	7.4	11.1	1.3	2	2.7	3.1	2	N/A	7.3	7
Wholesale trade	377	685	(D)	253	634	418	182	312	27	(D)	49,833	61,996
	1.1	1.6	N/A	<1	3.5	2.3	1.7	1.5	1.6	N/A	3.1	2.8

Sector	Summit County		Tooele County		Uintah County		Wasatch County		Wayne County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Retail trade	3,739	4,042	2,178	3,020	1,805	2,288	1,034	1,857	121	169	172,249	227,274
	11.2	9.2	10.2	11	10	12.7	9.4	9.1	7	8.7	10.6	10.2
Transportation and warehousing	469	618	1,104	2,390	936	828	(D)	367	(D)	29	50,900	97,325
	1.4	1.4	5.2	8.7	5.2	4.6	N/A	1.8	N/A	1.5	3.1	4.4
Information	366	605	270	277	156	154	159	166	(D)	(D)	34,345	46,605
	1.1	1.4	1.3	1	<1	<1	1.4	<1	N/A	N/A	2.1	2.1
Finance and insurance	1,976	3,404	647	831	379	514	673	1,629	(D)	(D)	111,543	159,236
	5.9	7.7	3	3	2.1	2.8	6.1	8	N/A	N/A	6.9	7.1
Real estate and rental and leasing	4,066	5,343	795	1,139	890	984	1,032	1,978	27	(D)	93,568	131,835
	12.2	12.1	3.7	4.1	4.9	5.5	9.4	9.7	1.6	N/A	5.8	5.9
Professional, scientific, and technical services	2,221	3,599	(D)	1,111	565	589	(D)	1,601	(D)	(D)	107,017	177,495
	6.7	8.2	N/A	4	3.1	3.3	N/A	7.9	N/A	N/A	6.6	8
Management of companies and enterprises	311	750	(D)	85	(D)	(D)	(D)	495	0	27	22,682	33,989
	<1	1.7	N/A	<1	N/A	N/A	N/A	2.4	0	1.4	1.4	1.5
Administrative and support and waste management and remediation services	1,140	1,573	2,348	1,430	(D)	(D)	509	860	(D)	(D)	89,810	118,472
	3.4	3.6	11	5.2	N/A	N/A	4.6	4.2	N/A	N/A	5.5	5.3
Educational services	617	809	276	769	100	306	160	428	(D)	8	48,952	75,217
	1.9	1.8	1.3	2.8	<1	1.7	1.5	2.1	N/A	<1	3	3.4
Health care and social assistance	1,181	2,052	1,509	2,042	1,083	1,202	656	1,335	(D)	169	137,138	185,491
	3.5	4.6	7.1	7.4	6	6.7	6	6.6	N/A	8.7	8.5	8.3
Arts, entertainment, and recreation	3,439	4,622	457	518	117	192	322	773	39	51	34,480	48,191
	10.3	10.5	2.1	1.9	<1	1.1	2.9	3.8	2.2	2.6	2.1	2.2
Accommodation and food services	5,082	5,892	1,136	1,737	982	1,392	1,127	1,586	277	342	99,679	135,066
	15.3	13.4	5.3	6.3	5.5	7.7	10.3	7.8	15.9	17.6	6.1	6.1
Other services	1,740	2,064	1,223	1,675	1,047	1,160	709	1,118	83	105	82,782	105,596
	5.2	4.7	5.7	6.1	5.8	6.4	6.5	5.5	4.8	5.4	5.1	4.7

Sector	Summit County		Tooele County		Uintah County		Wasatch County		Wayne County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Government and government enterprises	2,702	2,910	4,820	4,508	2,971	3,184	1,323	2,134	306	274	234,439	270,834
	8.1	6.6	22.6	16.4	16.5	17.7	12.1	10.5	17.6	14.1	14.5	12.1

Sources: BEA 2010a, 2021a
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

Table A-19 (Part 1). Utah Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Beaver County		Box Elder County		Cache County		Carbon County		Daggett County		Duchesne County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	228,833	340,414	1,760,360	2,713,188	4,031,753	6,495,574	854,493	919,193	45,261	50,432	723,373	849,060	111,999,656	186,990,527
Population (persons)	6,664	7,249	50,198	59,688	113,463	137,417	21,396	20,372	1,075	976	18,640	19,790	2,776,094	3,337,975
Per capita personal income (dollars)	34,339	46,960	35,068	45,456	35,534	47,269	39,937	45,120	42,103	51,672	38,807	42,903	40,345	56,019
Earnings by place of work (thousands of dollars)	164,645	243,624	1,294,392	1,656,545	2,959,223	4,590,587	613,494	573,959	24,296	25,942	569,873	567,099	83,829,430	135,242,519
Wages and salaries (thousands of dollars)	111,892	130,330	964,724	1,242,040	2,007,123	3,143,584	457,110	413,077	16,948	17,257	415,943	404,553	62,116,762	98,905,986
Supplement to wages and salaries	31,659	35,118	246,829	280,336	587,717	773,402	117,130	106,284	5,967	5,487	103,940	104,638	15,249,963	21,218,296
Proprietors' income	21,094	78,176	82,840	134,169	364,383	673,601	39,254	54,598	1,381	3,198	49,990	57,908	6,462,704	15,118,237
Farm earnings	39,510	44,244	28,154	12,681	33,452	43,713	1,315	999	601	1,046	481	13,151	272,662	432,762
Nonfarm earnings	125,136	199,380	1,266,238	1,643,864	2,925,771	4,546,874	614,809	572,960	23,695	24,896	570,353	553,948	83,556,767	134,809,757
Private nonfarm earnings	81,941	151,105	1,100,753	1,450,795	2,238,667	3,776,019	481,614	451,452	8,714	13,236	457,595	410,018	66,547,085	114,574,889
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)														
Forestry, fishing, and related activities	(D)	(D)	2,379	3,059	4,800	5,280	(D)	331	(D)	(D)	(D)	(D)	54,317	110,151
	N/A	N/A	<1	<1	<1	<1	N/A	<1	N/A	N/A	N/A	N/A	N/A	<1

Sector	Beaver County		Box Elder County		Cache County		Carbon County		Daggett County		Duchesne County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Mining (including quarrying and oil and gas extraction)	2,575	(D)	1,525	6,571	-322	6,199	113,622	81,734	(D)	155	161,071	119,454	960,774	1,446,946
	2.1	N/A	<1	<1	<1	<1	18.5	14.3	N/A	<1	28.2	21.6	N/A	1.1
Utilities	(D)	(D)	3,094	15,248	7,822	20,894	20,444	26,585	0	N/A	3,163	18,559	602,446	1,684,115
	N/A	N/A	<1	<1	<1	<1	3.3	4.6	<1	N/A	<1	3.4	N/A	1.2
Construction	8,539	12,076	69,284	170,437	207,359	310,814	38,783	26,776	(D)	(D)	69,825	30,671	5,404,695	12,018,858
	6.8	6.1	5.5	10.4	7.1	6.8	6.3	4.7	N/A	N/A	12.2	5.5	8.4	8.9
Manufacturing	3,779	10,498	632,076	675,824	685,001	1,140,439	25,087	35,782	(D)	95	11,647	10,506	9,046,028	12,657,653
	3.0	5.3	49.9	41.1	23.4	25.1	4.1	6.2	N/A	<1	2.0	1.9	1.3	9.4
Wholesale trade	(D)	(D)	31,763	51,357	59,956	179,716	37,561	20,740	5	N/A	11,606	13,297	4,010,937	6,047,750
	N/A	N/A	2.5	3.1	2.0	4.0	6.1	3.6	<1	N/A	2.0	2.4	1.6	4.5
Retail trade	8,485	13,765	60,516	73,763	175,562	316,161	44,075	53,688	(D)	(D)	27,435	39,003	6,409,896	10,085,319
	6.8	6.9	4.8	4.5	6.0	7.0	7.2	9.4	N/A	N/A	4.8	7.0	4.0	7.5
Transportation and warehousing	22,664	15,775	80,606	115,027	58,053	66,995	31,516	28,266	(D)	(D)	63,193	49,610	3,174,689	5,323,967
	18.1	7.9	6.4	7.0	2.0	1.5	5.1	4.9	N/A	N/A	11.1	9.0	N/A	3.9
Information	(D)	992	6,363	3,370	91,279	43,240	3,767	2,210	(D)	43	12,620	(D)	2,676,796	5,386,442
	N/A	<1	<1	<1	3.1	1.0	<1	<1	N/A	<1	2.2	N/A	N/A	4.0
Finance and insurance	(D)	2,718	19,104	28,277	86,645	105,580	11,168	8,785	0	(D)	6,746	8,479	4,662,518	8,962,858
	N/A	1.4	1.5	1.7	3.0	2.3	1.8	1.5	<1	N/A	1.2	1.5	N/A	6.6
Real estate and rental and leasing	(D)	4,703	14,003	31,740	112,409	197,421	10,390	11,602	(D)	(D)	10,781	9,880	1,390,393	3,843,223
	N/A	2.4	1.1	1.9	3.8	4.3	1.7	2.0	N/A	N/A	1.9	1.8	<1	2.9
Professional, scientific, and technical services	907	(D)	18,264	(D)	164,785	422,162	(D)	(D)	(D)	86	7,634	(D)	6,693,375	13,963,377
	<1	N/A	1.4	N/A	5.6	9.3	N/A	N/A	N/A	<1	1.3	N/A	N/A	10.4
Management of companies and enterprises	5	(D)	1,356	(D)	29,262	77,412	(D)	(D)	0	(D)	(D)	(D)	1,915,068	2,519,282
	<1	N/A	<1	N/A	1.0	1.7	N/A	N/A	<1	N/A	N/A	N/A	<1	1.9
Administrative and support and waste management and remediation services	(D)	1,346	14,761	30,569	80,156	167,157	22,904	13,015	(D)	(D)	(D)	9,444	3,228,691	5,573,755
	N/A	<1	1.2	1.9	2.7	3.7	3.7	2.3	N/A	N/A	N/A	1.7	N/A	4.1
Educational services	88	112	2,994	5,932	18,357	35,499	(D)	(D)	20	60	363	(D)	1,756,196	2,952,678
	<1	<1	<1	<1	<1	<1	N/A	N/A	<1	<1	<1	N/A	N/A	2.2
Health care and social assistance	3,669	3,560	66,384	91,362	253,706	378,805	(D)	(D)	49	(D)	26,645	(D)	7,648,607	11,147,476
	2.9	1.8	5.2	5.6	8.7	8.3	N/A	N/A	<1	N/A	4.7	N/A	N/A	8.3
Arts, entertainment, and recreation	(D)	(D)	2,295	5,495	12,738	19,285	1,903	1,154	1,458	1,940	506	603	744,715	1,259,816
	N/A	N/A	<1	<1	<1	<1	<1	<1	6.2	7.8	<1	<1	1.7	<1
Accommodation and food services	(D)	(D)	22,438	37,982	61,817	100,205	13,520	15,793	2,848	3,213	7,880	11,384	2,277,932	4,006,686
	N/A	N/A	1.8	2.3	2.1	2.2	2.2	2.8	12.0	12.9	1.4	2.1	9.8	3.0

Sector	Beaver County		Box Elder County		Cache County		Carbon County		Daggett County		Duchesne County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Other services (except government and government enterprises)	6,904	(D)	51,546	67,697	129,282	182,755	33,113	34,688	(D)	(D)	26,113	(D)	3,889,012	5,584,537
	5.5	N/A	4.1	4.1	4.4	4.0	5.4	6.1	N/A	N/A	4.6	N/A	4.9	4.1
Government and government enterprises	43,195	48,275	165,485	193,069	687,104	770,855	133,195	121,508	14,981	11,660	112,758	143,930	17,009,682	20,234,868
	34.5	24.2	13.1	11.7	23.5	17.0	21.7	21.2	63.2	46.8	19.8	26.0	34.3	15.0

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

Table A-19 (Part 2). Utah Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Emery County		Garfield County		Grand County		Iron County		Juab County		Kane County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	392,208	407,359	184,950	257,521	426,517	674,784	1,319,606	2,350,189	318,600	584,171	270,297	398,337	111,999,656	186,990,527
Population (persons)	10,996	9,967	5,197	5,129	9,298	9,663	46,281	60,519	10,257	12,155	7,209	7,992	2,776,094	3,337,975
Per capita personal income (dollars)	35,668	40,871	35,588	50,209	45,872	69,832	28,512	38,834	31,062	48,060	37,495	49,842	40,345	56,019
Earnings by place of work (thousands of dollars)	304,382	251,157	122,745	163,522	288,755	464,141	817,108	1,386,490	180,463	303,000	157,087	252,789	83,829,430	135,242,519
Wages and salaries (thousands of dollars)	234,672	174,025	89,310	124,259	172,063	286,745	595,150	977,609	134,370	182,539	112,383	174,972	62,116,762	98,905,986
Supplement to wages and salaries	61,853	50,255	26,154	26,705	44,829	65,210	180,441	253,588	36,398	45,336	30,399	40,642	15,249,963	21,218,296
Proprietors' income	7,857	26,877	7,281	12,558	71,863	112,186	41,517	155,293	9,696	75,125	14,304	37,175	6,462,704	15,118,237
Farm earnings	973	8,372	1,505	5,859	965	1,815	15,046	36,456	1,861	18,350	497	2,676	272,662	432,762
Nonfarm earnings	303,409	242,785	124,250	157,663	289,720	462,326	802,062	1,350,034	178,603	284,650	156,589	250,113	83,556,767	134,809,757
Private nonfarm earnings	249,005	195,237	84,036	121,972	226,120	384,793	530,658	1,016,836	139,057	238,019	110,492	200,472	66,547,085	114,574,889
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)														
Forestry, fishing, and related activities	(D)	(D)	(D)	(D)	(D)	(D)	5,228	12,055	(D)	(D)	(D)	(D)	54,317	110,151
	N/A	N/A	N/A	N/A	N/A	N/A	<1	<1	N/A	N/A	N/A	N/A	N/A	<1

Sector	Emery County		Garfield County		Grand County		Iron County		Juab County		Kane County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Mining (including quarrying and oil and gas extraction)	(D)	34,845	(D)	(D)	(D)	(D)	2,517	5,387	(D)	10,614	(D)	(D)	960,774	1,446,946
	N/A	14.4	N/A	N/A	N/A	N/A	<1	<1	N/A	3.7	N/A	N/A	N/A	1.1
Utilities	(D)	(D)	(D)	2,816	3,570	18,277	11,512	33,750	(D)	(D)	(D)	(D)	602,446	1,684,115
	N/A	N/A	N/A	1.8	1.2	4.0	1.4	2.5	N/A	N/A	N/A	N/A	N/A	1.2
Construction	42,143	27,873	8,623	5,016	34,537	27,301	43,200	143,480	26,019	23,677	7,570	12,466	5,404,695	12,018,858
	13.9	11.5	6.9	3.2	11.9	5.9	5.4	10.6	14.6	8.3	4.8	5.0	8.4	8.9
Manufacturing	1,206	3,614	1,917	(D)	3,198	14,867	87,181	142,811	37,278	72,422	(D)	14,294	9,046,028	12,657,653
	<1	1.5	1.5	N/A	1.1	3.2	10.9	10.6	20.9	25.4	N/A	5.7	1.3	9.4
Wholesale trade	(D)	(D)	1,508	714	3,874	5,828	11,685	21,951	1,514	3,868	(D)	1,222	4,010,937	6,047,750
	N/A	N/A	1.2	<1	1.3	1.3	1.5	1.6	<1	1.4	N/A	<1	1.6	4.5
Retail trade	12,092	17,184	4,409	6,140	31,729	36,000	75,165	112,580	8,069	8,925	10,132	15,109	6,409,896	10,085,319
	4.0	7.1	3.5	3.9	11.0	7.8	9.4	8.3	4.5	3.1	6.5	6.0	4.0	7.5
Transportation and warehousing	4,723	3,810	(D)	1,887	4,698	8,278	18,016	31,546	(D)	(D)	3,172	(D)	3,174,689	5,323,967
	1.6	1.6	N/A	1.2	1.6	1.8	2.2	2.3	N/A	N/A	2.0	N/A	N/A	3.9
Information	8,579	(D)	(D)	37,841	2,876	2,600	7,237	8,935	(D)	4,151	978	2,931	2,676,796	5,386,442
	2.8	N/A	N/A	24.0	<1	<1	<1	<1	N/A	1.5	<1	1.2	N/A	4.0
Finance and insurance	(D)	3,620	1,120	1,639	4,700	6,330	39,080	67,871	2,846	6,421	3,816	4,111	4,662,518	8,962,858
	N/A	1.5	<1	1.0	1.6	1.4	4.9	5.0	1.6	2.3	2.4	1.6	N/A	6.6
Real estate and rental and leasing	(D)	(D)	413	403	19,311	28,439	6,107	36,329	267	1,599	3,141	3,284	1,390,393	3,843,223
	N/A	N/A	<1	<1	6.7	6.2	<1	2.7	<1	<1	2.0	1.3	<1	2.9
Professional, scientific, and technical services	22,116	5,422	874	2,774	11,865	18,967	19,818	55,085	9,498	(D)	3,461	7,804	6,693,375	13,963,377
	7.3	2.2	<1	1.8	4.1	4.1	2.5	4.1	5.3	N/A	2.2	3.1	N/A	10.4
Management of companies and enterprises	(D)	(D)	0	N/A	(D)	(D)	2,193	7,390	8	(D)	0	(42)	1,915,068	2,519,282
	N/A	N/A	<1	N/A	N/A	N/A	<1	<1	<1	N/A	<1	N/A	<1	1.9
Administrative and support and waste management and remediation services	(D)	(D)	(D)	971	(D)	(D)	30,293	39,367	4,157	7,033	1,026	3,662	3,228,691	5,573,755
	N/A	N/A	N/A	<1	N/A	N/A	3.8	2.9	2.3	2.5	<1	1.5	N/A	4.1
Educational services	(D)	(D)	(D)	(D)	2,060	3,270	4,367	10,446	(D)	(D)	(D)	276	1,756,196	2,952,678
	N/A	N/A	N/A	N/A	<1	<1	<1	<1	N/A	N/A	N/A	<1	N/A	2.2
Health care and social assistance	(D)	(D)	(D)	(D)	17,133	34,546	76,482	129,154	(D)	(D)	(D)	7,771	7,648,607	11,147,476
	N/A	N/A	N/A	N/A	5.9	7.5	9.5	9.6	N/A	N/A	N/A	3.1	N/A	8.3
Arts, entertainment, and recreation	252	103	(D)	1,532	7,750	16,929	5,653	12,129	(D)	718	2,444	13,782	744,715	1,259,816
	<1	<1	N/A	1.0	2.7	3.7	<1	<1	N/A	<1	1.6	5.5	1.7	<1
Accommodation and food services	5,259	8,017	(D)	37,234	45,757	100,475	30,331	70,792	(D)	7,167	25,343	50,720	2,277,932	4,006,686
	1.7	3.3	N/A	23.6	15.8	21.7	3.8	5.2	N/A	2.5	16.2	20.3	9.8	3.0

Sector	Emery County		Garfield County		Grand County		Iron County		Juab County		Kane County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Other services (except government and government enterprises)	17,451	12,856	4,925	4,820	11,878	15,495	54,595	75,778	(D)	15,017	29,715	38,252	3,889,012	5,584,537
	5.8	5.3	4.0	3.1	4.1	3.4	6.8	5.6	N/A	5.3	19.0	15.3	4.9	4.1
Government and government enterprises	54,404	47,548	40,215	35,691	63,600	77,533	271,404	333,198	39,546	46,631	46,098	49,641	17,009,682	20,234,868
	17.9	19.6	32.4	22.6	22.0	16.8	33.8	24.7	22.1	16.4	29.4	19.8	34.3	15.0

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

Table A-19 (Part 3). Utah Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Millard County		Morgan County		Piute County		Rich County		Sanpete County		Sevier County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	422,182	422,182	454,446	800,633	45,515	73,210	72,817	112,397	777,229	1,139,182	667,189	919,681	111,999,656	186,990,527
Population (persons)	12,534	12,534	9,522	12,657	1,562	1,487	2,256	2,597	27,873	29,106	20,794	21,906	2,776,094	3,337,975
Per capita personal income (dollars)	33,683	33,683	47,726	63,256	29,140	49,233	32,277	43,280	27,885	39,139	32,086	41,983	40,345	56,019
Earnings by place of work (thousands of dollars)	293,914	293,914	160,559	236,146	18,312	34,138	31,615	63,370	403,388	577,034	448,405	586,407	83,829,430	135,242,519
Wages and salaries (thousands of dollars)	209,142	209,142	93,859	156,089	10,987	10,236	23,809	39,056	255,048	371,111	326,856	415,938	62,116,762	98,905,986
Supplement to wages and salaries	62,828	62,828	22,873	33,813	3,853	3,298	7,220	9.808	85,774	109,646	90,278	107,352	15,249,963	21,218,296
Proprietors' income	21,944	21,944	43,826	46,244	3,471	20,604	586	14,506	62,566	96,277	31,271	63,117	6,462,704	15,118,237
Farm earnings	25,437	25,437	4,064	(2,682)	2,347	17,824	2,064	11,127	33,618	44,600	1,746	23,194	272,662	432,762
Nonfarm earnings	268,477	268,477	156,495	238,828	15,965	16,314	29,552	52,243	369,770	532,434	446,659	563,213	83,556,767	134,809,757
Private nonfarm earnings	202,957	202,957	131,555	203,008	8,084	10,096	17,301	39,411	218,477	350,900	341,481	446,017	66,547,085	114,574,889
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)														
Forestry, fishing, and related activities	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	2,650	6,464	(D)	(D)	54,317	110,151
	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	<1	1.2	N/A	N/A	N/A	<1
Mining (including quarrying and oil and gas extraction)	6,591	6,591	(D)	(D)	207	(D)	(D)	(D)	4,181	7,100	44,655	60,822	960,774	1,446,946
	2.5	2.5	N/A	N/A	1.3	N/A	N/A	N/A	1.1	1.3	10.0	10.8	N/A	1.1
Utilities	(D)	(D)	637	10,804	0	(D)	(D)	(D)	1,061	12,587	(D)	(D)	602,446	1,684,115
	N/A	N/A	<1	4.5	<1	N/A	N/A	N/A	<1	2.4	N/A	N/A	N/A	1.2
Construction	15,883	15,883	35,159	51,956	1,335	(D)	(D)	6,535	28,625	37,536	21,744	23,744	5,404,695	12,018,858
	5.9	5.9	22.5	21.8	8.4	N/A	N/A	12.5	7.7	7.0	4.9	4.2	8.4	8.9
Manufacturing	11,819	11,819	16,145	17,842	13	(D)	(D)	860	33,344	74,072	21,597	33,274	9,046,028	12,657,653
	4.4	4.4	10.3	7.5	<1	N/A	N/A	1.6	9.0	13.9	4.8	5.9	1.3	9.4

Sector	Millard County		Morgan County		Piute County		Rich County		Sanpete County		Sevier County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Wholesale trade	(D)	(D)	14,708	15,507	(D)	29	0	(D)	3,689	7,609	(D)	(D)	4,010,937	6,047,750
	N/A	N/A	9.4	6.5	N/A	<1	<1	N/A	<1	1.4	N/A	N/A	1.6	4.5
Retail trade	15,393	15,393	7,442	18,035	(D)	(D)	1,809	4,428	25,771	32,080	47,103	57,117	6,409,896	10,085,319
	5.7	5.7	4.8	7.6	N/A	N/A	6.1	8.5	7.0	6.0	10.5	10.1	4.0	7.5
Transportation and warehousing	9,830	9,830	589	6,262	1,843	(D)	(D)	(D)	7,991	13,167	67,199	74,339	3,174,689	5,323,967
	3.7	3.7	<1	2.6	11.5	N/A	N/A	N/A	2.2	2.5	15.0	13.2	N/A	3.9
Information	2,546	2,546	(D)	808	0	98	51	(D)	14,559	17,074	3,893	1,151	2,676,796	5,386,442
	<1	<1	N/A	<1	<1	<1	<1	N/A	3.9	3.2	<1	<1	N/A	4.0
Finance and insurance	2,844	2,844	11,968	12,158	(D)	(D)	(D)	(D)	7,785	19,193	10,794	12,787	4,662,518	8,962,858
	1.1	1.1	7.6	5.1	N/A	N/A	N/A	N/A	2.1	3.6	2.4	2.3	N/A	6.6
Real estate and rental and leasing	1,099	1,099	3,833	1,403	0	(D)	(D)	(D)	6,682	10,513	5,695	8,667	1,390,393	3,843,223
	<1	<1	2.4	<1	<1	N/A	N/A	N/A	1.8	2.0	1.3	1.5	<1	2.9
Professional, scientific, and technical services	(D)	(D)	5,191	26,201	(D)	(D)	(D)	(D)	(D)	11,768	14,718	23,528	6,693,375	13,963,377
	N/A	N/A	3.3	11.0	N/A	N/A	N/A	N/A	N/A	2.2	3.3	4.2	N/A	10.4
Management of companies and enterprises	(D)	(D)	(D)	(D)	0	0	(D)	(D)	(D)	1,651	13	262	1,915,068	2,519,282
	N/A	N/A	N/A	N/A	<1	0	N/A	N/A	N/A	<1	<1	<1	<1	1.9
Administrative and support and waste management and remediation services	12,656	12,656	(D)	(D)	128	(D)	327	2,763	4,038	7.396	5,620	10,606	3,228,691	5,573,755
	4.7	4.7	N/A	N/A	<1	N/A	1.1	5.3	1.1	1.4	1.3	1.9	N/A	4.1
Educational services	(D)	(D)	(D)	1,126	40	120	(D)	325	(D)	(D)	(D)	(D)	1,756,196	2,952,678
	N/A	N/A	N/A	<1	<1	<	N/A	<1	N/A	N/A	N/A	N/A	N/A	2.2
Health care and social assistance	(D)	(D)	(D)	10,696	(D)	(D)	(D)	(D)	(D)	(D)	(D)	(D)	7,648,607	11,147,476
	N/A	N/A	N/A	4.5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.3
Arts, entertainment, and recreation	(D)	(D)	(D)	2,845	503	(D)	(D)	1,821	1,133	1,151	498	1,186	744,715	1,259,816
	N/A	N/A	N/A	1.2	3.2	N/A	N/A	3.5	<1	<1	<1	<1	1.7	<1
Accommodation and food services	(D)	(D)	(D)	4,029	501	(D)	(D)	6,349	5,785	9,849	16,884	22,251	2,277,932	4,006,686
	N/A	N/A	N/A	1.7	3.1	N/A	N/A	12.2	1.6	1.8	3.8	4.0	9.8	3.0
Other services	12,992	12,992	(D)	12,758	(D)	(D)	3,176	4,823	25,424	30,510	22,024	27,260	3,889,012	5,584,537
	4.8	4.8	N/A	5.3	N/A	N/A	10.7	9.2	6.9	5.7	4.9	4.8	4.9	4.1
Government and government enterprises	65,520	65,520	24,941	35,820	7,880	6,218	12,251	12,832	151,294	282,534	105,178	117,196	17,009,682	20,234,868
	24.4	24.4	15.9	15.0	49.4	38.1	41.5	24.6	40.9	34.1	23.5	20.8	34.3	15.0

Sources: BEA 2010b, 2021b

Note: All percentages are rounded to the nearest tenth.

All 2010 dollar values were adjusted for inflation.

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

Table A-19 (Part 4). Utah Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Summit County		Tooele County		Uintah County		Wasatch County		Wayne County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	3,266,191	7,927,922	2,138,705	3,535,506	1,263,931	1,271,778	965,359	2,581,316	93,930	134,670	111,999,656	186,990,527
Population (persons)	36,501	43,093	58,479	76,640	32,457	36,204	23,638	36,173	2,765	2,558	2,776,094	3,337,975
Per capita personal income (dollars)	89,482	183,972	36,572	46,131	38,942	35,128	40,839	71,360	33,971	52,647	40,345	56,019
Earnings by place of work (thousands of dollars)	1,493,459	2,528,676	1,185,602	1,337,111	1,021,101	836,943	390,259	834,504	56,002	73,536	83,829,430	135,242,519
Wages and salaries (thousands of dollars)	993,090	1,692,750	878,183	999,031	769,034	619,476	259,221	584,359	39,399	48,000	62,116,762	98,905,986
Supplement to wages and salaries	207,126	296,520	225,577	240,755	171,894	151,280	65,728	124,501	11,676	12,768	15,249,963	21,218,296
Proprietors' income	293,243	539,406	81,843	97,325	80,172	66,187	65,311	125,644	4,926	12,768	6,462,704	15,118,237
Farm earnings	7,577	8,127	8,127	9,878	948	11,257	-1,654	660	2,178	6,459	272,662	432,762
Nonfarm earnings	1,485,882	2,520,549	1,177,475	1,327,233	1,020,153	825,686	391,914	833,844	53,824	67,077	83,556,767	134,809,757
Private nonfarm earnings	1,297,403	2,320,400	787,401	978,262	830,793	627,335	298,946	696,612	35,378	49,901	66,547,085	114,574,889
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)												
Forestry, fishing, and related activities	1,491	(D)	(D)	(D)	991	1,095	(D)	(D)	(D)	(D)	54,317	110,151
	<1	N/A	N/A	N/A	<1	<1	<1	N/A	N/A	N/A	N/A	<1
Mining (including quarrying and oil and gas extraction)	7,632	22,609	5,425	(D)	283,594	123,080	4,915	(D)	(D)	(D)	960,774	1,446,946
	<1	<1	<1	N/A	27.8	14.9	1.1	N/A	1.3	N/A	N/A	1.1
Utilities	7,550	(D)	(D)	15,019	23,383	37,962	(D)	13,872	(D)	(D)	602,446	1,684,115
	<1	N/A	N/A	1.1	2.3	4.6	<1	1.7	N/A	N/A	N/A	1.2
Construction	148,178	199,723	59,626	91,845	93,650	58,059	54,322	189,855	4,504	12,384	5,404,695	12,018,858
	10.0	7.9	5.1	6.9	9.2	7.0	6.5	22.8	13.9	18.5	8.4	8.9
Manufacturing	80,309	104,591	120,158	225,760	8,925	13,303	12,005	33,467	710	(D)	9,046,028	12,657,653
	5.4	4.1	10.2	17.0	<1	1.6	10.8	4.0	3.1	N/A	1.3	9.4
Wholesale trade	37,173	82,536	(D)	13,611	51,440	27,360	12,168	16,584	835	(D)	4,010,937	6,047,750
	2.5	3.3	N/A	1.0	5.0	3.3	4.8	2.0	3.1	N/A	1.6	4.5
Retail trade	132,318	164,590	56,131	82,845	58,058	74,513	25,140	69,273	2,164	4,498	6,409,896	10,085,319
	8.9	6.5	4.8	6.2	5.7	9.0	7.7	8.3	6.4	6.7	4.0	7.5
Transportation and warehousing	24,289	28,317	67,133	112,436	71,558	54,797	(D)	18,647	(D)	1,088	3,174,689	5,323,967
	1.6	1.1	5.7	8.5	7.0	6.6	3.8	2.2	N/A	1.6	N/A	3.9
Information	27,497	(D)	15,919	11,481	7,894	8,370	8,739	8,723	(D)	(D)	2,676,796	5,386,442
	1.9	N/A	1.4	<1	<1	1.0	3.2	1.0	2.2	N/A	N/A	4.0
Finance and insurance	67,184	98,775	13,896	20,271	17,697	14,678	10,086	21,847	(D)	(D)	4,662,518	8,962,858
	4.5	3.9	1.2	1.5	1.7	1.8	5.6	2.6	2.6	N/A	N/A	6.6
Real estate and rental and leasing	69,834	298,003	7,674	13,119	35,704	23,106	9,093	13,688	30	(D)	1,390,393	3,843,223
	4.7	11.8	<1	1.0	3.5	2.8	1.7	1.6	2.3	N/A	<1	2.9
Professional, scientific, and technical services	143,140	322,409	(D)	51,347	36,092	26,541	(D)	72,696	(D)	(D)	6,693,375	13,963,377
	9.6	12.8	N/A	3.9	3.5	3.2	8.0	8.7	N/A	N/A	N/A	10.4
Management of companies and enterprises	14,572	39,566	(D)	2,132	(D)	(D)	(D)	2,481	0	186	1,915,068	2,519,282
	<1	1.6	N/A	<1	N/A	N/A	2.3	<1	N/A	<1	<1	1.9

Sector	Summit County		Tooele County		Uintah County		Wasatch County		Wayne County		State of Utah	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Administrative and support and waste management and remediation services	42,084	78,860	175,397	68,687	(D)	(D)	15,425	24,155	(D)	(D)	3,228,691	5,573,755
	2.8	3.1	14.9	5.2	N/A	N/A	3.9	2.9	3.9	N/A	N/A	4.1
Educational services	18,263	24,348	4,812	22,209	1,513	7,561	3,116	9,299	(D)	49	1,756,196	2,952,678
	1.2	1.0	<1	1.7	<1	<1	2.1	1.1	<1	<1	N/A	2.2
Health care and social assistance	65,069	139,393	68,638	93,726	50,854	57,358	36,879	63,330	(D)	7,226	7,648,607	11,147,476
	4.4	5.5	5.8	7.1	5.0	6.9	9.2	7.6	9.4	10.8	N/A	8.3
Arts, entertainment, and recreation	156,294	225,991	38,558	8,005	699	2,812	2,798	19,035	894	929	744,715	1,259,816
	10.5	9.0	3.3	<1	<1	<1	<1	2.3	<1	1.4	1.7	<1
Accommodation and food services	174,544	296,361	21,292	39,480	20,166	30,894	41,288	65,171	5,293	10,793	2,277,932	4,006,686
	11.7	11.8	1.8	3.0	2.0	3.7	2.7	7.8	10.5	16.1	9.8	3.0
Other services	79,981	103,625	59,409	89,750	49,415	54,226	28,615	53,405	2,637	3,032	3,889,012	5,584,537
	5.4	4.1	5.0	6.8	4.8	6.6	4.7	6.4	7.3	4.5	4.9	4.1
Government and government enterprises	188,479	200,149	390,074	348,971	189,361	198,351	92,968	137,232	18,446	17,176	17,009,682	20,234,868
	12.7	7.9	33.1	26.3	18.6	24.0	20.4	16.5	23.7	11.9	34.3	15.0

Sources: BEA 2010b, 2021b

Note: All percentages are rounded to the nearest tenth.

All 2010 dollar values were adjusted for inflation.

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

Table A-20 (Part 1). Wyoming Analysis Area Employment by Sector (2010 and 2021)

Sector	Albany County		Big Horn County		Campbell County		Carbon County		Converse County		Crook County		Fremont County		State of Wyoming	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	22,700	25,169	6,750	6,800	36,344	32,069	9,599	9,852	8,203	8,763	4,291	4,676	24,428	23,249	385,059	409,176
Wage and salary employment	17,995	19,178	4,572	4,519	29,759	24,482	7,217	7,321	5,993	6,266	2,591	2,743	17,735	16,220	290,013	284,326
Proprietors employment	4,705	5,991	2,178	2,281	6,585	7,587	2,382	2,531	2,210	2,497	1,700	1,933	6,693	7,029	95,046	124,850
Farm proprietors employment	394	414	584	607	661	733	241	251	362	367	419	434	1,251	1,244	10,216	10,847
Nonfarm proprietors employment	4,311	5,577	1,594	1,674	5,924	6,854	2,141	2,280	1,848	2,130	1,281	1,499	5,442	5,785	84,830	114,003
Farm employment	516	567	745	786	793	917	392	446	499	533	511	553	1,471	1,501	13,053	14,277
Nonfarm employment	22,184	24,602	6,005	6,014	35,551	31,152	9,207	9,406	7,704	8,230	3,780	4,123	22,957	21,748	372,006	394,899
Private nonfarm employment	14,176	16,663	4,426	4,493	30,964	26,377	7,000	7,482	6,159	6,536	3,011	3,385	16,812	16,091	296,953	320,988
By Industry (Number of Jobs/Percentage of Total Employment)																
Forestry, fishing, and related activities	113	146	(D)	130	120	(D)	(D)	169	95	117	127	146	234	(D)	2,816	3,323
	<1	<1	N/A	1.9	<1	N/A	N/A	1.7	1.2	1.3	3	3.1	1	N/A	<1	<1
Mining (including quarrying and oil and gas extraction)	151	167	639	479	8,978	5,532	459	(D)	1,297	1,266	387	399	1,071	578	30,919	18,824
	<1	<1	9.5	7	24.7	17.3	4.8	N/A	15.8	14.4	9.0	8.5	4.4	2.5	8.0	4.6
Utilities	36	46	26	33	273	336	78	42	(D)	(D)	(D)	(D)	75	81	2,586	2,551
	<1	<1	<1	<1	<1	1	<1	<1	N/A	N/A	N/A	N/A	<1	<1	<1	<1
Construction	1,134	1,198	477	607	4,288	2,457	763	(D)	765	589	369	411	1,589	1,386	30,543	29,989
	5	4.8	7.1	8.9	11.8	7.7	7.9	N/A	9.3	6.7	8.6	8.8	6.5	6	7.9	7.3
Manufacturing	410	679	304	402	588	607	(D)	(D)	127	194	208	280	397	515	10,441	12,284
	1.8	2.7	4.5	5.9	1.6	1.9	N/A	N/A	1.5	2.2	4.8	6.0	1.6	2.2	2.7	3.0
Wholesale trade	198	200	165	123	1,697	1,339	72	77	(D)	(D)	(D)	91	440	398	9,387	8,547
	<1	<1	2.4	1.8	4.7	4.2	<1	<1	N/A	N/A	N/A	1.9	1.8	1.7	2.4	2.1
Retail trade	2,144	2,159	(D)	460	3,066	3,263	938	996	616	661	326	417	2,516	2,334	38,004	39,259
	9.4	8.6	N/A	6.8	8.4	10.2	9.8	10.1	7.5	7.5	7.6	8.9	10.3	10	9.9	9.6
Transportation and warehousing	275	513	214	185	1,491	1,396	529	349	459	471	136	(D)	554	475	14,094	16,124
	1.2	2	3.2	2.7	4.1	4.4	5.5	3.5	5.6	5.4	3.2	N/A	2.3	2	3.7	3.9
Information	201	179	131	80	240	280	98	68	75	46	(D)	(D)	285	181	4,701	4,197
	<1	<1	1.9	1.2	<1	<1	1	<1	<1	<1	N/A	N/A	1.2	<1	1.2	1

Sector	Albany County		Big Horn County		Campbell County		Carbon County		Converse County		Crook County		Fremont County		State of Wyoming	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Finance and insurance	788	1,066	222	242	752	994	275	409	176	341	(D)	181	671	911	14,999	26,587
	3.5	4.2	3.3	3.6	2.1	3.1	2.9	4.2	2.1	3.9	N/A	3.9	2.7	3.9	3.9	6.5
Real estate and rental and leasing	987	1,283	176	227	1,500	1,748	377	446	346	420	(D)	264	1,255	1,203	19,797	27,667
	4.3	5.1	2.6	3.3	4.1	5.5	3.9	4.5	4.2	4.8	N/A	5.6	5.1	5.2	5.1	6.8
Professional, scientific, and technical services	1,402	1,722	(D)	(D)	1,249	1,071	283	250	248	(D)	133	155	878	853	16,595	19,159
	6.2	6.8	N/A	N/A	3.4	3.3	2.9	2.5	3.0	N/A	3.1	3.3	3.6	3.7	4.3	4.7
Management of companies and enterprises	(D)	(D)	(D)	(D)	265	118	20	16	(D)	(D)	3	(D)	38	103	1,242	2,192
	N/A	N/A	N/A	N/A	<1	<1	<1	<1	N/A	N/A	<1	N/A	<1	<1	<1	<1
Administrative and support and waste management and remediation services	(D)	(D)	301	267	1,051	1,108	259	340	(D)	305	66	(D)	588	598	12,347	14,540
	N/A	N/A	4.5	3.9	2.9	3.5	2.7	3.5	N/A	3.5	1.5	N/A	2.4	2.6	3.2	3.6
Educational services	621	458	34	47	161	242	(D)	49	(D)	27	(D)	(D)	(D)	584	3,645	4,106
	2.7	1.8	<1	<1	<1	<1	N/A	<1	N/A	<1	N/A	N/A	N/A	2.5	<1	1
Health care and social assistance	1,939	2,405	265	286	1,293	1,469	(D)	470	(D)	397	(D)	(D)	(D)	2,454	28,965	30,657
	8.5	9.6	3.9	4.2	3.6	4.6	N/A	4.8	N/A	4.5	N/A	N/A	N/A	10.6	7.5	7.5
Arts, entertainment, and recreation	440	522	36	102	293	(D)	201	152	105	122	75	103	406	(D)	6,593	8,233
	1.9	2.1	<1	1.5	<1	N/A	2.1	1.5	1.3	1.4	1.7	2.2	1.7	N/A	1.7	2
Accommodation and food services	1,881	2,208	277	336	2,076	2,353	962	1,346	554	582	278	299	1,601	1,622	32,205	35,231
	8.3	8.8	4.1	4.9	5.7	7.3	10.0	13.7	6.8	6.6	6.5	6.4	6.6	7	8.4	8.6
Other services	882	996	274	244	1,583	1,457	411	364	354	400	169	187	1,229	1,095	17,074	17,518
	3.9	4	4.1	3.6	4.4	4.5	4.3	3.7	4.3	4.6	3.9	4	5	4.7	4.4	4.3
Government and government enterprises	8,008	7,939	1,579	1,521	4,587	4,775	2,207	1,924	1,545	1,694	769	738	6,145	5,657	75,053	73,911
	35.3	31.5	23.4	22.4	12.6	14.9	23.0	19.5	18.8	19.3	17.9	15.8	25.2	24.3	19.5	18.1

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

Table A-20 (Part 2). Wyoming Analysis Area Employment by Sector (2010 and 2021)

Sector	Hot Spring County		Johnson County		Laramie County		Lincoln County		Natrona County		Niobrara County		Park County		State of Wyoming	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	3,175	2,938	5,916	6,438	61,441	75,024	9,833	11,969	51,833	52,883	1,709	1,733	20,280	21,916	385,059	409,176
Wage and salary employment	2,270	2,028	3,539	3,463	48,730	52,739	6,496	7,293	40,075	38,830	1,024	967	14,086	14,337	290,013	284,326
Proprietors employment	905	910	2,377	2,975	12,711	22,285	3,337	4,676	11,758	14,053	685	766	6,194	7,579	95,046	124,850
Farm proprietors employment	163	171	293	325	898	1,055	525	575	358	357	208	220	737	810	10,216	10,847
Nonfarm proprietors employment	742	739	2,084	2,650	11,813	21,230	2,812	4,101	11,400	13,696	477	546	5,457	6,769	84,830	114,003
Farm employment	190	201	406	466	1,135	1,369	628	692	469	483	262	282	980	1,092	13,053	14,277
Nonfarm employment	2,985	2,737	5,510	5,972	60,306	73,655	9,205	11,277	51,364	52,400	1,447	1,451	19,300	20,824	372,006	394,899
Private nonfarm employment	2,365	2,113	4,451	4,945	42,777	56,103	7,261	9,312	45,091	46,244	983	993	15,605	17,282	296,953	320,988
By Industry (Number of Jobs/Percentage of Total Employment)																
Forestry, fishing, and related activities	(D)	(D)	137	139	(D)	(D)	104	109	(D)	(D)	(D)	(D)	232	251	2,816	3,323
	N/A	N/A	2.3	2.2	N/A	N/A	1.1	<1	N/A	N/A	N/A	N/A	1.1	1.1	<1	<1
Mining (including quarrying and oil and gas extraction)	(D)	(D)	420	276	(D)	683	820	654	4,820	2,434	100	101	866	526	30,919	18,824
	N/A	N/A	7.1	4.3	N/A	<1	8.3	5.5	9.3	4.6	5.9	5.8	4.3	2.4	8	4.6
Utilities	(D)	(D)	16	23	143	184	202	169	(D)	150	(D)	(D)	78	60	2,586	2,551
	N/A	N/A	<1	<1	<1	<1	2.1	1.4	N/A	<1	N/A	N/A	<1	<1	<1	<1
Construction	149	145	536	451	3,553	4,716	1,183	1,607	3,782	4,074	86	(D)	1,591	1,733	30,543	29,989
	4.7	4.9	9.1	7	5.8	6.3	12	13.4	7.3	7.7	5	N/A	7.8	7.9	7.9	7.3
Manufacturing	84	154	77	152	1,609	1,509	222	280	1,800	1,882	(D)	(D)	647	599	10,441	12,284
	2.6	5.2	1.3	2.4	2.6	2	2.3	2.3	3.5	3.6	N/A	N/A	3.2	2.7	2.7	3
Wholesale trade	(D)	(D)	101	121	1,008	1,298	118	139	2,591	2,141	(D)	(D)	337	440	9,387	8,547
	N/A	N/A	1.7	1.9	1.6	1.7	1.2	1.2	5	4	N/A	N/A	1.7	2	2.4	2.1
Retail trade	265	(D)	501	535	6,659	6,685	907	1,272	5,873	5,914	(D)	(D)	2,422	2,240	38,004	39,259
	8.3	N/A	8.5	8.3	10.8	8.9	9.2	10.6	11.3	11.2	N/A	N/A	11.9	10.2	9.9	9.6
Transportation and warehousing	113	98	166	(D)	3,468	4,960	304	295	1,373	2,482	91	(D)	382	471	14,094	16,124
	3.6	3.3	2.8	N/A	5.6	6.6	3.1	2.5	2.6	4.7	5.3	N/A	1.9	2.1	3.7	3.9

Sector	Hot Spring County		Johnson County		Laramie County		Lincoln County		Natrona County		Niobrara County		Park County		State of Wyoming	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Information	50	(D)	53	72	1,242	1,071	134	143	588	421	(D)	(D)	253	278	4,701	4,197
	1.6	N/A	<1	1.1	2	1.4	1.4	1.2	1.1	<1	N/A	N/A	1.2	1.3	1.2	1
Finance and insurance	88	122	309	389	3,421	8,087	326	538	2,219	3,098	(D)	73	780	1,187	14,999	26,587
	2.8	4.2	5.2	6	5.6	10.8	3.3	4.5	4.3	5.9	N/A	4.2	3.8	5.4	3.9	6.5
Real estate and rental and leasing	94	125	465	743	2,916	4,987	521	922	2,735	3,448	(D)	69	906	1,474	19,797	27,667
	3	4.3	7.9	11.5	4.7	6.6	5.3	7.7	5.3	6.5	N/A	4	4.5	6.7	5.1	6.8
Professional, scientific, and technical services	101	111	240	351	2,706	3,505	(D)	560	2,373	2,406	(D)	61	901	1,071	16,595	19,159
	3.2	3.8	4.1	5.5	4.4	4.7	N/A	4.7	4.6	4.5	N/A	3.5	4.4	4.9	4.3	4.7
Management of companies and enterprises	(D)	(D)	(D)	(D)	198	612	(D)	70	171	171	0	0	97	76	1,242	2,192
	N/A	N/A	N/A	N/A	<1	<1	N/A	<1	<1	<1	0	0	<1	<1	<1	<1
Administrative and support and waste management and remediation services	(D)	(D)	(D)	170	2,487	3,335	302	468	2,139	2,156	(D)	22	582	747	12,347	14,540
	N/A	N/A	N/A	2.6	4.0	4.4	3.1	3.9	4.1	4.1	N/A	1.3	2.9	3.4	3.2	3.6
Educational services	20	(D)	(D)	42	566	570	64	93	385	(D)	(D)	(D)	135	185	3,645	4,106
	<1	N/A	N/A	<1	<1	<1	<1	<1	<1	N/A	N/A	N/A	<1	<1	<1	1
Health care and social assistance	366	(D)	(D)	286	4,768	5,219	489	586	6,443	6,634	(D)	(D)	1,734	1,925	28,965	30,657
	11.5	N/A	N/A	4.4	7.8	7	5	4.9	12.4	12.5	N/A	N/A	8.6	8.8	7.5	7.5
Arts, entertainment, and recreation	88	89	150	191	768	(D)	128	155	872	1,094	(D)	8	590	730	6,593	8,233
	2.8	3.0	2.5	3	1.2	N/A	1.3	1.3	1.7	2.1	N/A	<1	2.9	3.3	1.7	2
Accommodation and food services	321	278	553	567	4,195	4,626	559	677	3,760	(D)	(D)	(D)	2,180	2,326	32,205	35,231
	10.1	9.5	9.3	8.8	6.8	6.2	5.7	5.7	7.3	N/A	N/A	N/A	10.7	10.6	8.4	8.6
Other services	173	(D)	245	292	2,508	2,726	447	575	2,863	2,661	65	(D)	892	963	17,074	17,518
	5.4	N/A	4.1	4.5	4.1	3.6	4.5	4.8	5.5	5	3.8	N/A	4.4	4.4	4.4	4.3
Government and government enterprises	620	624	1,059	1,027	17,529	17,552	1,944	1,965	6,273	6,156	464	458	3,695	3,542	75,053	73,911
	19.5	21.2	17.9	16	28.5	23.4	19.8	16.4	12.1	11.6	27.2	26.4	18.2	16.2	19.5	18.1

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

Table A-20 (Part 3). Wyoming Analysis Area Employment by Sector (2010 and 2021)

Sector	Platte County		Sheridan County		Sublette County		Sweetwater County		Uinta County		Washakie County		Weston County		State of Wyoming	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Total employment (number of jobs)	5,649	5,551	19,595	25,067	8,157	6,167	29,291	25,444	12,791	11,554	5,522	5,174	3,893	3,945	385,059	409,176
Wage and salary employment	3,827	3,668	13,791	14,397	5,974	3,923	25,071	20,921	9,978	8,373	4,193	3,727	2,521	2,465	290,013	284,326
Proprietors employment	1,822	1,883	5,804	10,670	2,183	2,244	4,220	4,523	2,813	3,181	1,329	1,447	1,372	1,480	95,046	124,850
Farm proprietors employment	452	451	603	657	304	309	225	236	305	300	170	192	231	251	10,216	10,847
Nonfarm proprietors employment	1,370	1,432	5,201	10,013	1,879	1,935	3,995	4,287	2,508	2,881	1,159	1,255	1,141	1,229	84,830	114,003
Farm employment	593	622	762	847	428	451	266	283	373	388	279	311	288	314	13,053	14,277
Nonfarm employment	5,056	4,929	18,833	24,220	7,729	5,716	29,025	25,161	12,418	11,166	5,243	4,863	3,605	3,631	372,006	394,899
Private nonfarm employment	4,012	3,920	15,250	20,525	6,607	4,642	24,205	20,656	10,138	8,963	4,292	4,010	2,757	2,791	296,953	320,988
By Industry (Number of Jobs/Percentage of Total Employment)																
Forestry, fishing, and related activities	(D)	128	234	300	118	(D)	(D)	(D)	64	76	(D)	(D)	38	69	2,816	3,323
	N/A	2.3	1.2	1.2	1.4	N/A	N/A	N/A	<1	<1	N/A	N/A	1	1.7	<1	<1
Mining (including quarrying and oil and gas extraction)	(D)	117	677	284	1,907	575	5,788	3,448	946	238	195	134	341	339	30,919	18,824
	N/A	2.1	3.5	1.1	23.4	9.3	19.8	13.6	7.4	2.1	3.5	2.6	8.8	8.6	<1	4.6
Utilities	(D)	(D)	67	(D)	36	(D)	(D)	425	97	141	46	44	33	15	2,586	2,551
	N/A	N/A	<1	N/A	<1	N/A	N/A	1.7	<1	1.2	<1	<1	<1	<1	<1	<1
Construction	337	284	1,662	1,849	1,070	660	2,196	1,662	1,699	1,067	395	321	306	(D)	30,543	29,989
	6.0	5.1	8.5	7.4	13.1	10.7	7.5	6.5	13.3	9.2	7.2	6.2	7.9	N/A	7.9	7.3
Manufacturing	96	110	358	955	82	102	1,369	1,314	314	361	483	500	147	(D)	10,441	12,284
	1.7	2	1.8	3.8	1	1.7	4.7	5.2	2.5	3.1	8.7	9.7	3.8	N/A	2.7	3
Wholesale trade	(D)	(D)	426	(D)	72	(D)	(D)	656	304	173	128	166	50	33	9,387	8,547
	N/A	N/A	2.2	N/A	<1	N/A	N/A	2.6	2.4	1.5	2.3	3.2	1.3	<1	2.4	2.1
Retail trade	497	627	2,155	2,677	534	539	2,874	2,734	1,424	1,508	492	431	376	445	38,004	39,259
	8.8	11.3	11	10.7	6.5	8.7	9.8	10.7	11.1	13.1	8.9	8.3	9.7	11.3	9.9	9.6
Transportation and warehousing	299	225	725	696	339	152	1,650	1,294	460	482	183	198	169	166	14,094	16,124
	5.3	4.1	3.7	2.8	4.2	2.5	5.6	5.1	3.6	4.2	3.3	3.8	4.3	4.2	3.7	3.9

Sector	Platte County		Sheridan County		Sublette County		Sweetwater County		Uinta County		Washakie County		Weston County		State of Wyoming	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Information	38	28	210	342	45	22	247	130	248	308	90	51	45	34	4,701	4,197
	<1	<1	1.1	1.4	<1	<1	<1	<1	1.9	2.7	1.6	1	1.2	<1	1.2	1
Finance and insurance	234	216	913	2,314	127	181	710	809	408	469	184	190	166	160	14,999	26,587
	4.1	3.9	4.7	9.2	1.6	2.9	2.4	3.2	3.2	4.1	3.3	3.7	4.3	4.1	3.9	6.5
Real estate and rental and leasing	247	269	1,211	2,666	431	497	1,237	1,126	553	559	263	276	110	167	19,797	27,667
	4.4	4.8	6.2	10.6	5.3	8.1	4.2	4.4	4.3	4.8	4.8	5.3	2.8	4.2	5.1	6.8
Professional, scientific, and technical services	186	187	1,100	1,717	328	322	862	716	502	486	229	163	112	92	16,595	19,159
	3.3	3.4	5.6	6.8	4	5.2	2.9	2.8	3.9	4.2	4.1	3.2	2.9	2.3	4.3	4.7
Management of companies and enterprises	38	(D)	37	291	(D)	32	92	125	32	55	(D)	(D)	(D)	12	1,242	2,192
	<1	N/A	<1	1.2	N/A	<1	<1	<1	<1	<1	N/A	N/A	N/A	<1	<1	<1
Administrative and support and waste management and remediation services	134	(D)	575	695	(D)	240	742	813	295	241	(D)	(D)	(D)	106	12,347	14,540
	2.4	N/A	2.9	2.8	N/A	3.9	2.5	3.2	2.3	2.1	N/A	N/A	N/A	2.7	3.2	3.6
Educational services	27	32	167	237	(D)	(D)	124	(D)	(D)	81	37	(D)	(D)	(D)	3,645	4,106
	<1	<1	<1	<1	N/A	N/A	<1	N/A	N/A	<1	<1	N/A	N/A	N/A	<1	1
Health care and social assistance	383	367	1,725	1,694	(D)	(D)	1,283	1,532	(D)	1,259	630	(D)	(D)	(D)	28,965	30,657
	6.8	6.6	8.8	6.8	N/A	N/A	4.4	6	N/A	10.9	11.4	N/A	N/A	N/A	7.5	7.5
Arts, entertainment, and recreation	62	(D)	479	573	113	149	260	292	127	195	71	85	(D)	(D)	6,593	8,233
	1.1	N/A	2.4	2.3	1.4	2.4	<1	1.1	1	1.7	1.3	1.6	N/A	N/A	1.7	2
Accommodation and food services	492	506	1,601	1,611	526	412	2,274	2,336	797	786	323	311	(D)	(D)	32,205	35,231
	8.7	9.1	8.2	6.4	6.4	6.7	7.8	9.2	6.2	6.8	5.8	6.0	N/A	N/A	8.4	8.6
Other services	229	228	928	1,147	297	273	1,159	1,064	498	478	278	291	193	179	17,074	17,518
	4.1	4.1	4.7	4.6	3.6	4.4	4	4.2	3.9	4.1	5	5.6	5.0	4.5	4.4	4.3
Government and government enterprises	1,044	1,009	3,583	3,695	1,122	1,074	4,820	4,505	2,280	2,203	951	853	848	840	75,053	73,911
	18.5	18.2	18.3	14.7	13.8	17.4	16.5	17.7	17.8	19.1	17.2	16.5	21.8	21.3	19.5	18.1

Sources: BEA 2010a, 2021a

(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.

(N/A) means data are not available, or no information was given.

Table A-21 (Part 1). Wyoming Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Albany County		Big Horn County		Campbell County		Carbon County		Converse County		Crook County		Fremont County		State of Wyoming	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	1,579,334	1,825,036	480,132	549,715	2,962,772	2,598,834	785,012	949,319	715,890	951,343	334,265	379,099	1,829,332	2,023,919	32,970,057	40,322,831
Population (persons)	36,427	37,608	11,662	11,632	46,263	46,401	15,843	14,649	13,821	13,672	7,109	7,315	40,196	39,336	564,405	578,803
Per capita personal income (dollars)	43,356	48,528	41,170	47,259	64,042	56,008	49,550	64,804	51,798	69,583	47,021	51,825	45,510	51,452	58,416	69,666
Earnings by place of work (thousands of dollars)	1,075,264	1,211,877	302,939	308,958	2,998,686	2,117,995	537,427	595,468	490,676	604,083	166,423	199,932	1,182,477	1,121,041	22,966,334	24,273,866
Wages and salaries (thousands of dollars)	759,714	817,565	204,151	210,258	2,073,561	1,476,323	366,059	408,856	331,215	373,264	112,554	134,317	819,610	744,960	15,489,828	15,426,455
Supplement to wages and salaries	226,619	267,802	59,919	67,046	448,214	368,010	113,199	145,520	87,348	105,142	32,042	38,242	220,093	229,065	3,957,129	4,219,422
Proprietors' income	88,932	126,510	38,870	31,654	476,911	273,662	58,169	41,092	72,113	125,677	21,827	27,373	142,773	147,016	3,519,377	4,627,989
Farm earnings	2,959	9,687	9,343	11,524	-7,457	13,956	2,896	13,068	-321	8,531	-928	11,663	18,350	29,932	153,277	287,560
Nonfarm earnings	1,072,305	1,202,190	293,596	297,434	3,006,144	2,104,039	534,530	582,400	490,996	595,552	167,351	188,269	1,164,126	1,091,109	22,813,057	23,986,306
Private nonfarm earnings	547,808	699,885	195,492	194,129	2,638,794	1,735,833	376,157	440,323	384,982	455,151	119,300	138,714	753,408	691,056	17,237,710	18,281,004
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)																
Forestry, fishing, and related activities	1,340	2,056	(D)	2,243	1,786	(D)	(D)	2,250	3,225	3,698	2,782	3,357	3,410	(D)	118,817	53,082
	<1	<1	N/A	<1	<1	N/A	N/A	<1	<1	<1	1.7	1.8	<1	N/A	<1	<1
Mining (including quarrying and oil and gas extraction)	3,600	7,076	50,106	35,778	1,230,257	565,972	34,387	(D)	120,693	141,535	22,538	28,149	100,882	56,028	3,627,912	2,091,152
	<1	<1	17.1	12.0	40.9	26.9	6.4	N/A	24.6	23.8	13.5	15	8.7	5.1	15.9	8.7
Utilities	4,008	4,856	2,226	3116	38,997	51,847	7,710	5,535	(D)	(D)	(D)	(D)	8,438	8,928	349,808	353,681
	<1	<1	<1	1.0	1.3	2.5	1.4	1	N/A	N/A	N/A	N/A	<1	<1	1.5	1.5
Construction	58,382	67,869	24,690	30,345	351,563	176,775	56,482	(D)	63,747	51,653	17,227	23,189	99,779	74,540	2,223,256	1,976,951
	5.4	5.6	8.4	10.2	11.7	8.4	10.6	N/A	13.0	8.7	10.3	12.3	8.6	6.8	9.7	8.2
Manufacturing	22,532	34,699	14,051	23,983	55,119	47,233	(D)	(D)	5,590	10,991	11,893	18,661	14,492	22,121	752,057	978,307
	2.1	2.9	4.8	8.1	1.8	2.2	N/A	N/A	1.1	1.8	7.1	9.9	1.2	2	3.3	4.1
Wholesale trade	10,893	15,233	8,687	6,920	166,016	125,372	3,521	4,449	(D)	(D)	(D)	4,921	22,580	20,641	760,672	650,287
	1.0	1.3	3.0	2.3	5.5	6.9	<1	<1	N/A	N/A	N/A	2.6	1.9	1.9	3.3	2.7

Sector	Albany County		Big Horn County		Campbell County		Carbon County		Converse County		Crook County		Fremont County		State of Wyoming	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Retail trade	65,928	81,550	(D)	10,098	123,461	135,153	35,353	32,537	25,156	20,138	9,173	8,797	89,792	82,450	1,343,277	1,454,718
	6.1	6.8	N/A	3.4	4.1	6.4	6.6	5.6	5.1	3.4	5.5	4.7	7.7	7.6	5.9	6.1
Transportation and warehousing	18,756	15,390	14,253	23,369	129,124	159,480	48,586	37,589	40,161	54,316	5,944	(D)	34,825	59,075	1,200,603	2,791,054
	1.7	1.3	4.9	7.9	4.3	7.6	9.1	6.5	8.2	9.1	3.6	N/A	3.0	5.4	5.3	11.6
Information	10,087	6,169	7,854	4,203	14,393	18,043	4,439	4,082	3,419	2,318	(D)	(D)	14,089	9,450	288,954	282,771
	<1	<1	2.7	1.4	<1	<1	<1	<1	<1	<1	N/A	N/A	1.2	<1	1.3	1.2
Finance and insurance	39,254	44,140	7,503	8,321	36,001	42,962	11,220	3,672	7,357	10,288	(D)	330	24,762	25,124	934,962	842,124
	3.7	3.7	2.6	2.8	1.2	2	2.1	<1	1.5	1.7	N/A	<1	2.1	2.3	4.1	3.5
Real estate and rental and leasing	22,698	32,909	2,244	948	77,858	62,395	10,849	4,332	11,408	41,659	(D)	1,991	38,125	20,780	551,697	746,346
	2.1	2.7	<1	<1	2.6	3	2.0	<1	2.3	7	N/A	1.1	3.3	1.9	2.4	3.1
Professional, scientific, and technical services	82,709	103,505	(D)	(D)	95,113	57,559	12,243	10,267	11,109	(D)	6,013	9,328	50,650	39,759	1,015,148	1,282,758
	7.7	8.6	N/A	N/A	3.2	2.7	2.3	1.8	2.3	N/A	3.6	5	4.4	3.6	4.4	5.3
Management of companies and enterprises	(D)	(D)	(D)	(D)	48,390	11,394	1,905	1,734	(D)	(D)	637	(D)	3,332	9,786	146,154	185,754
	N/A	N/A	N/A	N/A	1.6	<1	<1	<1	N/A	N/A	<1	N/A	<1	<1	<1	<1
Administrative and support and waste management and remediation services	(D)	(D)	8,123	10,458	32,809	45,706	7,273	11,883	(D)	17,265	2,451	(D)	14,053	16,210	388,126	635,097
	N/A	N/A	2.8	3.5	1.1	2.2	1.4	2	N/A	2.9	1.5	N/A	1.2	1.5	1.7	2.6
Educational services	23,952	16,287	306	448	3,806	9,019	(D)	470	(D)	163	(D)	(D)	(D)	24,178	98,393	131,633
	2.2	1.4	<1	<1	<1	<1	N/A	<1	N/A	<1	N/A	N/A	N/A	2.2	<1	<1
Health care and social assistance	97,467	140,243	7,981	8,928	87,518	78,163	(D)	19,636	(D)	20,062	(D)	(D)	(D)	127,601	1,725,003	1,790,081
	9.1	11.7	2.7	3.0	2.9	3.7	N/A	3.4	N/A	3.4	N/A	N/A	N/A	11.7	7.6	7.5
Arts, entertainment, and recreation	4,771	13,022	468	1,185	2,705	(D)	7,822	5,163	1,161	1,103	2,467	2,280	3,763	(D)	123,308	156,217
	<1	1.1	<1	<1	<1	N/A	1.5	<1	<1	<1	1.5	1.2	<1	N/A	<1	<1
Accommodation and food services	37,589	52,761	4,293	6,365	48,998	64,368	26,236	46,221	10,754	18,455	4,610	8,624	33,886	41,999	843,366	1,157,822
	3.5	4.4	1.5	2.1	1.6	3.1	4.9	7.9	2.2	3.1	2.8	4.6	2.9	3.8	3.7	
Other services (except government and government enterprises)	32,141	40,454	8,701	7,423	94,880	76,949	14,059	11,405	13,001	15,733	4,512	7,834	47,225	42,390	746,199	721,169
	3.0	3.4	3.0	2.5	3.2	3.7	2.6	Feb-00	2.6	2.6	2.7	4.2	4.1	3.9	3.3	3.0

Sector	Albany County		Big Horn County		Campbell County		Carbon County		Converse County		Crook County		Fremont County		State of Wyoming	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Government and government enterprises	524,497	502,305	98,105	103,305	367,350	368,206	158,374	142,077	106,014	140,401	48,051	49,555	410,719	400,053	5,575,347	5,705,302
	48.9	41.8	33.4	34.7	12.2	17.5	29.6	24.4	21.6	23.6	28.7	26.3	35.3	36.7	24.4	23.8

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

Table A-21 (Part 2). Wyoming Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Hot Springs County		Johnson County		Laramie County		Lincoln County		Natrona County		Niobrara County		Park County		State of Wyoming	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	231,738	362,323	408,724	528,539	5,005,701	5,915,191	771,940	1,248,380	4,776,439	5,582,770	115,681	131,156	1,464,635	1,985,442	32,970,057	40,322,831
Population (persons)	4,814	4,597	8,588	8,623	92,247	100,863	18,085	20,153	75,463	79,555	2,495	2,438	28,251	30,108	564,405	578,803
Per capita personal income (dollars)	48,139	78,817	47,593	61,294	54,263	58,646	42,684	61,945	63,295	70,175	46,366	53,797	51,844	65,944	58,416	69,666
Earnings by place of work (thousands of dollars)	136,309	259,279	216,311	259,435	3,596,383	4,266,191	451,191	651,002	3,590,795	3,981,649	72,616	83,248	975,208	995,735	22,966,334	24,273,866
Wages and salaries (thousands of dollars)	92,060	88,551	142,986	155,930	2,505,828	2,930,494	320,727	402,574	2,253,390	2,052,343	41,181	41,237	650,628	664,276	15,489,828	15,426,455
Supplement to wages and salaries	25,411	27,364	40,483	46,054	743,449	864,455	90,667	113,186	508,742	513,312	13,391	15,240	171,906	189,946	3,957,129	4,219,422
Proprietors' income	18,839	143,364	32,843	57,451	347,106	471,242	39,796	135,242	828,664	1,415,994	18,044	26,771	152,674	141,513	3,519,377	4,627,989
Farm earnings	2,642	(315)	674	11,649	41,297	29,628	3,776	8,746	1,654	3,753	3,077	7,835	13,825	20,910	153,277	287,560
Nonfarm earnings	133,667	259,594	215,638	247,786	3,555,086	4,236,563	447,416	642,256	3,589,141	3,977,896	69,540	75,413	961,383	974,825	22,813,057	23,986,306
Private nonfarm earnings	95,568	214,327	142,330	170,611	2,049,505	2,667,692	322,260	488,146	3,102,221	3,518,567	40,162	43,536	698,331	706,571	17,237,710	18,281,004
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)																
Forestry, fishing, and related activities	(D)	(D)	3,301	2,802	(D)	(D)	1,693	1,059	(D)	(D)	(D)	(D)	4,696	3,520	118,817	53,082
	N/A	N/A	1.5	1.1	N/A	N/A	<1	<1	N/A	N/A	N/A	N/A	<1	<1	<1	<1

Sector	Hot Springs County		Johnson County		Laramie County		Lincoln County		Natrona County		Niobrara County		Park County		State of Wyoming	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Mining (including quarrying and oil and gas extraction)	(D)	(D)	13,594	20,838	(D)	62,692	92,490	89,610	603,587	187,661	1,763	2,892	107,117	40,716	3,627,912	2,091,152
	N/A	N/A	6.3	8.4	N/A	1.5	20.7	14	16.8	4.7	2.5	3.8	11.1	4.2	15.9	8.7
Utilities	(D)	(D)	1,744	1,710	17,907	24,023	27,871	23,675	(D)	19,614	(D)	(D)	7,912	7,069	349,808	353,681
	N/A	N/A	<1	<1	<1	<1	6.2	3.7	N/A	<1	N/A	N/A	<1	<1	1.5	1.5
Construction	8,329	6,700	30,347	18,197	208,038	359,054	60,537	103,263	398,088	277,455	4,850	(D)	96,662	93,259	2,223,256	1,976,951
	6.2	2.6	14.1	7.3	5.9	8.5	13.5	26.1	11.1	7	7.0	N/A	10.1	9.6	9.7	8.2
Manufacturing	3,516	5,258	1,543	4,282	125,896	122,226	8,506	11,274	127,448	148,974	(D)	(D)	29,191	29,934	752,057	978,307
	2.6	2.0	<1	1.7	3.5	2.9	1.9	1.8	3.6	3.7	N/A	N/A	3.0	3.1	3.3	4.1
Wholesale trade	(D)	(D)	3,382	6,123	70,971	98,709	5,088	8,960	277,592	193,541	(D)	(D)	18,690	27,263	760,672	650,287
	N/A	N/A	1.6	2.5	2.0	2.3	1.1	1.4	7.7	4.9	N/A	N/A	1.9	2.8	3.3	2.7
Retail trade	6,343	(D)	11,449	31,423	237,855	271,123	23,118	37,238	237,868	237,018	(D)	(D)	75,212	72,228	1,343,277	1,454,718
	4.7	N/A	5.3	12.7	6.7	6.4	5.2	5.8	6.6	6	N/A	N/A	7.8	7.4	5.9	6.1
Transportation and warehousing	7,405	133,450	7,393	(D)	273,519	355,214	17,349	73,391	167,605	1,174,864	10,814	(D)	19,260	22,681	1,200,603	2,791,054
	5.5	51.4	3.4	N/A	7.7	8.4	3.9	11.4	4.7	29.5	15.6	N/A	2.0	2,3	5.3	11.6
Information	1,426	(D)	3,480	5,184	86,648	76,961	9,413	20,234	32,784	24,213	(D)	(D)	11,846	19,648	288,954	282,771
	1.1	N/A	1.6	2.1	2.4	1.8	2.1	3.2	<1	<1	N/A	N/A	1.2	2	1.3	1.2
Finance and insurance	2,488	2,870	10,290	11,248	132,333	176,659	8,465	13,842	106,224	109,817	(D)	1,283	27,733	34,479	934,962	842,124
	1.9	1.1	4.8	4.5	3.7	4.2	1.9	2.2	3.0	2.8	N/A	1.7	2.9	3.5	4.1	3.5
Real estate and rental and leasing	1,936	2,585	10,907	1,470	75,346	86,237	5,843	15,315	97,644	146,041	(D)	4,315	23,939	35,390	551,697	746,346
	1.4	1.0	5.1	<1	2.1	2	1.3	2.4	2.7	3.7	N/A	5.7	2.5	3.6	2.4	3.1
Professional, scientific, and technical services	3,769	4,388	10,774	15,618	166,887	254,310	(D)	30,370	162,049	149,933	(D)	1,542	40,965	50,774	1,015,148	1,282,758
	2.8	1.7	5.0	6.3	4.7	6	N/A	4.7	4.5	3.8	N/A	2	4.3	5.2	4.4	5.3
Management of companies and enterprises	(D)	(D)	(D)	(D)	7,398	15,825	(D)	(3,688)	23,463	13,949	0	N/A	13,384	4,507	146,154	185,754
	N/A	N/A	N/A	N/A	<1	<1	N/A	<-1	<1	<1	<1	N/A	1.4	<1	<1	<1
Administrative and support and waste management and remediation services	(D)	(D)	(D)	4,073	74,625	134,069	8,041	10,734	69,717	82,764	(D)	329	13,552	23,945	388,126	635,097
	N/A	N/A	N/A	1.6	2.1	3.2	1.8	1.7	1.9	2.1	N/A	<1	1.4	2.5	1.7	2.6
Educational services	520	(D)	(D)	848	16,014	19,588	299	1,733	7,770	(D)	(D)	(D)	1,225	3,072	98,393	131,633
	<1	N/A	N/A	<1	<1	<1	<1	<1	<1	N/A	N/A	N/A	<1	<1	<1	<1
Health care and social assistance	15,395	(D)	(D)	9,612	298,554	341,645	15,800	17,958	487,259	462,836	(D)	(D)	104,731	115,664	1,725,003	1,790,081
	11.5	N/A	N/A	3.9	8.4	8.1	3.5	5.3	13.6	11.6	N/A	N/A	10.9	11.9	7.6	7.5
Arts, entertainment, and recreation	1,267	2,044	1,885	1,922	8,921	(D)	713	1,901	15,936	18,788	(D)	102	11,456	13,029	123,308	156,217
	<1	<1	<1	<1	<1	N/A	<1	<1	<1	<1	N/A	<1	1.2	1.3	<1	<1

Sector	Hot Springs County		Johnson County		Laramie County		Lincoln County		Natrona County		Niobrara County		Park County		State of Wyoming	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Accommodation and food services	6,235	6,117	11,896	13,538	100,220	137,908	8,107	15,643	98,013	(D)	(D)	(D)	58,033	70,854	843,366	1,157,822
	4.7	2.4	5.5	5.5	2.8	3.3	1.8	2.4	2.7	N/A	N/A	N/A	6.0	7.3	3.7	
Other services (except government and government enterprises)	4,582	(D)	7,774	10,462	99,637	115,354	11,727	15,634	164,556	125,235	3,529	(D)	32,729	38,539	746,199	721,169
	3.4	N/A	3.6	4.2	2.8	2.7	2.6	2.4	4.6	3.1	5.1	N/A	3.4	4	3.3	3.0
Government and government enterprises	38,100	45,267	73,308	77,175	1,505,581	1,568,871	125,156	154,110	486,920	459,329	29,378	31,877	263,051	268,254	5,575,347	5,705,302
	28.5	17.4	34.0	31.1	42.4	37	28.0	24	13.6	11.5	42.2	42.3	27.4	27.5	24.4	23.8

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

Table A-21 (Part 3). Wyoming Analysis Area Labor Income by Sector, 2010 and 2021 (2021$)

Sector	Platte County		Sheridan County		Sublette County		Sweetwater County		Uinta County		Washakie County		Weston County		State of Wyoming	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Personal income (thousands of dollars)	421,852	464,250	1,881,054	2,039,562	597,974	570,695	2,402,208	2,369,272	1,040,119	911,174	401,392	464,107	349,622	334,054	32,970,057	40,322,831
Population (persons)	8,666	8,699	29,151	31,646	10,232	8,697	43,567	41,614	21,096	20,635	8,528	7,705	7,200	6,745	564,405	578,803
Per capita personal income (dollars)	48,678	53,368	64,528	64,449	58,441	65,620	55,139	56,934	49,305	44,157	47,068	60,235	48,558	49,526	58,416	69,666
Earnings by place of work (thousands of dollars)	290,448	283,389	956,515	1,065,297	606,463	330,532	2,219,086	1,965,805	769,845	548,456	277,699	296,296	170,146	173,621	22,966,334	24,273,866
Wages and salaries (thousands of dollars)	190,102	180,252	659,317	723,159	421,100	217,269	1,635,167	1,268,626	544,702	379,837	189,348	177,335	110,613	112,175	15,489,828	15,426,455
Supplement to wages and salaries	59,725	59,726	176,516	205,644	88,668	60,779	379,521	337,973	137,577	114,916	52,911	52,868	35,651	39,979	3,957,129	4,219,422
Proprietors' income	40,622	43,411	120,683	136,494	96,696	52,484	204,398	359,206	87,566	53,703	35,440	66,093	23,882	21,467	3,519,377	4,627,989
Farm earnings	23,158	28,346	773	8,526	1,428	15,706	-1,845	16,385	2,095	4,104	10,415	9,409	-1,162	232	153,277	287,560

Sector	Platte County		Sheridan County		Sublette County		Sweetwater County		Uinta County		Washakie County		Weston County		State of Wyoming	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Nonfarm earnings	267,290	255,043	955,743	1,056,771	605,036	314,826	2,220,930	1,949,420	767,750	544,352	267,284	286,887	171,308	173,389	22,813,057	23,986,306
Private nonfarm earnings	203,061	189,777	674,907	742,096	516,337	235,181	1,874,794	1,619,639	617,169	408,755	203,551	229,366	117,586	116,439	17,237,710	18,281,004
By Industry (Earnings in Thousands of Dollars/Percentage of Nonfarm Earnings)																
Forestry, fishing, and related activities	(D)	2,585	10,387	6,073	3,491	(D)	(D)	(D)	831	922	(D)	(D)	1,066	1,465	118,817	53,082
	N/A	1	1.1	<1	<1	N/A	N/A	N/A	<1	<1	N/A	N/A	<1	<1	<1	<1
Mining (including quarrying and oil and gas extraction)	(D)	7,859	35,416	9,277	253,896	77,108	725,104	631,829	120,172	15,886	17,769	12,815	14,744	15,085	3,627,912	2,091,152
	N/A	3.1	3.7	<1	42.0	24.5	32.6	32.4	15.7	2.9	6.6	4.5	8.6	8.7	15.9	8.7
Utilities	(D)	(D)	9,602	(D)	4,419	(D)	(D)	63,928	12,256	19,931	5,261	5,599	3,573	1,027	349,808	353,681
	N/A	N/A	1.0	N/A	<1	N/A	N/A	3.3	1.6	3.7	2.0	2.0	2.1	<1	1.5	1.5
Construction	23,697	11,374	105,509	101,735	86,419	33,168	191,143	110,189	145,312	63,539	21,410	18,328	21,628	(D)	2,223,256	1,976,951
	8.9	4.5	11.0	9.6	14.3	10.5	8.6	5.7	18.9	11.7	8.0	6.4	12.6	N/A	9.7	8.2
Manufacturing	2,767	3,497	17,997	51,664	3,131	4,382	164,324	174,385	22,460	20,953	34,372	35,898	14,735	(D)	752,057	978,307
	1.0	1.4	1.9	4.9	<1	1.4	7.4	8.9	2.9	3.8	12.9	12.5	8.6	N/A	3.3	4.1
Wholesale trade	(D)	(D)	24,309	(D)	5,911	(D)	(D)	46,087	26,348	11,448	6,190	8,469	2,466	1,641	760,672	650,287
	N/A	N/A	2.5	N/A	<1	N/A	N/A	2.4	3.4	2.1	2.3	3.0	1.4	<1	3.3	2.7
Retail trade	12,715	17,302	70,364	82,908	20,356	15,901	99,369	100,691	39,701	42,755	16,771	13,839	14,314	10,034	1,343,277	1,454,718
	4.8	6.8	7.4	7.8	3.4	5.1	4.5	5.2	5.2	7.9	6.3	4.8	8.4	5.8	5.9	6.1
Transportation and warehousing	24,694	18,030	63,142	63,869	38,337	16,408	168,066	153,172	41,395	43,163	11,817	59,475	11,119	15,694	1,200,603	2,791,054
	9.2	7,1	6.6	6.0	6.3	5,2	7.6	7.9	5.4	7.9	4.4	20.7	6.5	9.1	5.3	11.6
Information	1,534	1,215	14,069	19,673	3,176	1,725	10,911	8,683	20,553	25,298	5,705	4,297	1,501	1,349	288,954	282,771
	<1	<1	1.5	1.9	<1	<1	<1	<1	2.7	4.6	2.1	1.5	<1	<1	1.3	1.2
Finance and insurance	9,939	8,392	32,384	42,136	8,777	7,794	35,824	29,912	11,653	14,408	10,012	6,155	4,023	5,410	934,962	842,124
	3.7	3.3	3.4	4.0	1.5	2.5	1.6	1.5	1.5	2.6	3.7	2.1	2.3	3.1	4.1	3.5
Real estate and rental and leasing	3,765	8,076	11,859	17,021	5,299	16,920	71,706	38,425	28,077	16,127	4,308	5,592	2,716	5,731	551,697	746,346
	1.4	3.2	1.2	1.6	<1	5.4	3.2	2	3.7	3	1.6	1.9	1.6	3.3	2.4	3.1
Professional, scientific, and technical services	8,167	8,703	67,735	92,553	26,938	15,829	60,048	42,172	27,210	23,094	11,850	7,264	4,275	2,934	1,015,148	1,282,758
	3.1	3.4	7.1	8.8	4.5	5	2.7	2.2	3.5	4.2	4.4	2.5	2.5	1.7	4.4	5.3
Management of companies and enterprises	1,719	(D)	2,632	17,101	(D)	731	7,979	10,958	1,089	3,209	(D)	(D)	(D)	2,752	146,154	185,754
	<1	N/A	<1	1.6	N/A	<1	<1	<1	<1	<1	N/A	N/A	N/A	1.6	<1	<1

Sector	Platte County		Sheridan County		Sublette County		Sweetwater County		Uinta County		Washakie County		Weston County		State of Wyoming	
	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021	2010	2021
Administrative and support and waste management and remediation services	1,902	(D)	21,440	19,995	(D)	7,722	25,863	28,892	27,210	6,815	(D)	(D)	(D)	1,193	388,126	635,097
	<1	N/A	2.2	1.9	N/A	2.5	1.2	1.5	3.5	1.3	N/A	N/A	N/A	<1	1.7	2.6
Educational services	1,039	657	4,606	6,718	(D)	(D)	2,759	(D)	(D)	1,505	420	(D)	(D)	(D)	98,393	131,633
	<1	<1	<1	<1	N/A	N/A	<1	N/A	N/A	<1	<1	N/A	N/A	N/A	<1	<1
Health care and social assistance	20,374	22,870	98,713	88,536	(D)	(D)	64,891	70,060	(D)	62,883	29,970	(D)	(D)	(D)	1,725,003	1,790,081
	7.6	9	10.3	8.4	N/A	N/A	2.9	3.6	N/A	11.6	11.2	N/A	N/A	N/A	7.6	7.5
Arts, entertainment, and recreation	585	(D)	7,204	8,501	2,362	1,771	2,685	3,996	4,399	5,154	736	738	(D)	(D)	123,308	156,217
	<1	N/A	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	N/A	N/A	<1	<1
Accommodation and food services	8,602	11,211	34,782	44,704	18,512	10,275	53,690	56,674	16,136	18,670	5,466	6,198	(D)	(D)	843,366	1,157,822
	3.2	4.4	3.6	4.2	3.1	3.3	2.4	2.9	2.1	3.4	2.0	2.2	N/A	N/A	3.7	
Other services (except government and government enterprises)	5,868	7,938	42,757	40,474	12,317	8,185	61,355	45,603	15,906	12,995	8,445	8,466	4,627	4,192	746,199	721,169
	2.2	3.1	4.5	3.8	2.0	2.6	2.8	2.3	2.1	2.4	3.2	3.0	2.7	2.4	3.3	3.0
Government and government enterprises	64,229	65,266	280,836	314,675	88,699	79,645	346,137	329,781	150,581	135,597	63,733	57,521	53,723	56,950	5,575,347	5,705,302
	24.0	25.6	29.4	29.8	14.7	25.3	15.6	16.9	19.6	24.9	23.8	20.1	31.4	32.8	24.4	23.8

Sources: BEA 2010b, 2021b
Note: All percentages are rounded to the nearest tenth.
All 2010 dollar values were adjusted for inflation.
(D) represents data not shown to avoid disclosure of confidential information; estimates are included in high-level totals.
(N/A) means data are not available, or no information was given.

Table A-22. Oil and Gas Production in the Planning Area (2018–2022)

Geography	Resource	2018	2019	2020	2021	2022	Total Change 2018–2021	Total % Change 2018–2021	Average Annual % Change 2018–2021
Counties in Colorado									
Garfield	Gas (mcf)	168,815,925	163,668,642	176,841,498	173,542,982	156,875,661	-11,940,264	-7.1	-1.8
	Oil (bbl)	474,360	487,635	448,937	418,925	374,488	-99,872	-21.1	-5.3
Jackson	Gas (mcf)	136,382	124,275	84,196	83,237	76,810	-59,572	-43.7	-10.9
	Oil (bbl)	85,168	118,431	143,135	64,644	64,634	-20,534	-24.1	-6.0
Mesa	Gas (mcf)	21,531,788	20,434,827	16,439,760	14,092,619	12,301,551	-9,230,237	-42.9	-10.7
	Oil (bbl)	41,536	45,858	33,663	21,939	18,535	-23,001	-55.4	-13.8
Moffat	Gas (mcf)	8,928,791	8,384,288	7,735,211	7,310,794	6,380,251	-2,548,540	-28.5	-7.1
	Oil (bbl)	191,421	204,745	156,472	148,797	125,107	-66,314	-34.6	-8.7
Rio Blanco	Gas (mcf)	73,107,127	75,595,198	68,716,585	63,400,913	46,449,501	-26,657,626	-36.5	-7.3
	Oil (bbl)	2,053,425	1,922,110	1,841,100	1,638,924	1,552,138	-501,287	-24.4	-4.9
Routt	Gas (mcf)	5,235	7,091	5,843	4,948	1,366	-3,869	-73.9	-18.5
	Oil (bbl)	10,194	6,529	3,806	5,978	168	-10,026	-98.4	-24.6
Total for Colorado	Gas (mcf)	645,844,237	653,040,055	573,460,764	509,638,437	503,706,090	-142,138,147	-22.0	-5.5
	Oil (bbl)	6,795,715	5,987,111	6,783,466	9,276,360	10,545,883	3,750,168	55.2	13.8
Counties in Idaho									
Payette	Gas (mcf)	83,248	25,151	11,465	23,139	5,529	-77,719	-93.4	-23.3
	Oil (bbl)	1,361	213	164	437	117	-1244	-91.4	-22.9
Total for Idaho	Gas (mcf)	83,248	25,151	11,465	23,139	5,529	-77,719	-93.4	-23.3
	Oil (bbl)	1,361	213	164	437	117	-1244	-91.4	-22.9
Counties in Montana									
Blaine	Gas (mcf)	864,652	829,467	782,354	721,387	699,293	-165,359	-19.1	-4.8
	Oil (bbl)	36,719	47,554	36,872	45,720	43,303	6,584	17.9	4.5
Carbon	Gas (mcf)	1,257,138	1,209,202	1,162,085	1,018,238	951,055	-306,083	-24.3	-6.1
	Oil (bbl)	367,321	370,660	318,095	300,569	318,185	-49,136	-13.4	-3.3
Carter	Oil (bbl)	237,628	294,489	337,306	269,416	230,747	-6,881	-2.9	-0.7
Chouteau	Gas (mcf)	81,905	91,633	75,511	76,930	70,918	-10,987	-13.4	-3.4
Custer	Gas (mcf)	13,223	2,304	830	0	0	-13223	-100.0	-25.0
Dawson	Gas (mcf)	70,025	56,092	49,453	44,994	37,069	-32,956	-47.1	-11.8
	Oil (bbl)	168,708	156,707	141,186	127,750	127,142	-41,566	-24.6	-6.2
Fallon	Gas (mcf)	2,671,750	2,486,694	2,306,560	2,180,034	2,068,248	-603,502	-22.6	-5.6
	Oil (bbl)	1,294,613	1,326,391	1,175,874	1,100,311	1,021,878	-272,735	-21.1	-5.3
Fergus	Gas (mcf)	7,780	7,536	8,142	7,640	7,212	-568	-7.3	-1.8
Garfield	Oil (bbl)	1,387	1,200	1,174	1,386	1,118	-269	-19.4	-4.8
Musselshell	Oil (bbl)	4,287	4,278	2,041	3,863	4,720	433	10.1	2.5
Petroleum	Oil (bbl)	5,691	7,429	7,976	8,447	8,155	2,464	43.3	10.8
Phillips	Gas (mcf)	4,834,733	4,520,784	4,385,377	4,064,755	3,791,391	-1,043,342	-21.6	-5.4
Powder River	Gas (mcf)	8,593	1,544	5,024	8,023	9,425	832	9.7	2.4
	Oil (bbl)	232,625	284,416	333,421	263,231	225,571	-7,054	-3.0	-0.8
Prairie	Gas (mcf)	23,438	22,627	22,956	15,996	16,765	-6,673	-28.5	-7.1
	Oil (bbl)	80,331	73,863	64,818	54,740	58,148	-22,183	-27.6	-6.9

Geography	Resource	2018	2019	2020	2021	2022	Total Change 2018–2021	Total % Change 2018–2021	Average Annual % Change 2018–2021
Roosevelt	Gas (mcf)	151,644	308,691	185,485	184,724	190,079	38,435	25.3	6.3
	Oil (bbl)	135,809	260,642	91,450	105,588	79,170	-56,639	-41.7	-10.4
Rosebud	Gas (mcf)	224	176	123	126	145	-79	-35.3	-8.8
	Oil (bbl)	8,406	7,224	4,656	5,580	6,408	-1,998	-23.8	-5.9
Stillwater	Gas (mcf)	0	0	211	0	0	0	N/A	N/A
	Oil (bbl)	0	1,919	4,248	4,945	5,617	5,617	N/A	N/A
Valley	Gas (mcf)	860,954	822,112	781,702	727,822	720,379	-140,575	-16.3	-4.1
Wibaux	Gas (mcf)	85,421	82,162	77,331	66,721	55,597	-29,824	-34.9	-8.7
	Oil (bbl)	70,848	64,257	57,158	47,709	51,594	-19,254	-27.2	-6.8
Total for Montana	Gas (mcf)	11,723,676	11,212,307	10,528,418	10,558,446	9,949,936	-1,773,740	-15.1	-3.8
	Oil (bbl)	2,997,351	3,283,460	2,884,167	3,806,513	3,094,413	97,062	3.2	0.8
Counties in Nevada									
Eureka	Gas (mcf)	0	0	8,848	4,177	2,246	2,246	N/A	N/A
	Oil (bbl)	27,416	25,039	37,834	29,209	22,050	-5,366	-19.6	-4.9
Nye	Gas (mcf)	1,971	1,890	1,444	1,210	1,444	-527	-26.7	-6.7
	Oil (bbl)	230,088	242,590	200,036	190,310	210,102	-19,986	-8.7	-2.2
Total for Nevada	Gas (mcf)	1,971	1,890	10,292	5,387	3,690	1,719	87.2	21.8
	Oil (bbl)	257,504	267,629	237,870	219,519	232,152	-25,352	-9.8	-2.5
Counties in North Dakota									
Bowman	Gas (mcf)	1,005,279	914,100	806,739	711,935	658,443	-346,836	-34.5	-8.6
	Oil (bbl)	672,471	612,887	535,318	473,101	408,653	-263,818	-39.2	-9.8
Slope	Gas (mcf)	63,522	66,106	66,604	49,884	48,958	-14,564	-22.9	-5.7
	Oil (bbl)	269,232	246,114	219,249	198,141	177,084	-92,148	-34.2	-8.6
Total for North Dakota	Gas (mcf)	67,387,123	87,503,485	82,522,902	117,326,062	118,788,527	51,401,404	76.3	19.1
	Oil (bbl)	34,642,345	45,284,989	39,147,046	49,431,810	43,063,872	8,421,527	24.3	6.1
Counties in South Dakota									
Harding	Gas (mcf)	1,029,792	949,527	836,796	623,974	477,212	-552,580	-53.7	-13.4
	Oil (bbl)	112,641	103,748	84,699	80,738	76,882	-35,759	-31.7	-7.9
Total for South Dakota	Gas (mcf)	1,029,792	949,527	836,796	625,804	489,482	-540,310	-52.5	-13.1
	Oil (bbl)	119,826	110,211	102,873	122,760	121,517	1,691	1.4	0.4
Counties in Utah									
Carbon	Gas (mcf)	23,067,003	21,041,172	18,937,125	17,190,820	16,577,346	-6,489,657	-28.1	-7.0
	Oil (bbl)	45,495	42,535	32,817	27,444	27,545	-17,950	-39.5	-9.9
Daggett	Gas (mcf)	84,187	139,284	106,839	83,789	107,054	22,867	27.2	6.8
	Oil (bbl)	98	156	77	59	159	61	62.2	15.6
Duchesne	Gas (mcf)	3,045,131	2,646,461	2,139,287	2,088,342	2,219,987	-825,144	-27.1	-6.8
	Oil (bbl)	1,818,645	1,694,119	1,222,840	1,270,112	1,104,720	-713,925	-39.3	-9.8
Emery	Gas (mcf)	3,928,264	3,519,504	3,323,826	3,073,158	2,876,228	-1,052,036	-26.8	-6.7
	Oil (bbl)	388	195	42	0	0	-388	-100.0	-25.0
Garfield	Gas (mcf)	9,125	9,125	9,149	9,130	9,110	-15	-0.2	0.0
	Oil (bbl)	134,483	128,372	114,672	114,433	117,438	-17,045	-12.7	-3.2
Grand	Gas (mcf)	2,421,198	2,105,987	1,899,479	2,056,840	2,271,259	-149,939	-6.2	-1.5
	Oil (bbl)	251,971	205,600	145,680	128,347	112,901	-139,070	-55.2	-13.8

Geography	Resource	2018	2019	2020	2021	2022	Total Change 2018–2021	Total % Change 2018–2021	Average Annual % Change 2018–2021
Sevier	Oil (bbl)	1,019,618	1,006,886	847,871	713,215	773,283	-246,335	-24.2	-6.0
Summit	Gas (mcf)	117,846	93,390	96,992	46,630	95,685	-22,161	-18.8	-4.7
	Oil (bbl)	21,193	24,586	26,870	23,271	25,673	4,480	21.1	5.3
Uintah	Gas (mcf)	136,800,374	121,166,601	108,878,476	95,961,764	108,315,797	-28,484,577	-20.8	-5.2
	Oil (bbl)	4,664,686	4,531,838	3,754,012	3,839,720	4,037,891	-626,795	-13.4	-3.4
Total for Utah	Gas (mcf)	174,965,312	156,614,474	140,706,475	125,282,304	136,521,074	-38,444,238	-22.0	-5.5
	Oil (bbl)	8,385,759	8,030,427	6,475,920	6,432,650	6,498,265	-1,887,494	-22.5	-5.6
Counties in Wyoming									
Albany	Gas (mcf)	14,950	15,025	15,135	13,848	6,604	-8,346	-55.8	-14.0
	Oil (bbl)	15,333	14,658	10,754	10,649	10,401	-4,932	-32.2	-8.0
Big Horn	Gas (mcf)	1,091,804	1,031,400	904,863	927,484	955,285	-136,519	-12.5	-3.1
	Oil (bbl)	382,763	361,753	314,347	320,020	328,119	-54,644	-14.3	-3.6
Campbell	Gas (mcf)	43,554,645	48,179,446	51,642,550	61,781,289	57,191,324	13,636,679	31.3	7.8
	Oil (bbl)	7,933,229	9,946,503	11,104,597	12,243,877	11,611,174	3,677,945	46.4	11.6
Carbon	Gas (mcf)	47,358,004	44,100,224	45,332,285	44,354,752	43,412,574	-3,945,430	-8.3	-2.1
	Oil (bbl)	657,660	741,237	822,043	621,275	553,983	-103,677	-15.8	-3.9
Converse	Gas (mcf)	34,605,568	52,177,378	56,807,051	47,829,241	47,086,044	12,480,476	36.1	9.0
	Oil (bbl)	10,970,350	16,539,361	20,119,075	16,451,010	18,663,760	7,693,410	70.1	17.5
Crook	Gas (mcf)	13,360	14,145	12,464	14,813	16,512	3,152	23.6	5.9
	Oil (bbl)	457,386	437,362	387,185	370,512	371,229	-86,157	-18.8	-4.7
Fremont	Gas (mcf)	95,418,980	53,264,043	49,457,952	65,461,223	64,818,059	-30,600,921	-32.1	-8.0
	Oil (bbl)	947,383	680,455	646,066	637,948	739,073	-208,310	-22.0	-5.5
Hot Springs	Gas (mcf)	137,350	102,196	88,040	96,364	114,076	-23,274	-16.9	-4.2
	Oil (bbl)	1,483,612	1,409,973	1,179,922	1,156,024	1,251,114	-232,498	-15.7	-3.9
Johnson	Gas (mcf)	66,320,139	54,518,516	46,148,684	39,036,452	36,122,406	-30,197,733	-45.5	-11.4
	Oil (bbl)	744,724	747,606	737,607	668,518	1,026,392	281,668	37.8	9.5
Laramie	Gas (mcf)	7,665	50,471	848,389	552,481	619,683	612,018	7984.6	1996.1
	Oil (bbl)	19,733	81,816	951,511	476,680	418,675	398,942	2021.7	505.4
Lincoln	Gas (mcf)	26,583,364	24,204,762	21,328,885	20,982,928	19,792,662	-6,790,702	-25.5	-6.4
	Oil (bbl)	207,948	163,835	145,784	145,169	144,655	-63,293	-30.4	-7.6
Natrona	Gas (mcf)	12,574,138	11,351,451	9,813,790	8,691,303	8,020,970	-4,553,168	-36.2	-9.1
	Oil (bbl)	4,667,301	4,617,234	4,038,843	3,975,358	4,126,573	-540,728	-11.6	-2.9
Niobrara	Gas (mcf)	847,261	895,973	673,208	619,210	499,727	-347,534	-41.0	-10.3
	Oil (bbl)	644,678	624,597	464,834	405,837	330,027	-314,651	-48.8	-12.2
Park	Gas (mcf)	5,478,242	4,382,870	3,975,844	3,623,224	3,585,476	-1,892,766	-34.6	-8.6
	Oil (bbl)	4,027,127	3,714,880	3,210,674	3,184,426	3,179,140	-847,987	-21.1	-5.3
Sheridan	Gas (mcf)	437,535	335,901	334,603	328,396	266,342	-171,193	-39.1	-9.8
	Oil (bbl)	8,320	8,476	4,333	6,085	5,494	-2,826	-34.0	-8.5
Sublette	Gas (mcf)	932,058,189	855,753,773	808,536,137	693,662,320	597,977,293	-334,080,896	-35.8	-9.0
	Oil (bbl)	5,988,517	5,331,804	4,619,948	3,616,580	3,057,080	-2,931,437	-49.0	-12.2
Sweetwater	Gas (mcf)	119,915,957	119,221,592	111,043,960	103,914,323	92,278,961	-27,636,996	-23.0	-5.8
	Oil (bbl)	2,407,547	2,444,697	2,166,473	1,971,001	1,546,744	-860,803	-35.8	-8.9

Geography	Resource	2018	2019	2020	2021	2022	Total Change 2018–2021	Total % Change 2018–2021	Average Annual % Change 2018–2021
Uinta	Gas (mcf)	37,405,372	29,774,763	20,886,651	25,811,560	25,597,185	-11,808,187	-31.6	-7.9
	Oil (bbl)	368,590	283,328	224,551	216,094	272,348	-96,242	-26.1	-6.5
Washakie	Gas (mcf)	492,955	445,767	366,548	360,485	283,888	-209,067	-42.4	-10.6
	Oil (bbl)	381,760	337,295	273,303	297,359	285,885	-95,875	-25.1	-6.3
Weston	Gas (mcf)	670,639	542,815	536,106	452,263	440,247	-230,392	-34.4	-8.6
	Oil (bbl)	297,449	233,945	201,905	180,785	185,844	-111,605	-37.5	-9.4
Total for Wyoming	Gas (mcf)	1,424,986,117	1,300,362,511	1,228,753,145	1,118,513,959	999,103,701	-425,882,416	-29.9	-7.5
	Oil (bbl)	42,611,410	48,720,815	51,623,755	46,955,207	48,122,845	5,511,435	12.9	3.2

Source: ONRR 2023a

N/A = percent change not available due to no federal production reported in 2018

Note: Includes all planning area counties for which the ONRR reported data. Oregon did not have any federal oil or natural gas production from 2018 to 2022; although there was federal oil and gas production in California, the production occurred outside the socioeconomic analysis area. Therefore, the data are not included in this report.

Table A-23. Federal Disbursements to States from Oil and Gas Extraction, Fiscal Years 2018–2022

State	2018 ($)	2019 ($)	2020 ($)	2021 ($)	2022 ($)	Change 2018–2022 ($)	% Change 2018–2022
California	33,733,418	35,629,330	26,567,804	26,637,358	44,135,594	10,402,175	30.8
Colorado	90,731,614	93,569,410	49,300,376	84,806,140	136,322,179	45,590,565	50.2
Idaho	43,831	10,551	5,768	7,780	18,902	(24,930)	-56.9
Montana	10,446,859	12,830,625	6,457,566	8,723,239	14,298,912	3,852,053	36.9
Nevada	1,622,879	1,314,070	1,412,847	1,041,347	1,500,239	(122,640)	-7.6
North Dakota	54,339,456	97,431,552	69,185,135	86,414,115	171,499,877	117,160,422	215.6
South Dakota	585,923	479,962	321,446	329,973	488,020	(97,904)	-16.7
Utah	57,120,180	48,998,347	41,006,715	44,405,383	81,006,213	23,886,032	41.8
Wyoming	355,777,987	458,184,527	285,683,930	319,770,982	615,497,307	259,719,320	73.0

Source: ONRR 2023b

Note: Oregon did not have any disbursements from oil and gas from 2018 to 2022. California received disbursements for federal oil and gas produced in the state; however, the minerals were produced outside the California socioeconomic analysis area. Therefore, California disbursements for federal oil and gas are not included in this report.

Table A-24. Coal Production by County on Federal Land in the Planning Area, 2018–2022 (Tons)

State	County	2018	2019	2020	2021	2022
Colorado						
Colorado	Moffat	2,734,909	2,988,342	3,007,759	3,171,900	2,245,208
	Rio Blanco	3,078,343	2,613,317	2,633,240	1,607,398	2,337,295
	Routt	5,071	0	0	0	99,690
	State total	11,263,001	10,058,177	9,037,683	7,468,159	6,331,968
Montana						
Montana	Big Horn	12,814,626	13,170,171	7,883,362	7,786,759	6,771,924
	Musselshell	697,866	127,434	1,153,580	1,219,867	4,058,944
	Rosebud	3,236,474	4,770,101	4,370,568	1,608,260	1,846,150
	Treasure	0	0	0	0	82,929
	State total	16,748,966	18,067,706	13,407,510	10,614,886	12,759,947
Utah						
Utah	Carbon	2,031,923	429,899	6,955	2,139	0
	Emery	4,585,605	4,673,242	4,315,355	4,807,290	4,428,476
	Kane	0	0	389,045	477,326	374,490
	San Pete	600,517	2,808,857	3,841,998	2,974,409	2,133,365
	Sevier	4,465,926	5,052,775	3,689,079	3,034,303	3,340,267
	State total	11,683,971	12,964,773	12,242,432	11,295,467	10,276,598

State	County	2018	2019	2020	2021	2022
			Wyoming			
Wyoming	Campbell	245,923,603	243,201,182	200,958,516	214,305,800	230,040,175
	Converse	12,959,491	3,962,557	1,898,497	228,434	521,582
	Lincoln	820,532	804,080	7,501	39,292	0
	Sweetwater	3,852,935	4,136,899	3,719,805	3,540,231	2,460,751
	State total	263,556,561	252,104,718	206,584,319	218,113,757	233,022,508

Source: ONRR 2023

Note: Includes all planning area counties for which the ONRR reported data. California, Idaho, Nevada, Oregon, and South Dakota did not have any federal coal extraction from 2018 to 2022; while there was federal coal extraction in North Dakota, the production occurred outside the socioeconomic analysis area. Therefore, the data are not included in this report.

Table A-25. Federal Disbursements to States from Coal Extraction

State	2018 ($)	2019 ($)	2020 ($)	2021 ($)	2022 ($)	Change 2018–2022 ($)	% Change 2018–2022
Colorado	11,293,401	14,554,781	4,222,405	9,280,605	11,696,818	403,417	4
Montana	15,776,378	17,917,119	13,828,372	10,814,390	22,458,386	6,682,009	42
North Dakota	1,107,203	779,083	1,302,045	748,514	1,126,624	19,421	2
Utah	19,140,579	21,572,041	11,182,695	10,412,387	10,038,842	(9,101,737)	-48
Wyoming	193,570,054	173,656,249	148,076,661	161,375,517	196,538,917	2,968,862	2

Source: ONRR 2023b

Note: California, Idaho, Nevada, Oregon, and South Dakota did not have any disbursements from coal from 2018 to 2022. North Dakota received disbursements for federal coal extracted in the state; however, the minerals were extracted outside the North Dakota socioeconomic analysis area. Therefore, North Dakota disbursements for federal coal are not included in this report.

Table A-26. Nonenergy Leasable Mineral Production by County on Federal Land in the Planning Area, 2018–2022 (Tons)

State	County	2018	2019	2020	2021	2022
Colorado						
Colorado	Rio Blanco	196,101	226,700	236,368	252,464	256,124
	State total	196,101	226,700	236,368	252,464	256,124
Idaho						
Idaho	Caribou	3,870,843	3,878,800	4,752,151	5,325,240	4,782,074
	State total	3,870,843	3,878,800	4,752,151	5,325,240	4,782,074
Utah						
Utah	Carbon	78,021	57,715	65,945	85,461	34,015
	Emery	88,415	76,057	69,179	90,361	73,301
	Kane	17,812	24,380	10,941	12,112	23,090
	State total	184,248	158,152	146,065	190,431	134,848
Wyoming						
Wyoming	Lincoln	196,700	475,600	241,900	0	0
	Sweetwater	3,698,534	3,575,615	4,563,459	5,219,122	4,838,280
	State total	3,895,234	4,051,215	4,805,359	5,219,122	4,838,280

Source: ONRR 2023

Note: Includes all planning area counties for which the ONRR reported data. Montana, Nevada, Oregon, and South Dakota did not have any federal nonenergy mineral extraction from 2018 to 2022. Although there was federal nonenergy mineral extraction in California and North Dakota, the extraction occurred outside the socioeconomic analysis area. Therefore, the data are not included in this report.

Table A-27. Federal Disbursements to States from Nonenergy Mineral Extraction

State	2018 ($)	2019 ($)	2020 ($)	2021 ($)	2022 ($)	Change 2018–2022 ($)	% Change 2018–2022
Colorado	980,929	1,012,120	1,167,651	824,188	542,777	(438,152)	-45
Idaho	4,237,741	3,529,543	4,656,285	4,380,755	5,101,091	863,350	20
Utah	738,527	1,374,179	921,871	748,658	1,227,146	488,620	66
Wyoming	16,131,318	25,736,670	18,948,857	9,794,050	8,402,061	(7,729,258)	-48

Source: ONRR 2023b

Note: North Dakota, Oregon, and South Dakota did not have any disbursements from nonenergy minerals from 2018 to 2022. California received disbursements for federal nonenergy minerals extracted in the state; however, the minerals were extracted outside the California socioeconomic analysis area; therefore, California disbursements for federal nonenergy minerals are not included in this report. Montana and Nevada received small disbursements for rents, bonuses, and other distributions from nonenergy minerals, but there were no nonenergy minerals extracted from 2018 to 2022. Therefore, because these disbursements were not material and not likely to be impacted by the BLM's management decisions, they are not included in this report.

Table A-28. State Policies for Distributions of Federal Mineral Revenue

State	State Expenditures	Local Distributions	Savings
California	California deposits royalties from federal mineral leasing into the State School Fund	N/A	N/A
Colorado	Fifty percent of bonus disbursements are allocated to the Higher Education Federal Mineral Lease Revenues Fund Colorado allocates 48.3 percent of non-bonus disbursements (up to 104 percent of the previous year's transfer amount) to the state's Public School Fund.	Twenty percent of non-bonus revenue is allocated to federal lease districts, counties, and municipalities based on data, including the proportion of original lease payments and employees in the natural resource sectors. Colorado distributes 1.7 percent of non-bonus disbursements to local school districts. Twenty percent of non-bonus revenue is allocated as grants by the Colorado Department of Local Affairs to assist local governments' processes for planning, public engagement, or collaboration with federal land managers.	Ten percent of non-coal bonus disbursements are transferred to the Colorado Water Conservation Board. Fifty percent of bonus disbursements are allocated into the Local Government Permanent Fund.
Montana	Seventy-five percent of disbursements are allocated to the state's General Fund.	Twenty-five percent of disbursements are allocated to the county of origin.	N/A
Nevada	The first $7 million of disbursements are deposited directly into the State Education Fund. Spillover amounts are deposited into the Account for Revenue from the Lease of Federal Lands. Of these spillover disbursements, 43.75 percent are allocated to the State Education Fund.	Of the spillover disbursements deposited in the Account for Revenue from the Lease of Federal Lands, 56.25 percent are then allocated to the county of origin.	N/A
North Dakota	N/A	Fifty percent of disbursements are allocated to school districts. Fifty percent of disbursements are allocated to the county of origin.	N/A

State	State Expenditures	Local Distributions	Savings
Utah	Utah allocates 2.25 percent of non-bonus disbursements to the Utah Geological Survey. Utah allocates 2.25 percent of non-bonus disbursements to the Utah State University Water Research Lab. Thirty percent of bonus payments in the Mineral Bonsu Account are allocated to the Wildland Fire Suppression Fund.	Forty percent of non-bonus disbursements are allocated to counties and special service districts. Five percent of disbursements are allocated to special service districts through the Department of Workforce Services. Disbursements are used to pay PILTs to local governments for state-owned lands. Utah allocates 32.5 percent of non-bonus disbursements and spillover amounts and 70 percent of non-bonus disbursements to the Permanent Community Impact Fund and distributes them to socially and economically impacted areas.	N/A
Wyoming	Wyoming allocates $2 million of disbursements (of the first $200 million) to the state's General Fund for administration. Of the coal bonus disbursements, 12.5 percent are allocated to the Highway Fund. Ten percent of bonus disbursements are allocated to the Community College Commission, and unspent and spillover amounts are allocated to the School Capital Construction Account. Of the non-bonus disbursements, 44.8 percent are allocated to the School Foundation Program Account as are 33 percent of the disbursements after the first $200 million. Of the non-bonus disbursements, 6.75 percent are allocated to the University of Wyoming.	Forty percent of coal bonus disbursements and 2.7 percent of non-bonus disbursements are allocated to the School Capital Construction Account. Wyoming allocates 37.5 percent of coal bonus disbursements and 3.75 percent of non-bonus disbursements to the Capital Construction Account. Of the non-bonus disbursements, 31.375 percent are allocated to the Highway Fund. Of the non-bonus disbursements, 9.375 percent are allocated to municipalities based on the general and school populations.	Wyoming allocates 66.6 percent of the disbursements after the first $200 million to the Budget Reserve Account. Spillover amounts from the distributions to the School Foundation Program Account are allocated to the Common School Permanent Fund.

Source: Headwaters Economics 2021

Table A-29. State Taxes Assessed on Hard-Rock Mining Activities on Land Types, including Federal Lands (as of 2019)

State	Tax Name	Type of Mines or Minerals Assessed	Type of Tax	Tax Rate
Colorado	Severance tax—metallic minerals	Metallic minerals, all other minerals except molybdenum, oil, gas, coal, oil shale, rock, sand, gravel, stone products, earth minerals, limestone, carbon dioxide, and dolomite	Modified gross revenue	2.25 percent of gross income above $19 million per year
	Severance tax—molybdenum	Molybdenum ore	Unit based	$0.05 per ton above 625,000 tons per calendar quarter
Idaho	Mining license tax	Gold, silver, copper, and lead	Net proceeds	1 percent of net value of royalties paid or ore mined or extracted
Montana	Mining license tax—metal mine	Gold, silver, or any other metals or precious or semiprecious gems or stones	Net smelter returns	Percentage of gross value, less first $250,000, as follows: For gold, silver, or any platinum group metal-processed concentrates shipped to a refinery, 1.6 percent of gross value minus $250,000; For mineral concentrates shipped to smelter, mill, or reduction works, 1.81 percent of gross value minus $250,000
	Mining license tax—micaceous mines	Vermiculite, perlite, kerrite, maconite, or any other micaceous minerals	Unit based	$0.05 per ton of concentrate mined, extracted, or produced
	Resource indemnity and groundwater assessment tax	Includes any precious stones or gems, gold, silver, copper, lead, uranium, vermiculite, limestone, or other nonrenewable, merchantable products	Metals—net smelter returns; selected minerals—gross revenue with reference price	Default rate: $25 plus 0.5 to 1 percent of gross value greater than $5,000; For garnets: $25 plus 1 percent of gross value greater than $2,500; For limestone: $25 plus 10 percent of gross value greater than $250; For vermiculite: $25 plus 2 percent of gross value greater than $1,250

State	Tax Name	Type of Mines or Minerals Assessed	Type of Tax	Tax Rate
Nevada	Net Proceeds of Minerals Taxes	All minerals	Net proceeds	Based on a sliding scale between 2 percent and 5 percent, depending on the ratio of net proceeds to gross proceeds.
Utah	Severance tax on metals and metalliferous minerals	Ore, metal, or other substance containing 57 listed minerals, including gold, iron, mercury, nickel, and uranium extracted from all lands; does not include gemstones, potash, sand and gravel, oil, gas, and coal, and others	Net proceeds	2.6 percent of taxable value, which is the gross proceeds of sale (sale of yellowcake in the case of a sale of uranium concentrates) less $50,000 per year per mine and standard deduction
	Severance tax—beryllium	Beryllium	Other (cost based)	2.6 percent of taxable value; taxable value is 125 percent of direct mining costs
Wyoming	Mining severance tax—uranium	Uranium	Modified net smelter returns	4 percent of value of gross product, which is fair market value of minerals at mouth of mine, not including processing; fair market value is calculated by multiplying sales of yellowcake less royalties, ad valorem production taxes, and severance taxes; the result is multiplied by the industry factor
	Mining severance tax—other	Valuable deposits other than coal, oil and gas, trona, bentonite, uranium, and sand and gravel	Modified net smelter returns	2 percent of the value of the gross product, which is fair market value of minerals at mouth of mine, not including any processing

Source: GAO 2019

Note: California also charges taxes for hard-rock mining; however, there were no locatable mineral types on federal lands (see **Table 3-3**). Therefore, information on taxes in California were not included above. Nevada and Oregon only charge royalties for minerals extracted on state lands; therefore, data from Nevada and Oregon are not included above.

Table A-30. Disbursements to States from Geothermal with a Federal Stake

State	2018 ($)	2019 ($)	2020 ($)	2021 ($)	2022 ($)	Change 2018–2022 ($)	% Change 2018–2022
Nevada	3,854,581	5,665,406	6,483,864	5,680,458	8,185,231	4,330,649	112
Utah	538,739	491,491	528,661	716,894	1,247,237	708,498	132

Source: ONRR 2023b

Note: From 2018 to 2022, there was no geothermal production with a federal stake in Colorado, Idaho, Montana, North Dakota, Oregon, South Dakota, and Wyoming. Although there was federal oil and gas production and disbursements made to California, none of the production occurred in the socioeconomic analysis area. Therefore, only Nevada and Utah are included in the table above.

Table A-31. California Environmental Justice Screening

Geographic Area	(Non-metro) Minority Population (%)	(Non-metro) Minority Population Meaningfully Greater Threshold?	Low-Income Populations (%)	Low-Income Population Threshold?	(Non-metro) American Indian and Alaska Native Population (%)	(Non-metro) American Indian and Alaska Native Population Threshold
California	**29.3**	**32.2%**	**29**	**29%**	**5.9**	**5.9%**
Lassen County	36.0	Yes	35	Yes	4.4	No
Modoc County	23.0	No	41	Yes	5.6	No

Sources: US Environmental Protection Agency 2023; US Census Bureau 2023

Table A-32. Colorado Environmental Justice Screening

Geographic Area	Minority Population (%)	Minority Population Meaningfully Greater Threshold?	Low-Income Populations (%)	Low-Income Population Threshold?	American Indian and Alaska Native Population (%)	American Indian and Alaska Native Threshold Population?
Colorado	**33.2**	**36.5%**	**23.6**	**23.6%**	**2.5**	**2.5%**
Eagle County	35	No	24	Yes	0.2	No
Garfield County	34	No	25	Yes	1.7	No
Grand County	16	No	23	Yes	0.8	No
Jackson County	10	No	37	Yes	0.2	No
Mesa County	20	No	30	Yes	2.4	No
Moffat County	21	No	35	Yes	3.7	Yes
Rio Blanco County	17	No	32	Yes	5.0	Yes
Routt County	15	No	20	No	1.7	No

Source: US Environmental Protection Agency 2023; US Census Bureau 2023

Table A-33. Idaho Environmental Justice Screening

Geographic Area	Minority Population (%)	Minority Population Meets the Meaningfully Greater Threshold?	Low-Income Populations (%)	Low-Income Population Threshold?	American Indian and Alaska Native Population (%)	American Indian and Alaska Native Threshold Population?
Idaho	**19.4**	**21.3%**	**31.3**	**31.3%**	**2.6**	**2.6%**
Adams County	9	No	33	Yes	4.8	Yes
Bear Lake County	8	No	35	Yes	1.2	No
Bingham County	27	Yes	36	Yes	7.4	Yes
Blaine County	28	Yes	28	No	1.6	No
Bonneville County	18	No	32	Yes	1.3	No
Butte County	9	No	41	Yes	2.0	No
Camas County	11	No	35	Yes	0.6	No
Caribou County	9	No	25	No	1.2	No
Cassia County	32	Yes	37	Yes	2.8	Yes
Clark County	51	Yes	41	Yes	4.8	Yes
Custer County	12	No	37	Yes	6.9	Yes
Elmore County	29	Yes	42	Yes	3.9	Yes
Fremont County	15	No	34	Yes	1.7	No
Gem County	15	No	31	Yes	2.4	No
Gooding County	34	Yes	40	Yes	2.2	No
Jefferson County	14	No	35	Yes	2.7	Yes
Jerome County	40	Yes	39	Yes	2.2	No
Lemhi County	7	No	37	Yes	3.6	Yes
Lincoln County	35	Yes	37	Yes	2.6	Yes
Madison County	12	No	47	Yes	0.7	No
Minidoka County	39	Yes	41	Yes	2.8	Yes
Oneida County	8	No	23	No	2.0	No
Owyhee County	31	Yes	37	Yes	4.6	Yes
Payette County	23	Yes	33	Yes	3.1	Yes
Power County	39	Yes	42	Yes	6.8	Yes
Twin Falls County	23	Yes	35	Yes	2.0	No
Washington County	22	Yes	46	Yes	2.7	Yes

Sources: US Environmental Protection Agency 2023; US Census Bureau 2023

Table A-34. Montana Environmental Justice Screening

Geographic Area	Minority Population (%)	Minority Population Meets the Meaningfully Greater Threshold?	Low-Income Populations (%)	Low-Income Population Threshold?	American Indian and Alaska Native Population (%)	American Indian and Alaska Native Threshold Population
Montana	**14.9**	**16.4%**	**31.1**	**31.1%**	**8.2**	**8.2%**
Beaverhead County	11	No	38	Yes	1.6	No
Big Horn County	74	Yes	58	Yes	68.0	Yes
Blaine County	57	Yes	45	Yes	55.0	Yes
Carbon County	7	No	24	No	2.0	No
Carter County	4	No	42	Yes	1.6	No
Chouteau County	24	Yes	41	Yes	21.0	Yes
Custer County	9	No	30	No	3.2	No
Dawson County	8	No	25	No	2.7	No
Fallon County	7	No	31	Yes	5.5	No
Fergus County	7	No	34	Yes	2.4	No
Garfield County	1	No	34	Yes	0.6	No
Madison County	8	No	27	No	1.7	No
McCone County	11	No	24	No	4.8	No
Musselshell County	8	No	35	Yes	5.0	No
Petroleum County	6	No	40	Yes	0.0	No
Phillips County	17	Yes	34	Yes	13.0	Yes
Powder River County	30	Yes	31	Yes	3.9	No
Prairie County	3	No	50	Yes	0.1	No
Roosevelt County	67	Yes	54	Yes	65.0	Yes
Rosebud County	49	Yes	43	Yes	41.0	Yes
Stillwater County	8	No	23	No	2.3	No
Sweet Grass County	7	No	24	No	2.2	No
Treasure County	3	No	38	Yes	0.1	No
Valley County	15	No	33	Yes	11.2	Yes
Wibaux County	11	No	33	Yes	1.0	No
Yellowstone County	15	No	27	No	6.0	No

Sources: US Environmental Protection Agency 2023; US Census Bureau 2023

Table A-35. Nevada Environmental Justice Screening

Geographic Area	(Non-metro) Minority Population (%)	(Non-metro) Minority Population Meets the Meaningfully Greater Threshold?	Low-Income Populations (%)	Low-Income Population Threshold?	American Indian and Alaska Native Population (%)	American Indian and Alaska Native Threshold Population
Nevada	**28.8**	**31.7%**	**31.2**	**31.2%**	**2.5**	**2.5%**
Churchill County	28	No	26	No	6.0	Yes
Elko County	36	Yes	26	No	6.4	Yes
Eureka County	16	No	34	Yes	5.1	Yes
Humboldt County	31	Yes	31	Yes	5.3	Yes
Lander County	30	Yes	31	Yes	5.2	Yes
Lincoln County	16	No	32	Yes	3.2	Yes
Nye County	28	No	37	Yes	3.4	Yes
Pershing County	36	Yes	27	No	7.0	Yes
Washoe County	39	Yes	27	No	2.8	Yes
White Pine County	29	Yes	25	No	5.3	Yes

Sources: US Environmental Protection Agency 2023; US Census Bureau 2023

Table A-36. North Dakota Environmental Justice Screening

Geographic Area	Minority Population (%)	Minority Population Meets the Meaningfully Greater Threshold?	Low-Income Populations (%)	Low-Income Population Threshold?	American Indian and Alaska Native Population (%)	American Indian and Alaska Native Threshold Population
North Dakota	**16.9**	**18.6%**	**25.2**	**25.2%**	**6.8**	**6.8%**
Bowman County	8	No	19	No	4.3	No
Slope County	4	No	23	No	3.6	No

Sources: US Environmental Protection Agency 2023; US Census Bureau 2023

Table A-37. Oregon Environmental Justice Screening

Geographic Area	Minority Population (%)	Minority Population Meets the Meaningfully Greater Threshold?	Low-Income Populations (%)	Low-Income Population Threshold?	American Indian and Alaska Native Population (%)	American Indian and Alaska Native Threshold Population
Oregon	**25.9**	**28.5%**	**28.7**	**28.7%**	**3.3**	**3.3%**
Baker County	10	No	38	Yes	2.8	No
Crook County	13	No	29	Yes	3.1	No
Deschutes County	14	No	25	No	1.9	No
Grant County	10	No	33	Yes	2.4	No
Harney County	14	No	46	Yes	6.1	Yes
Lake County	18	No	38	Yes	4.9	Yes
Malheur County	40	Yes	45	Yes	5.3	Yes
Union County	12	No	34	Yes	2.7	No

Sources: US Environmental Protection Agency 2023; US Census Bureau 2023

Table A-38. South Dakota Environmental Justice Screening

Geographic Area	Minority Population (%)	Minority Population Meets the Meaningfully Greater Threshold?	Low-Income Populations (%)	Low-Income Population Threshold?	American Indian and Alaska Native Population (%)	American Indian and Alaska Native Threshold Population
South Dakota	**19.2**	**21.1%**	**29.0**	**29.0%**	**10.4**	**10.4%**
Butte County	11	No	35	Yes	4.8	No
Harding County	11	No	24	No	8.7	No

Source: US Environmental Protection Agency 2023; US Census Bureau 2023

Table A-39. Utah Environmental Justice Screening

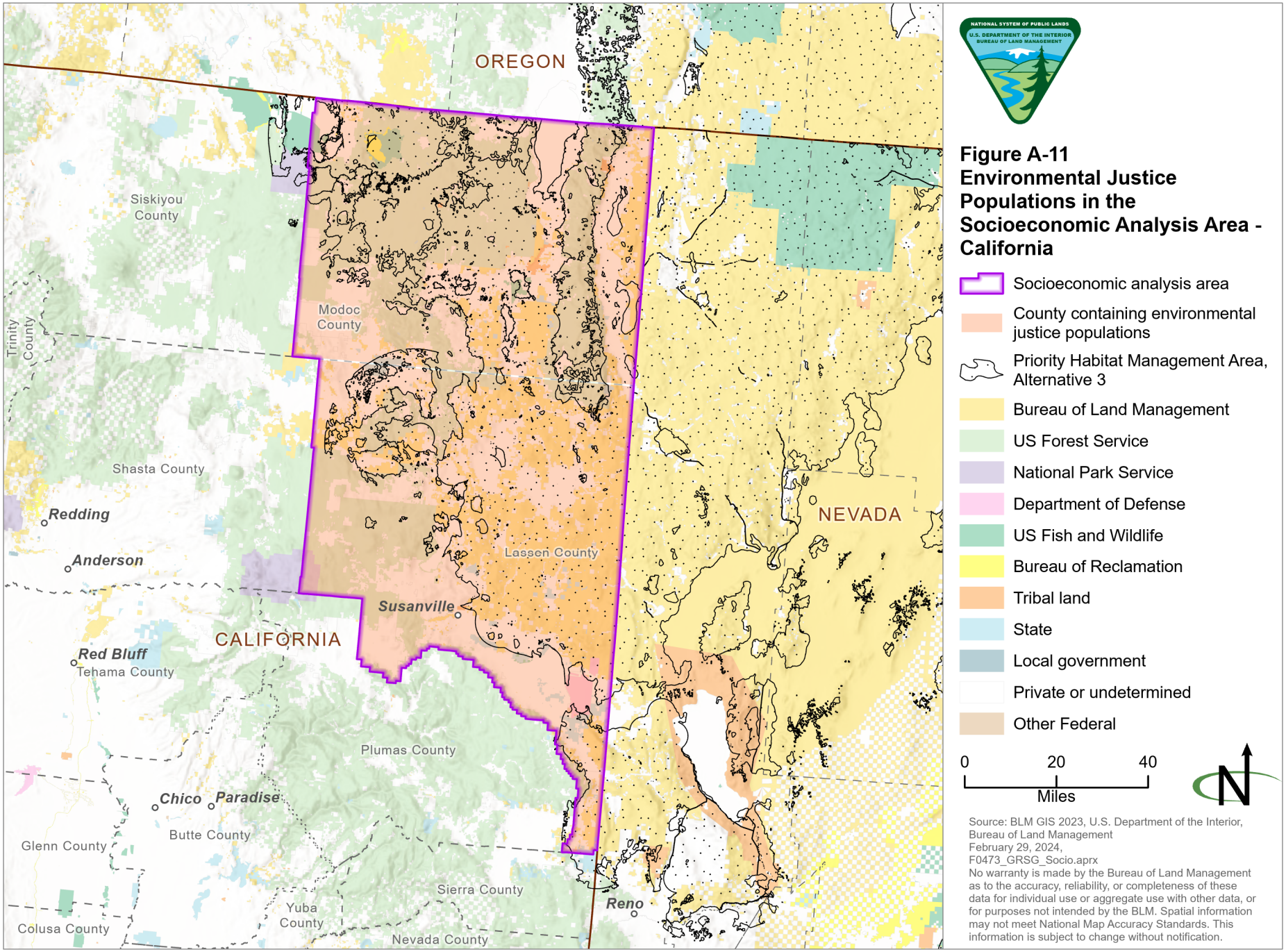
Geographic Area	Minority Population (%)	Minority Population Meets the Meaningfully Greater Threshold?	Low-Income Populations (%)	Low-Income Population Threshold?	American Indian and Alaska Native Population (%)	American Indian and Alaska Native Threshold Population
Utah	**22.7**	**25.0%**	**24.7**	**24.7%**	**2.0**	**2.0%**
Beaver County	16	No	23	No	1.3	No
Box Elder County	13	No	26	Yes	1.3	No
Cache County	17	No	35	Yes	1.8	No
Carbon County	18	No	38	Yes	1.8	No
Daggett County	8	No	20	No	3.9	Yes
Duchesne County	16	No	34	Yes	5.5	Yes
Emery County	10	No	32	Yes	2.4	Yes
Garfield County	12	No	40	Yes	4.6	Yes
Grand County	19	No	43	Yes	4.9	Yes
Iron County	15	No	39	Yes	2.6	Yes
Juab County	9	No	28	Yes	2.7	Yes
Kane County	10	No	31	Yes	5.1	Yes
Millard County	17	No	27	Yes	1.7	No
Morgan County	7	No	12	No	0.4	No
Piute County	6	No	53	Yes	0.0	No
Rich County	12	No	30	Yes	2.8	Yes
Sanpete County	14	No	36	Yes	1.5	No
Sevier County	9	No	34	Yes	1.5	No
Summit County	16	No	14	No	1.4	No
Tooele County	19	No	22	No	1.6	No
Uintah County	19	No	37	Yes	8.4	Yes
Wasatch County	17	No	16	No	0.5	No
Wayne County	8	No	33	Yes	1.7	No

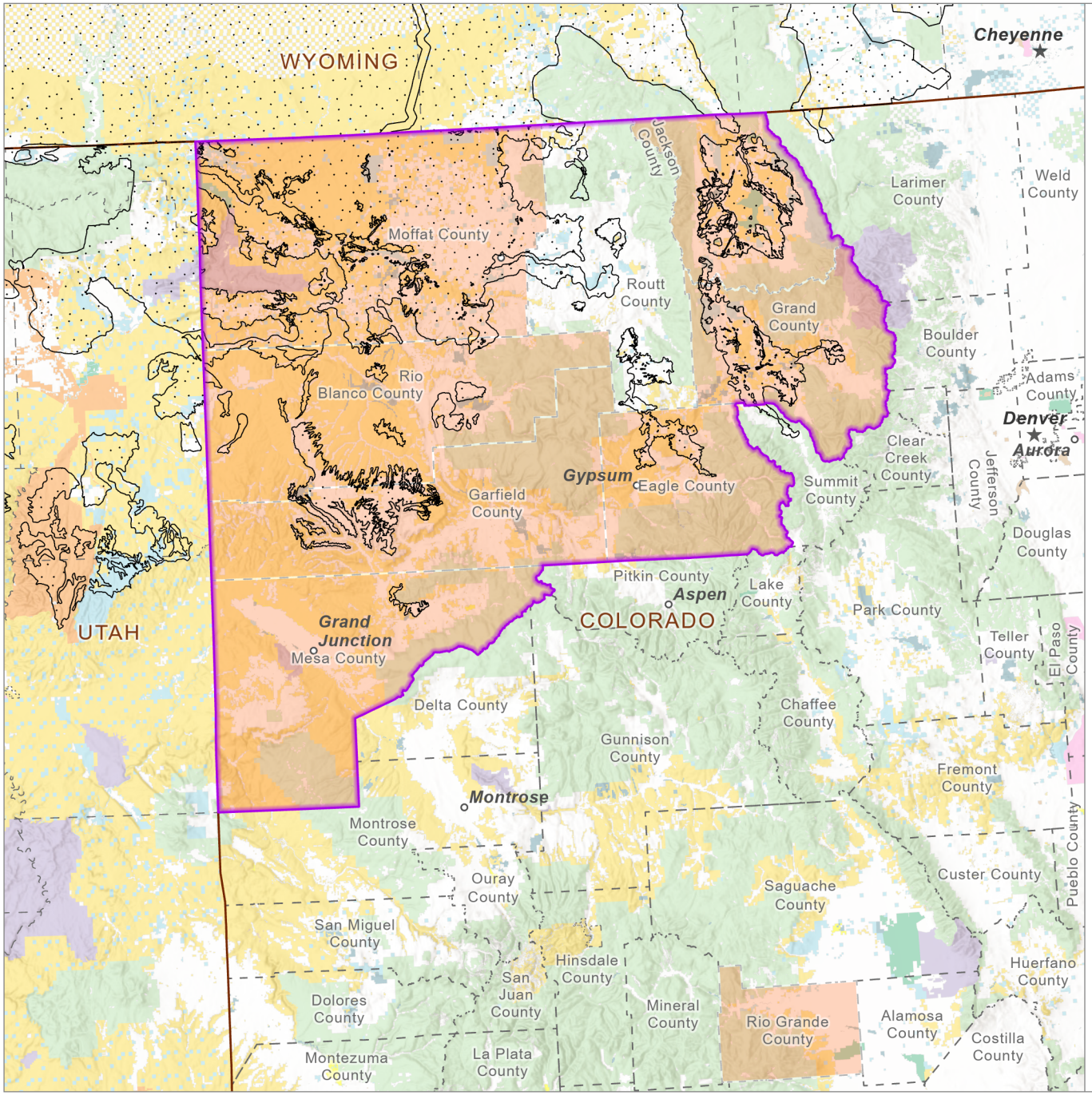
Source: US Environmental Protection Agency 2023; US Census Bureau 2023

Table A-40. Wyoming Environmental Justice Screening

Geographic Area	Minority Population (%)	Minority Population Meets the Meaningfully Greater Threshold?	Low-Income Populations (%)	Low-Income Population Threshold?	American Indian and Alaska Native Population (%)	American Indian and Alaska Native Threshold Population
Wyoming	**16**	**17.6%**	**26.5**	**26.5%**	**3.7**	**3.7%**
Albany County	19	Yes	39	Yes	1.9	No
Big Horn County	13	No	32	Yes	2.2	No
Campbell County	13	No	22	No	2.6	No
Carbon County	23	Yes	34	Yes	3.1	No
Converse County	12	No	21	No	2.6	No
Crook County	7	No	21	No	2.0	No
Fremont County	31	Yes	36	Yes	23.6	Yes
Hot Springs County	8	No	34	Yes	3.4	No
Johnson County	10	No	31	Yes	3.3	No
Laramie County	23	Yes	23	No	2.2	No
Lincoln County	8	No	20	No	1.9	No
Natrona County	14	No	27	Yes	2.1	No
Niobrara County	13	No	42	Yes	3.5	No
Park County	10	No	26	Yes	2.4	No
Platte County	15	No	29	Yes	1.5	No
Sheridan County	9	No	25	No	2.0	No
Sublette County	10	No	19	No	0.7	No
Sweetwater County	22	Yes	22	No	2.1	No
Uinta County	13	No	27	Yes	3.3	No
Washakie County	18	Yes	25	No	2.5	No
Weston County	12	No	27	Yes	4.2	Yes

Source: US Environmental Protection Agency 2023; US Census Bureau 2023


OREGON
Siskiyou County
Modoc County
Trinity County
Shasta County
Redding
Anderson
Lassen County
Susanville
NEVADA
CALIFORNIA
Red Bluff
Tehama County
Plumas County
Chico
Paradise
Butte County
Glenn County
Sierra County
Yuba County
Reno
Colusa County
Nevada County
NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Figure A-11
Environmental Justice Populations in the Socioeconomic Analysis Area - California
Socioeconomic analysis area
County containing environmental justice populations
Priority Habitat Management Area, Alternative 3
Bureau of Land Management
US Forest Service
National Park Service
Department of Defense
US Fish and Wildlife
Bureau of Reclamation
Tribal land
State
Local government
Private or undetermined
Other Federal
0
20
40
Miles
N
Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx
No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data, or for purposes not intended by the BLM. Spatial information may not meet National Map Accuracy Standards. This information is subject to change without notification.



NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

Figure A-12
Environmental Justice Populations in the Socioeconomic Analysis Area - Colorado

- Socioeconomic analysis area
- County containing environmental justice populations
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

0 30 60
Miles

N

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx
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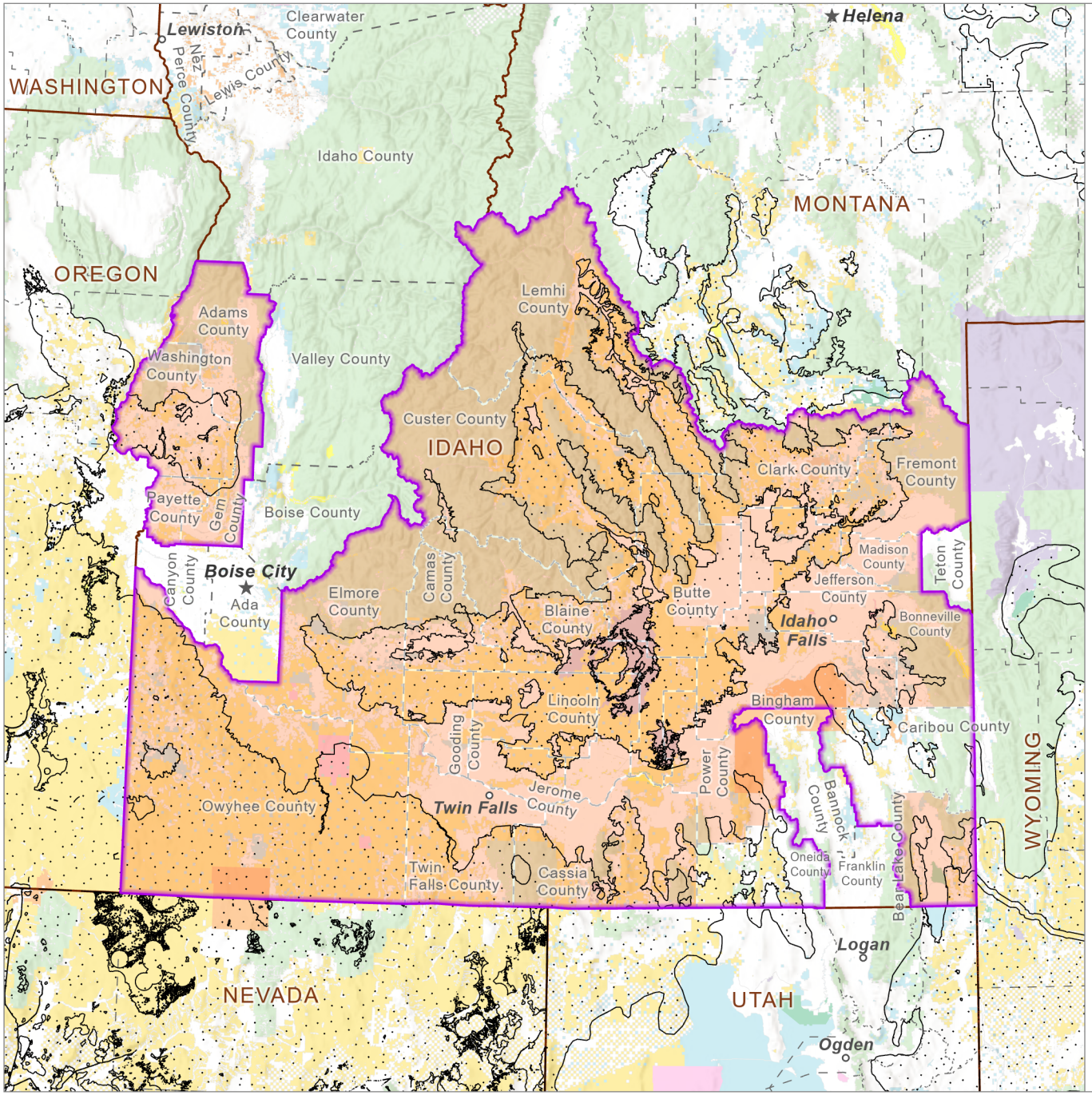


Figure A-13
Environmental Justice Populations in the Socioeconomic Analysis Area - Idaho

- Socioeconomic analysis area
- County containing environmental justice populations
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

0 40 80
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
February 29, 2024,
F0473_GRSG_Socio.aprx
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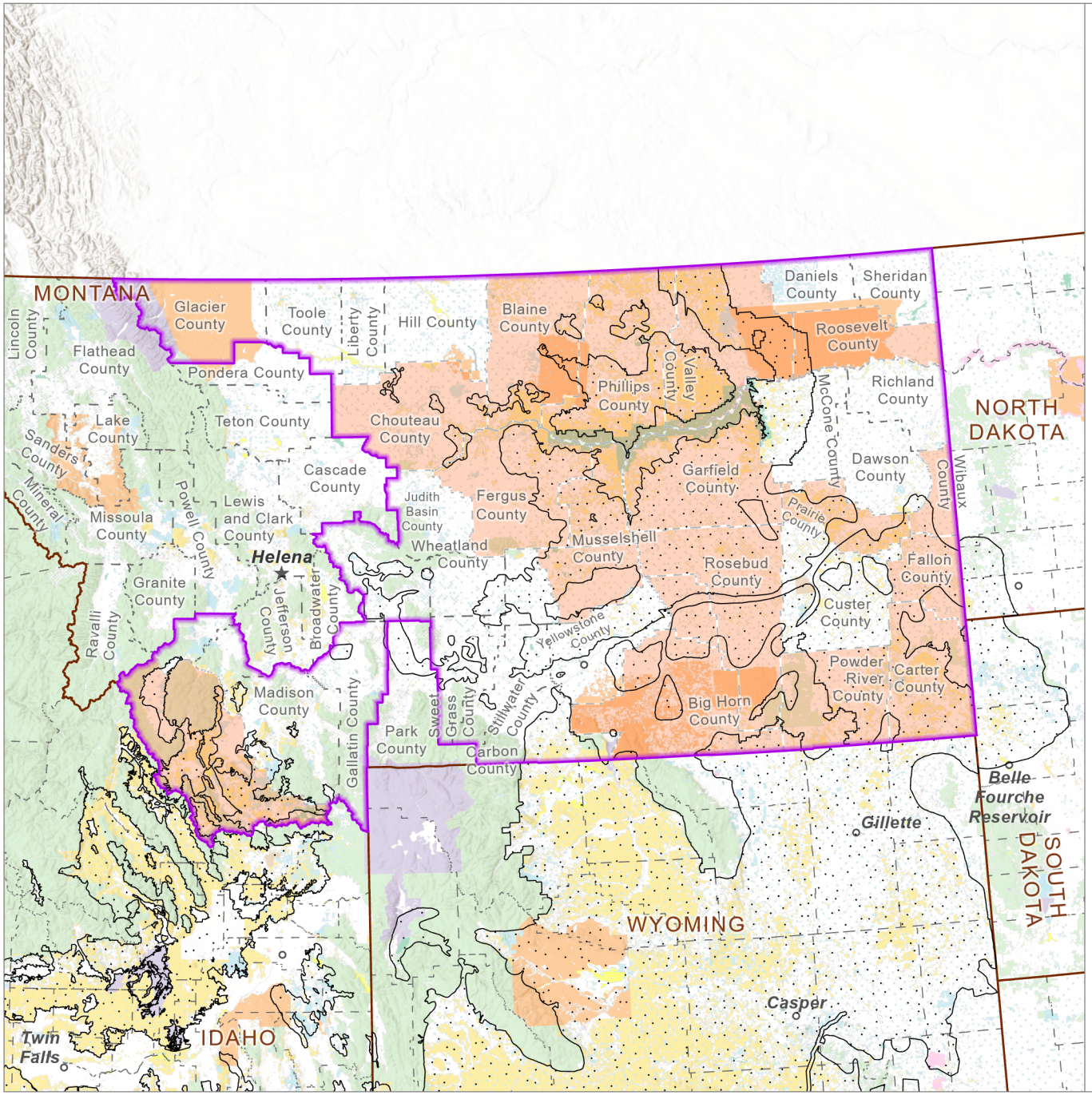


Figure A-14
Environmental Justice Populations in the Socioeconomic Analysis Area - Montana

- Socioeconomic analysis area
- County containing environmental justice populations
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

0 60 120
Miles

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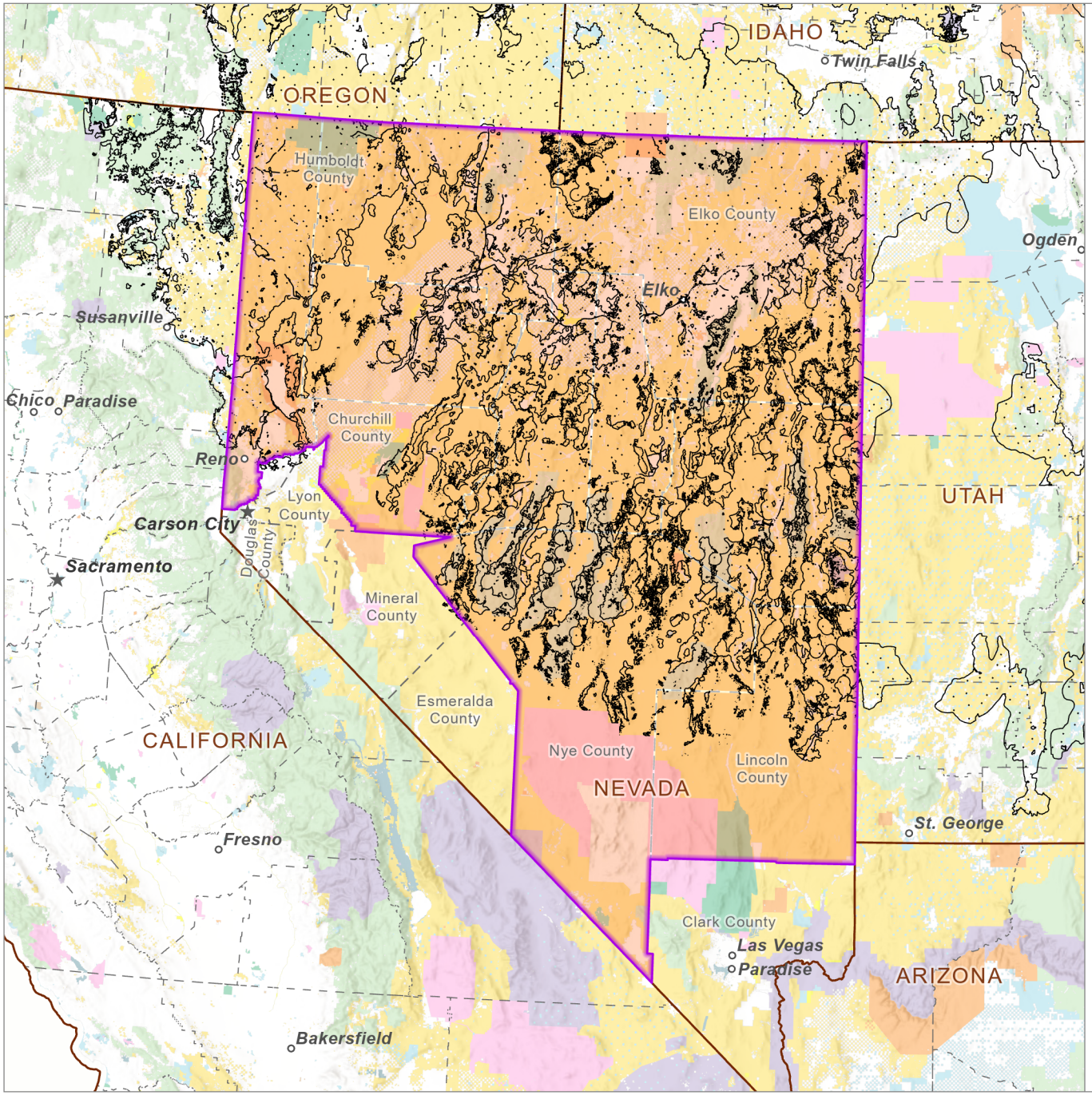


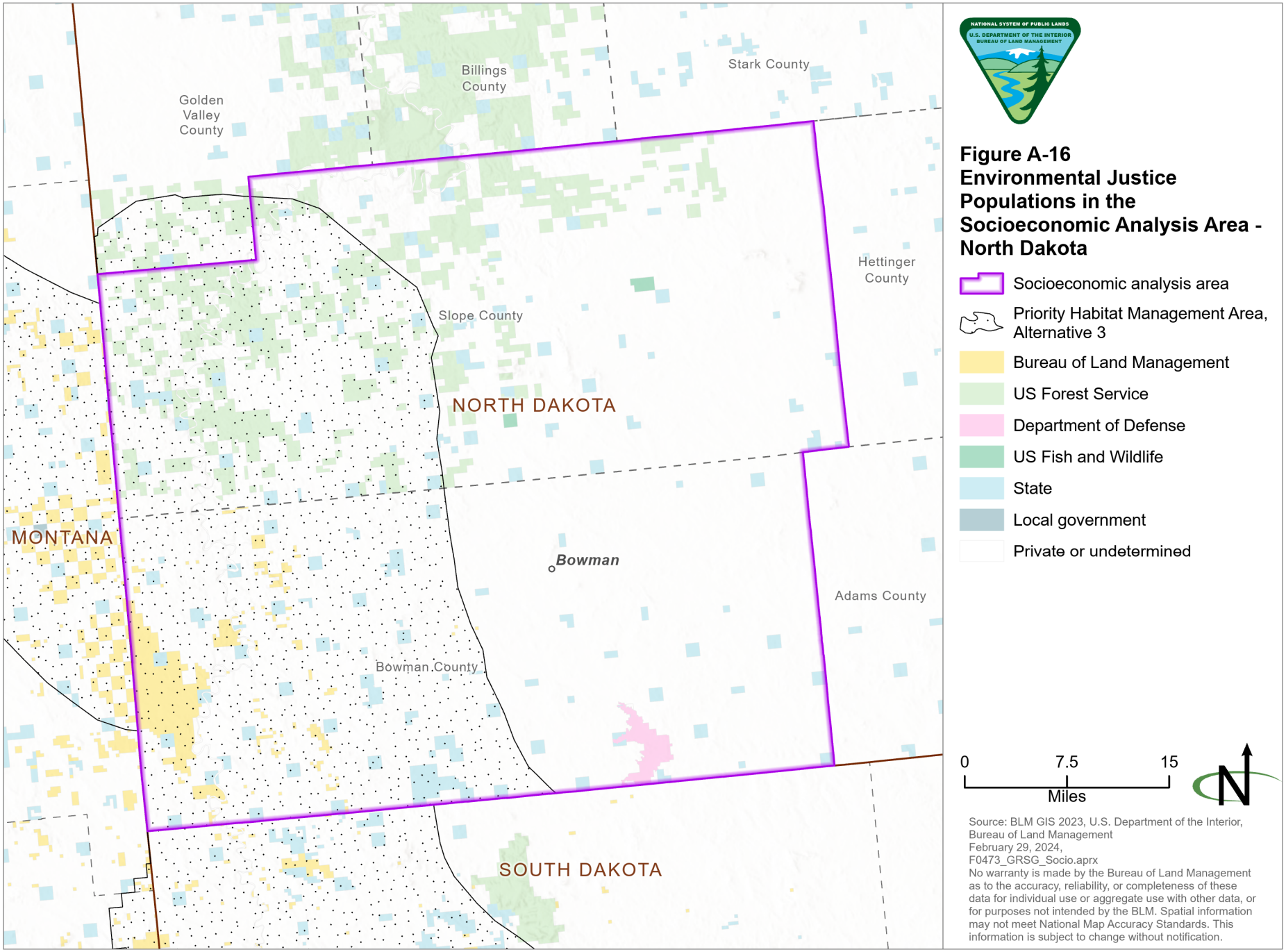
Figure A-15
Environmental Justice Populations in the Socioeconomic Analysis Area - Nevada

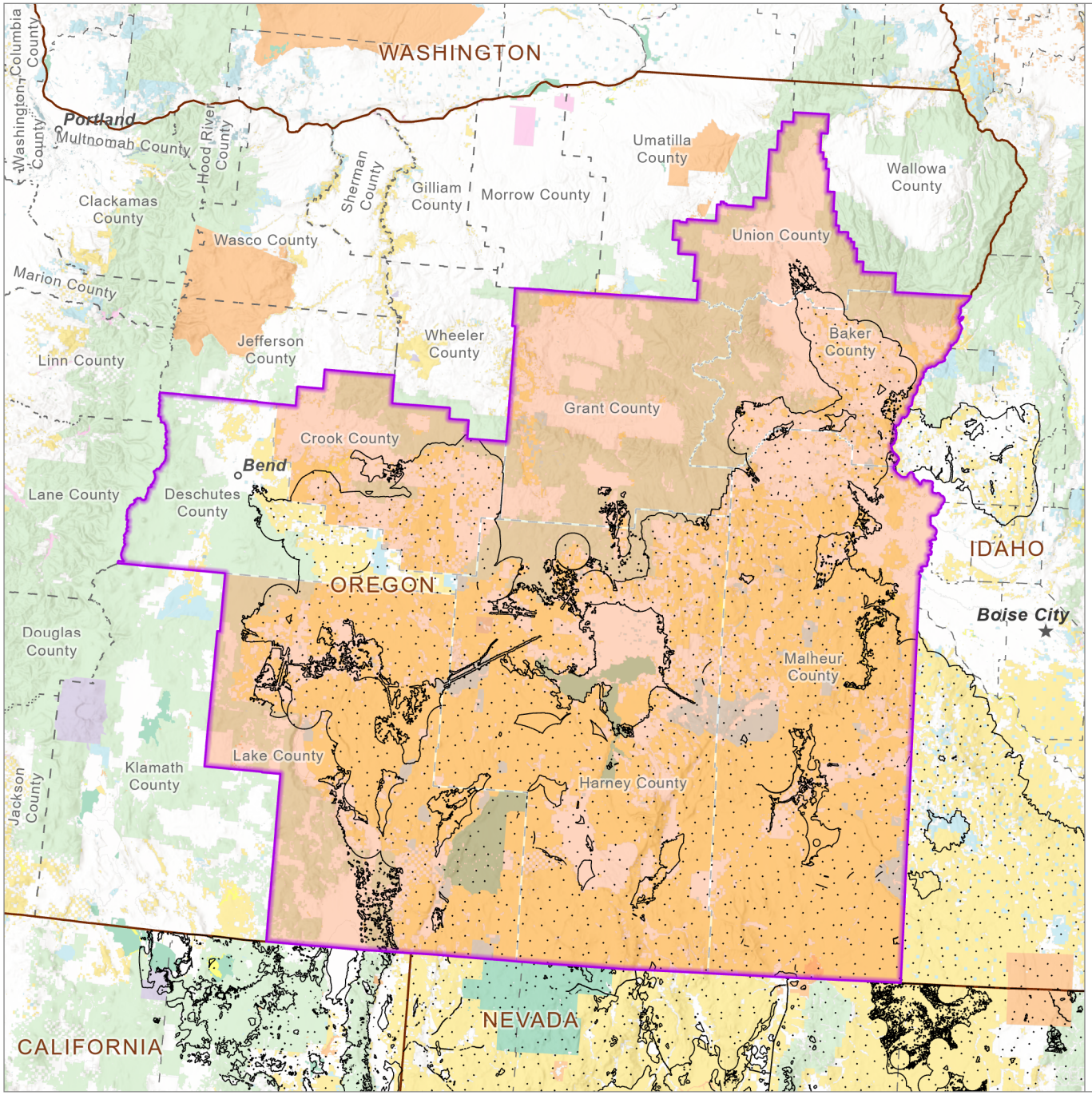
- Socioeconomic analysis area
- County containing environmental justice populations
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

0 50 100
Miles

N

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Billings County
Stark County
Golden Valley County
Hettinger County
Slope County
NORTH DAKOTA
MONTANA
Bowman
Adams County
Bowman County
SOUTH DAKOTA
Figure A-16
Environmental Justice Populations in the Socioeconomic Analysis Area - North Dakota
Socioeconomic analysis area
Priority Habitat Management Area, Alternative 3
Bureau of Land Management
US Forest Service
Department of Defense
US Fish and Wildlife
State
Local government
Private or undetermined
0
7.5
15
Miles
N
Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
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BUREAU OF LAND MANAGEMENT

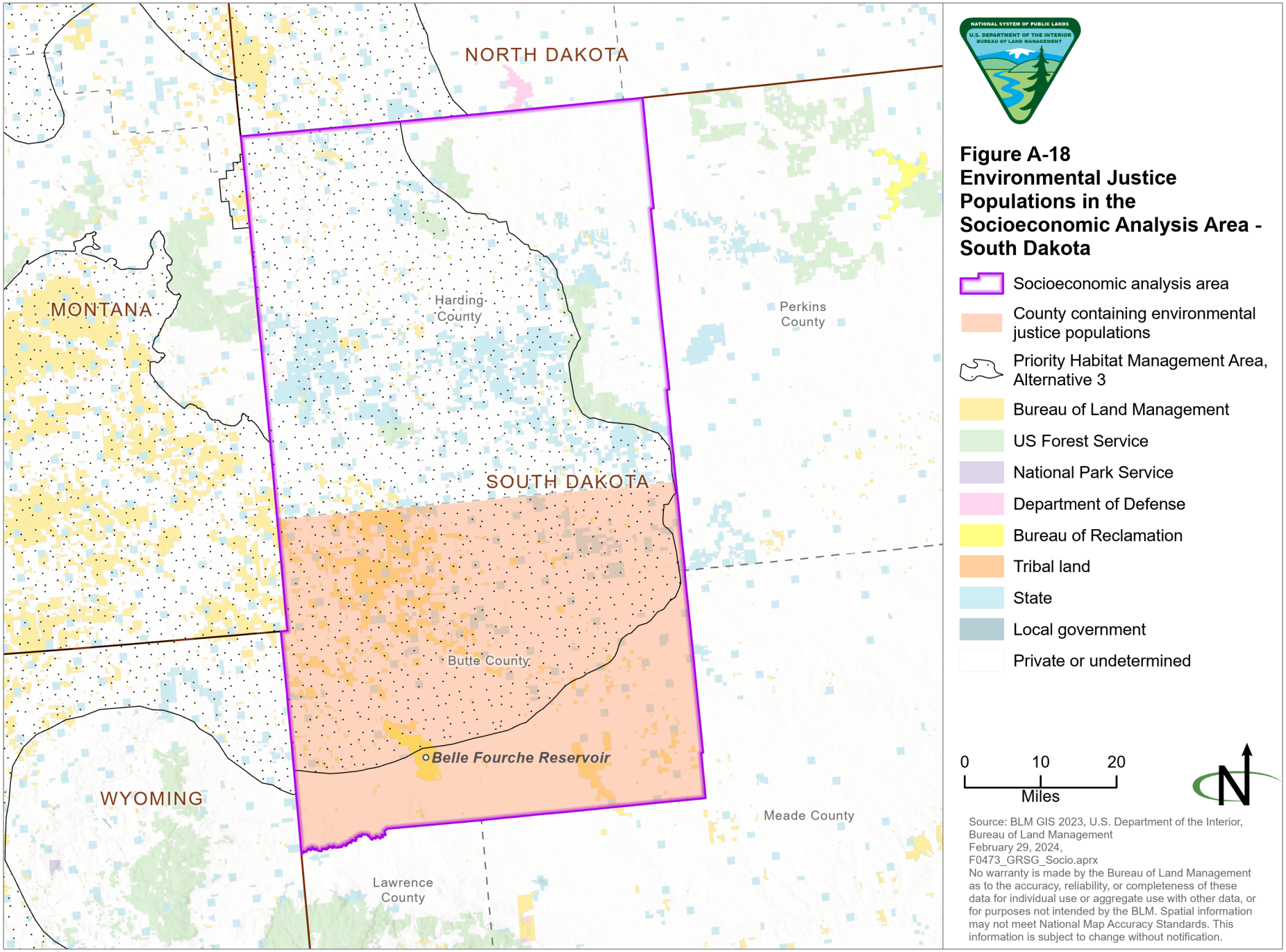
Figure A-17
Environmental Justice Populations in the Socioeconomic Analysis Area - Oregon

- Socioeconomic analysis area
- County containing environmental justice populations
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

0 30 60
Miles

N

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NORTH DAKOTA
MONTANA
SOUTH DAKOTA
WYOMING
Harding County
Perkins County
Butte County
Belle Fourche Reservoir
Meade County
Lawrence County
NATIONAL SYSTEM OF PUBLIC LANDS
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
Figure A-18
Environmental Justice Populations in the Socioeconomic Analysis Area - South Dakota
Socioeconomic analysis area
County containing environmental justice populations
Priority Habitat Management Area, Alternative 3
Bureau of Land Management
US Forest Service
National Park Service
Department of Defense
Bureau of Reclamation
Tribal land
State
Local government
Private or undetermined
0
10
20
Miles
N
Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
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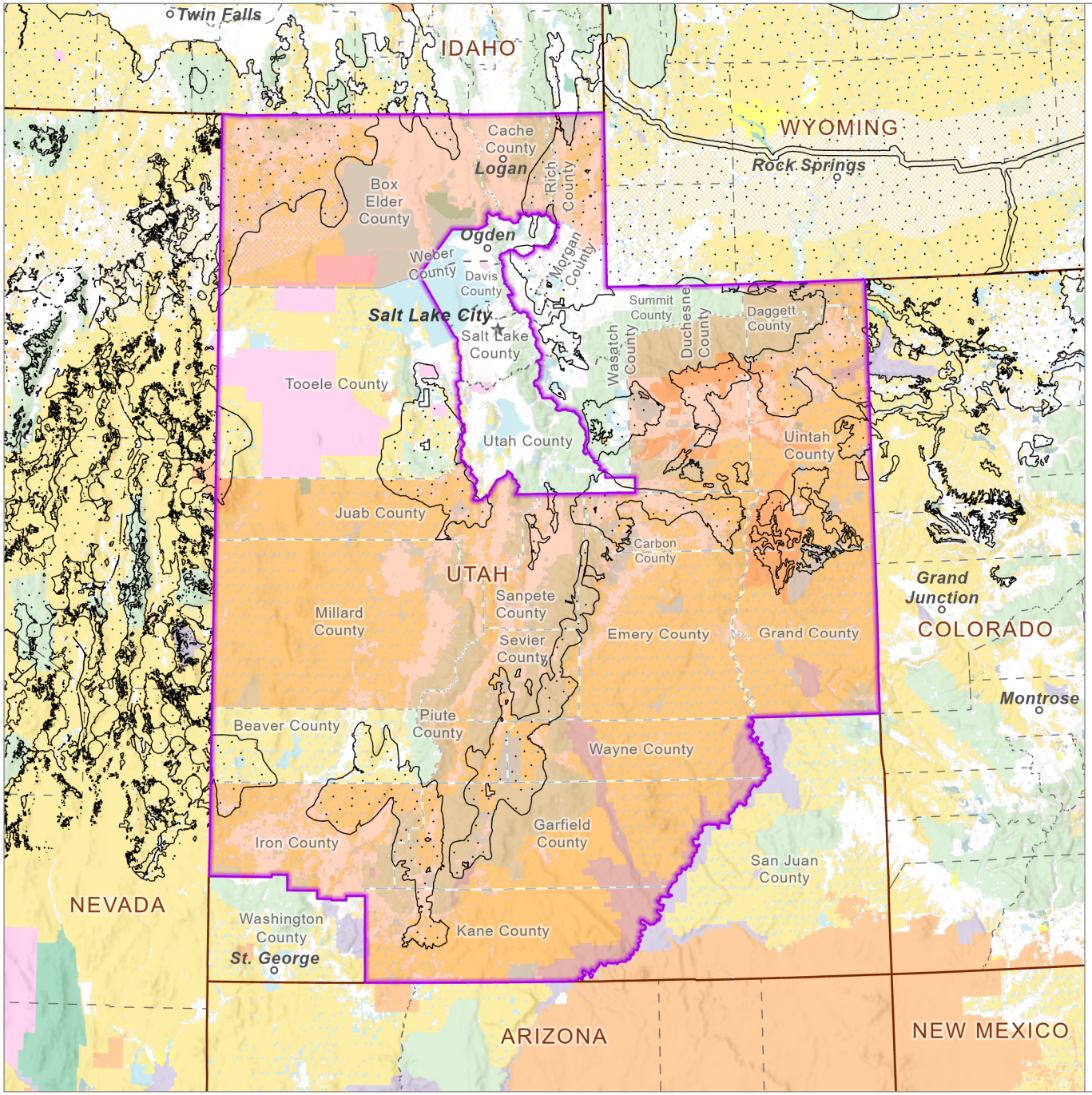


Figure A-19
Environmental Justice Populations in the Socioeconomic Analysis Area - Utah

- Socioeconomic analysis area
- County containing environmental justice populations
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

0 40 80
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
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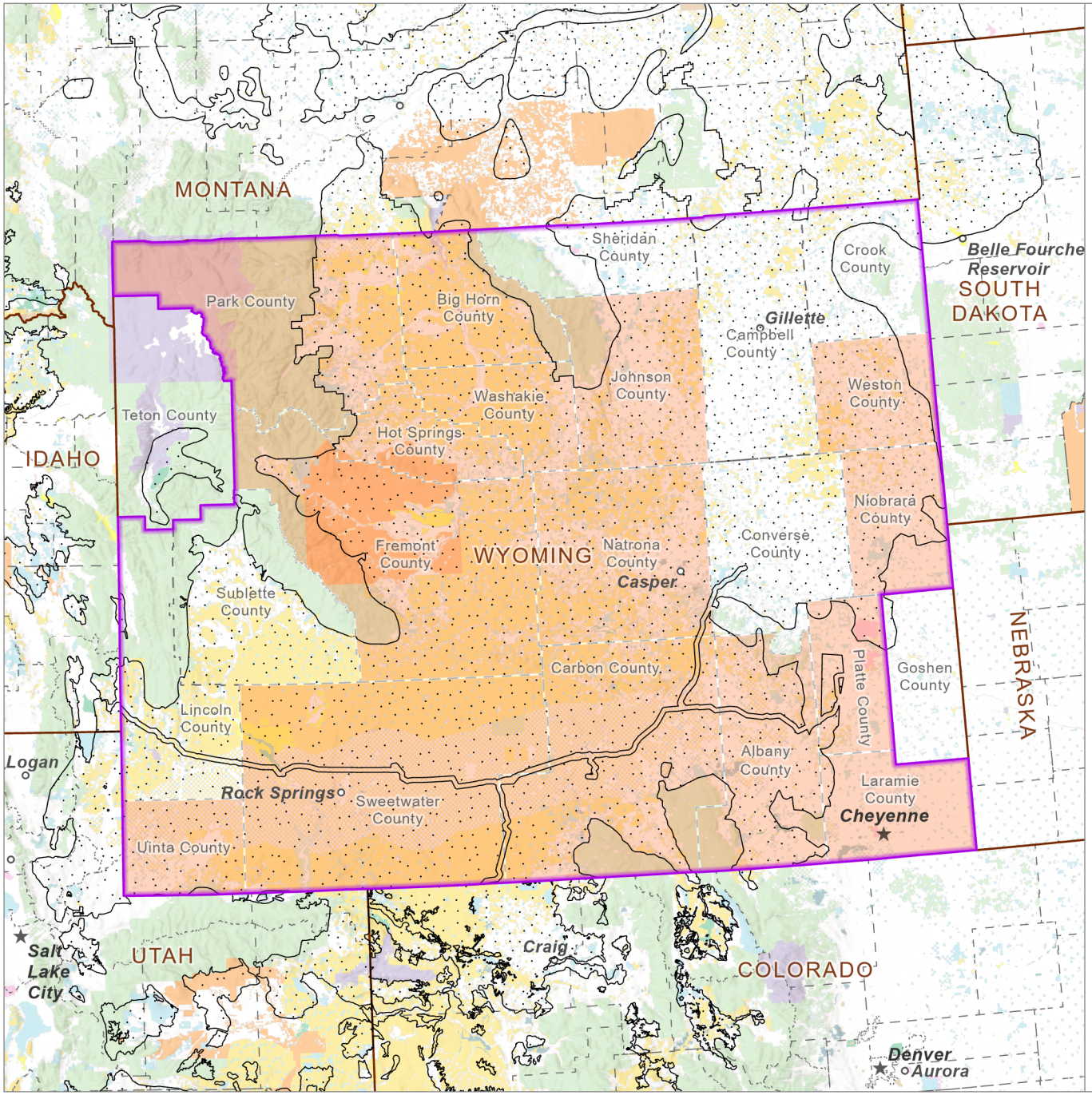


Figure A-20
Environmental Justice Populations in the Socioeconomic Analysis Area - Wyoming

- Socioeconomic analysis area
- County containing environmental justice populations
- Priority Habitat Management Area, Alternative 3
- Bureau of Land Management
- US Forest Service
- National Park Service
- Department of Defense
- US Fish and Wildlife
- Bureau of Reclamation
- Tribal land
- State
- Local government
- Private or undetermined
- Other Federal

0 50 100
Miles

Source: BLM GIS 2023, U.S. Department of the Interior, Bureau of Land Management
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Appendix 14

Environmental Consequences Supporting Information

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14-1 HAF Midscale Units, Habitat Management Areas, and Planning Areas 14-2

Appendix 14. Environmental Consequences Supporting Information

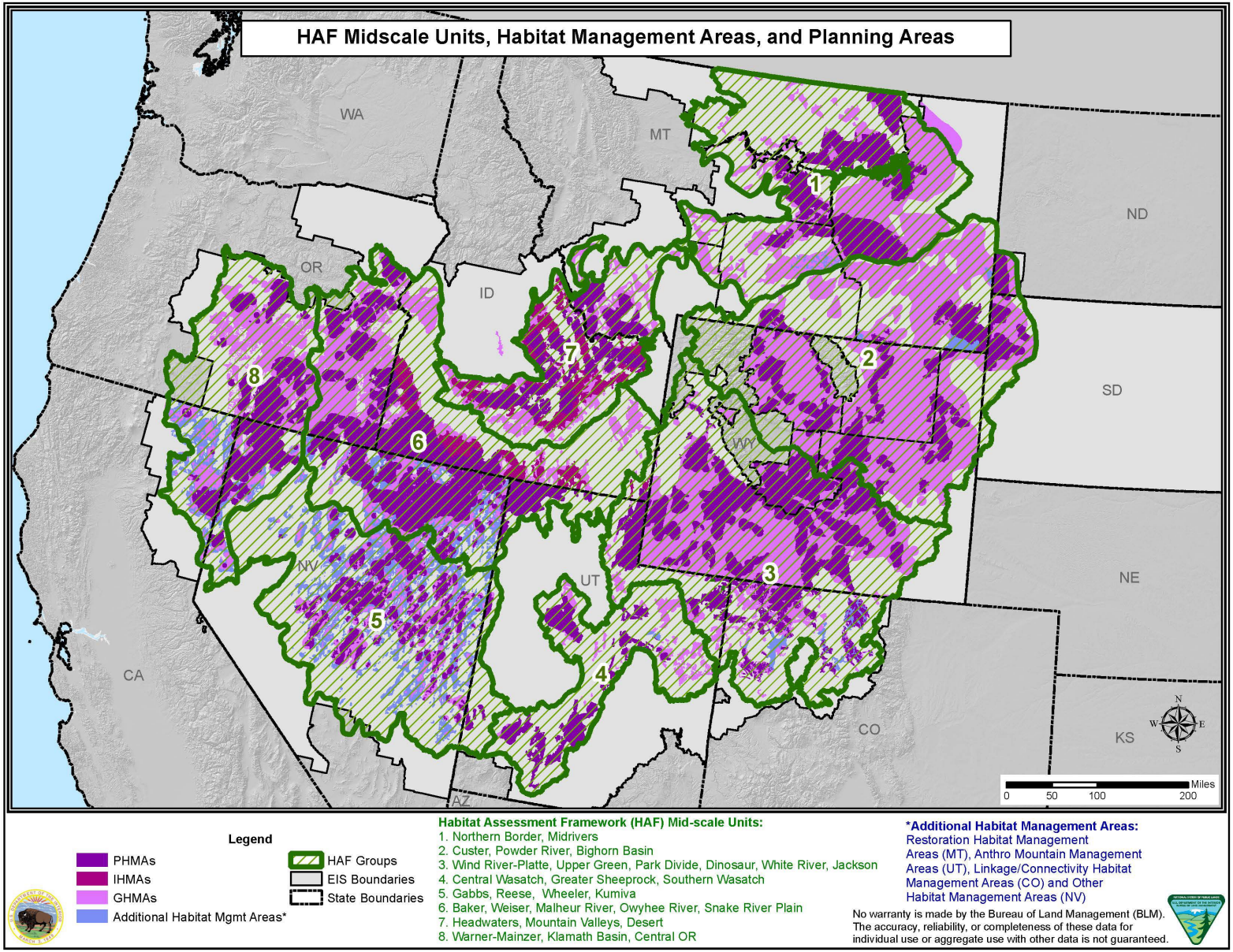
14.1 HAF Groupings

The Habitat Assessment Framework (HAF) is a tool to measure the suitability of GRSG habitat at multiple scales. Mid-scale (second order) HAF areas are conceptually linked to GRSG dispersal capabilities in population and subpopulation areas as described by Connelly and others (2004). Mid-scale HAF delineations also conceptually provide the life requisite space for GRSG dispersal, allowing for migration movements (presumably between seasonal habitats) based on the following key inputs:

- availability of sagebrush habitat,
- size and number of habitat patches,
- connectivity of habitat patches,
- characteristics of linkage areas between patches,
- landscape matrix and edge effects, and
- anthropogenic disturbances.

The mid-scale HAF delineations identified by the BLM capture a conceptual biologically meaningful unit. In addition, recent genetic analyses (Oyler-McCance et al. 2022) delineated sub-population clusters across GRSG range based on data collected between 2005 and 2015. These sub-population delineations indicate movement of GRSG within these areas (either in the past or currently), indicating a cumulative effects analysis on those units would have a biological basis. As such, the BLM combined habitat information using mid-scale HAF and results from the lek persistence model (Wann et al. 2022) with genetic information from Oyler-McCance et al. (2022), to group mid-scale HAF units within the genetic subpopulation boundaries. Given the divisions between subpopulation groupings are not distinct, groupings are based on the preponderance of genetic and habitat information. The resulting eight GRSG HAF groupings are shown in **Figure 14-1**. The allocation acres for Habitat Management Areas (HMAs), locatable minerals, and fluid minerals are provided for each of the eight mid-scale HAF groups by alternative in **Section 14.4**. These allocation acres for the locatable minerals and fluid minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. For example, for locatable minerals, proposed mineral withdrawals for the purposes of GRSG conservation are only proposed and considered under Alternative 1 and Alternative 3 in this RMP Amendment. All the other existing and proposed withdrawal acreage that is identified under other alternatives represent proposed or existing withdrawals that are either being proposed in other RMP efforts or existing withdrawals that are already in place. The information is provided for context and to facilitate the analysis of effects.

Figure 14-1. HAF Midscale Units, Habitat Management Areas, and Planning Areas



14.2 CUMULATIVE EFFECTS

A cumulative impact on the environment is one that results from the incremental impact of the given alternative when added to other past, present, and reasonably foreseeable actions, regardless of what agency (federal or nonfederal) or person undertakes such actions. Cumulative impacts can result from actions that have individually minor impacts, but when taken collectively over time, their combined effects may be significant. The cumulative impacts resulting from the implementation of the alternatives in this RMPA/EIS may be influenced by other actions, as well as activities and conditions on other public and private lands, including those beyond the planning area boundary. As a result, the sum of the effects of these incremental impacts involves determinations that often are complex, limited by the availability of information, and, to some degree, subjective.

Because of the programmatic nature of an RMPA/EIS and cumulative impacts assessment, the analysis tends to be broad and generalized. This allows BLM to examine the impacts that could occur from a reasonably foreseeable management scenario, combined with other reasonably foreseeable activities or projects; consequently, this assessment is primarily qualitative for most resources because of a lack of detailed project-scaled information at the planning stage. A quantitative comparison of geospatial management decisions on public lands across the greater sage-grouse (GRSG) range is presented in **Section 14.3** below.

The cumulative effects analysis in Chapter 4 and supported by the information in this appendix assesses the magnitude of cumulative impacts by comparing the environment in its baseline condition with the expected impacts of the alternatives and other actions in the same geographic area. The magnitude of an impact is determined through a comparison of anticipated conditions against the baseline, as depicted in the affected environment, or the long-term resilience of a resource or social system.

The following factors were considered in cumulative impact assessment:

- Federal, Tribal, nonfederal, and private actions
- Potential for combined impacts or combined interaction between impacts
- Potential for impacts across political and administrative boundaries
- Other spatial and temporal characteristics of each affected resource
- Comparative extent of cumulative impacts across alternatives

14.3 STATE AND LOCAL CONSERVATION PLANS AND EFFORTS

This RMPA is considering changes to GRSG habitat management on public lands and provides direction for if and/or how future developments may occur. This RMPA is limited to planning-level decisions; in other words, it does not authorize any specific project but establishes the conditions under which future actions would be considered in GRSG habitat on public lands. Because of the nature of this decision, the greatest equivalent corresponding actions to consider in cumulative impacts is from actions of a similar scale. The most critical of these types of actions/plans are state GRSG plans, executive orders, statures, and related conservation efforts. Across the landscape, the BLM's RMPAs for public lands will be added to the management from the State plans/efforts. States have legal jurisdiction for managing GRSG populations, as well as having permitting authority over several types of potentially impactful land uses both on non-BLM-administered lands (e.g., oil and gas development on private lands), as well as for some uses on public lands (e.g., locatable mineral mines). Because of this, the State plans/efforts have the greatest potential for a similarly scaled cumulative effect when combined with the BLM's RMPAs.

In addition to the State plans, many counties and conservation districts also include GRSG management in their local plans. There is substantial variability in the level of detail and regulatory nature of the decision in

these plans across the GRSG range. This includes providing recommendations for GRSG habitat management on public lands and may also include specific management for land uses for which the county has permitting authority.

Each State with GRSG has developed a specific approach for conserving those populations and providing or recommending management of uses that could impact GRSG and their habitat. The following sections summarize each state's plan and related efforts.

14.3.1 Colorado

Colorado GRSG Conservation Plan, EO 2015-004, Greater Sage Grouse Stewardship Action Plan, SB 19-181. GRSG habitat conservation in Colorado spans across federal, state, local and private management. In 2008, the State of Colorado published the Colorado Greater Sage-Grouse Conservation Plan (CCP) which built on conservation plans developed by local working groups. The CCP provides an extensive literature review of GRSG in Colorado and overarching conservation strategy to support conservation of the species and avoid or minimize impacts. The CCP contains voluntary management guidelines that may be applied across land ownerships and many land uses (Colorado Greater Sage-grouse Steering Committee 2008). Implementation of the CCP guidelines is not mandatory.

Through implementation of the CCP, the State of Colorado has funded and completed over 146,000 acres of habitat improvements in GRSG habitat and supported numerous conservation easements (Conservation Efforts Database).

In 2015 Colorado's governor issued Executive Order 2015-004 to strengthen the CCP. Under the order, the state oil and gas permitting agency would evaluate its existing wildlife siting rules for potential improvement and consult with Colorado Parks and Wildlife when considering actions that impact GRSG or GRSG habitat. The order also prioritized the completion of the Colorado Habitat Exchange, a voluntary compensatory mitigation program. The Colorado Habitat Exchange has not been fully implemented largely due to changing market conditions that devalued the credit/debit system. There are no other statewide mitigation exchanges or banks in place.

Oil and gas operations in Colorado, regardless of ownership, are subject to the rules and regulations overseen by the Colorado Energy & Carbon Management Commission (ECMC, formerly Oil and Gas Conservation Commission). In 2019, Colorado Senate Bill 19-181 was signed into law, amending the Oil and Gas Conservation Act. SB 19-181 ensures that oil and gas development including flowline operations in Colorado are regulated in a manner that protects public health, safety, welfare, the environment and wildlife resources (§34-60-101 et seq.). Subsequent approved rulemaking for SB 19-181 included substantial updates to the 300 Series (consultations), 400 Series (Noise & Lighting Requirements), and 1200 Series regulations, which dictate the protection of wildlife resources. The 1200 Series regulations require wildlife mitigation plans for new or amended oil and gas locations, or for previously permitted locations that would cause the density of oil and gas locations to exceed 1 per square mile in PHMA. The wildlife mitigation plans must have written concurrence from CPW. New ground disturbance within 1 mile of GRSG lek sites, among other high priority habitats, is precluded except under certain circumstances outlined in the regulations. Any direct and/or indirect impacts resulting from development triggers compensatory mitigation requirements (monetary fees or operator-completed projects) which are intended to provide a conservation benefit for the population(s) impacted. Mitigation under the SB 19-181 is enforceable by ECMC but is limited to oil and gas development and flowline operations.

State trust land represents approximately 10 percent of the GRSG habitat in Colorado. In 2016 the State Land Board issued the Greater Sage Grouse Stewardship Action Plan (SAP) for an original term of 4 years and re-issued the SAP in 2020 for an additional 5 years. The SAP describes the current uses of the state trust lands, the quality of these lands for GRSG habitat, sets prescriptions for both surface and mineral ownership, and clarifies GRSG habitat mitigation and adaptive management (Colorado State Land Board, 2016). Some management actions described in the SAP are required to hold leases on state trust lands, such as a set of required and voluntary grazing best management practices. In coordination with CPW, the State Land Board applies stipulations to fluid mineral leases including no surface occupancy in PHMA, no surface occupancy within 2 miles of a lek in GHMA, and timing limitations in all designated habitat. The State Land Board also applies the 3 percent disturbance cap and the average of one facility per 640-acre density cap described in the BLM 2015 ARMPA. To date, the State Land Board has foregone 6 oil and gas, 1 solid mineral, 3 solar, and 9 wind energy leases to conform with the SAP (Annual Stewardship Report 2023). The State Land Board has implemented $82,000 worth of habitat enhancement projects associated with the SAP since 2016 (Colorado State Land Board 2023).

Additionally, several regional plans provide important GRSG conservation strategies in Colorado. This includes the Middle Park Greater Sage-Grouse Conservation Plan (CPW 2000) which covers the upper Colorado River drainage in north-central Colorado and include portions of Grand and Summit counties and the northeast corner of Eagle County; the Northern Eagle/Southern Routt Greater Sage-Grouse Conservation Plan (CPW 2004) which addresses Northern Eagle and southern Routt counties north of Eagle River; the North Park Greater Sage-Grouse Conservation Plan (CPW 2001) which covers Jackson County in the northern tier of Colorado; the Parachute-Piceance-Roan Plateau Greater Sage-Grouse Conservation Plan (CPW 2008b) and the Parachute-Piceance-Roan Plateau Sage-Grouse Work Group (CPW 2008c) which addresses the Parachute-Piceance-Roan area in western Garfield and Rio Blanco counties.

14.3.2 Idaho

Policy for GRSG Management in Idaho and EO 2022-03. With Executive Order 2022-003 "Adopting Idaho's 2021 Sage-Grouse Management Plan and Idaho Sage-Steppe Mitigation Process," the State of Idaho updated its GRSG management plan. The State plan guides GRSG management and provides recommendations across all ownerships. The State plan identifies policy direction and recommendations for GRSG conservation and management on federal lands and actions with a federal nexus within the Sage-grouse Management Area. The State plan may also apply to management of State Endowment Lands (a decision by the Idaho Board of Land Commissioners); it is non-binding on private lands.

The objectives of the Idaho Plan are to: (1) implement policy mechanisms to conserve and manage GRSG habitats, populations, and connectivity; (2) monitor habitat and population trends; and (3) use adaptive regulatory triggers to prevent further loss and stabilize habitats and populations in PHMA and IHMA.

The State plan focuses on management and direction for large-scale anthropogenic disturbance, as well as priorities for habitat management and restoration. Under the State plan, habitat disturbance from wildfire and fuels management, maintenance and operation activities by utility companies, and infrastructure related to homes or small-scale agricultural businesses are exempt from restrictions for large-scale anthropogenic disturbance.

Idaho's GRSG management is based on the three-tiered approach to Habitat Management Areas (HMA), ranging from Priority, Important, and General HMA (i.e. PHMA, IHMA, and GHMA) in terms of habitat quality, breeding bird densities, and connectivity. Guidance for management from the most to least restrictive also follows this order. The State plan focuses on conserving primarily PHMA, followed by IHMA. This 3-

tiered HMA approach facilitates multiple-use activities in lower quality habitats, e.g. disturbed or fragmented, in GHMA.

Executive Order 2022-03 also adopted the Idaho Sage-Steppe Mitigation Principles that guide compensatory mitigation, albeit voluntary. The overall strategy is to primarily avoid, then minimize impacts to GRSG, and lastly, to mitigate for unavoidable impacts. Mitigation efforts would focus on increasing the resiliency and productivity of GRSG populations and habitats, particularly in PHMA and IHMA. The State will work with federal land management agencies and project proponents to use the Habitat Quantification Tool (HQT) to measure and quantify the impact of new anthropogenic disturbance on GRSG, and, if needed, provide mitigation recommendations.

BLM Idaho has a Memorandum of Understanding (MOU ID SO-2022-09: Idaho Greater Sage-grouse Implementation Team) with several partner federal and state agencies to develop conservation strategies and make recommendations pertaining to adaptive management, review of new anthropogenic disturbance, and mitigation. The State makes recommendations on mitigation largely based on the Idaho Sage-steppe Mitigation Principles document and results from the HQT. The Implementation Team review proposals for new anthropogenic disturbance and makes recommendations to the BLM Authorizing Officer.

The State of Idaho has several ongoing efforts that contribute to GRSG conservation:

- **Sage-Grouse Actions Team** (SGAT) is comprised of representatives from state and federal agencies and NGOs who collaborate on habitat restoration efforts. It is overseen by the Idaho Governor's Office of Species Conservation. The SGAT specifically targets work on invasives, juniper removal, wet meadow and riparian restoration, wildfire prevention (e.g., strategic fuel breaks, wildland fire engine fill stations), and wildfire rehabilitation. Annual funding annually is typically a mix of state or federal funds. Each winter project proposals from agencies and individual landowners are evaluated. Projects have been funded since 2016. In 2022, through the SGAT, approximately 8,000 acres of habitat were treated, leks monitored, and funding assistance for GRSG coordinator positions. Many on-the-ground projects have been completed to-date, including those complementing efforts by various agencies or landowners in Idaho.
- Idaho **Cheatgrass Challenge** (CC) is a multiagency partnership lead by the Natural Resource Conservation Service (NRCS) whose focus is to proactively maintain healthy landscapes, free of invasive annuals grasses (IAG) (cheatgrass, medusahead wildrye, ventenata and other invasive weeds), reduce IAG distribution in transitional areas, and mitigate the adverse effects in areas they dominate. The CC was formed in 2018 and consists of representatives from multiple federal and state agencies, as well as Pheasants Forever and the Idaho Rangeland Conservation Partnership. Projects are funded annually. A review team evaluates the applications based in factors such as treatment effectiveness, collaboration across landownerships, and leveraging of funding and in-kind efforts.

14.3.3 California

GRSG Conservation Plan for northeastern California (NV/CA Sub-region). The State of California has not developed a plan or established a mitigation strategy for GRSG. In lieu of a state mitigation strategy in California, the BLM coordinates with the Sagebrush Ecosystem Technical Team (SETT) on site-specific projects which require mitigation, as appropriate. The SETT runs a "table-top" analysis established in the Conservation Credit System (CCS; State of Nevada, 2022) to determine the impacts of the site-specific projects. The BLM uses this information to determine the appropriate mitigation measures required

to off-set impacts to GRSG and their habitat and remain consistent with mitigation measures applied on lands in Nevada.

In November of 2022, a petition was submitted to the California Fish and Game Commission (Commission) requesting the Commission list GRSG as threatened or endangered under the California Endangered Species Act (CESA). Based on the information contained in the petition and other relevant information, it was determined that there was sufficient information to indicate the petitioned action may be warranted. A one-year status review of GRSG by the California Department of Fish and Wildlife (CDFW) commenced in June of 2023. During the review period, GRSG will receive the same protections as a CESA-listed species throughout California.

On California BLM-managed lands in Nevada, the California BLM utilizes the Nevada Greater Sage-grouse Conservation Plan (State of Nevada, 2019), CCS and abides by the State of Nevada's Regulations (2022 Nevada Revised Statutes (NRS) Chapter 232-State Departments NRS 232.162) regarding GRSG mitigation, which applies to lands in GRSG habitat across all land ownership. See the "GRSG Conservation Plan for Nevada" below for additional information on the State of Nevada's GRSG conservation plan, CCS and mitigation strategy.

Additional ongoing efforts that contribute to GRSG conservation in California include the Buffalo Skedaddle Working Group. The group is named after a GRSG Population Management Unit (PMU) which is managed by the Eagle Lake and Applegate Field Offices. The group has been working for over a decade addressing ways to conserve habitats that are important for GRSG within the Buffalo Skedaddle PMU. The working group consists of wildlife biologists, rangeland management specialists, ecologists, private landowners, and permittees. The group represent the BLM, CDFW, Nevada Department of Wildlife, US Fish and Wildlife Service, Forest Service, Natural Resources Conservation Service, and the ranching community.

The group has been focused on implementing the conservation goals and habitat restoration targets established in the 2006 Buffalo Skedaddle Conservation Plan (currently under revision). The group works on projects focused on the habitat needs of GRSG including all seasonal habitats, wildfire rehabilitation, riparian restoration and protection, fuels reduction, control of invasive species and several multi-year research projects in conjunction with USGS, CDFW, NDOW and universities. The Plan includes strategies to manage uses such as livestock and wild horse and burro in ways that benefit GRSG and its habitat. It also recognizes the critical connection of public and private lands and the essential partnership among the land managing agencies and landowners.

14.3.4 Nevada

GRSG Conservation Plan for Nevada. On March 30, 2012, Governor Brian Sandoval fortified Nevada's commitment to GRSG conservation by issuing Executive Order 2012-09, which established the Governor's Greater Sage-grouse Advisory Committee (Advisory Committee) with a directive to provide updated recommendations for GRSG conservation in Nevada to preclude the need for listing GRSG under the Endangered Species Act (ESA) and provide a GRSG alternative in the Nevada BLM/ USFS Land Use Plan (or Resource Management Plan) revision process. Those efforts resulted in the Strategic Plan for Conservation of Greater Sage-Grouse in Nevada (2012 State Plan), completed on July 31, 2012, which consisted of a list of primary threats to GRSG in Nevada and recommendations to the Governor on strategies and actions to conserve GRSG in Nevada.

One of the main recommendations of the 2012 State Plan was the creation of the Sagebrush Ecosystem Program (SEP), which would consist of the Sagebrush Ecosystem Council (SEC) and the Sagebrush Ecosystem

Technical Team (SETT). The SEC was originally established under Executive Order 2012-19, on November 19, 2012, and later codified under Nevada Revised Statutes Chapter 232.162. The SETT began work on February 11, 2013. On April 22, 2013, the SEC directed the SETT to further develop the recommendation in the 2012 State Plan into a more comprehensive and detailed strategy. The SEC considered proposed revisions over a series of meetings starting in July 2013. The result of those efforts was the 2014 Nevada Greater Sage-grouse Conservation Plan (State Plan).

The State Plan, as updated in 2019, is based on available scientific information and stakeholder input to apply a GRSG conservation plan specific to Nevada. This is meant to be a "working document" that will be updated as new science emerges and lessons are learned through implementation of the State Plan, using an adaptive management framework.

In addition to the State Plan, the SEP developed the Nevada Sage-grouse Strategic Action Plan (SAP). The State Plan provides broad goals, objectives, and management actions to ameliorate the primary threats to GRSG in Nevada. The SAP is a companion document to the State Plan and goes into greater detail identifying areas in which to focus conservation efforts to achieve the broad goals and objectives outlined in the State Plan. The SAP identifies funding sources to implement the management actions recommended in the State Plan. The SAP also identifies where the primary threats to GRSG habitat are located across the landscape and provides specific guidance on how to ameliorate these threats based on local area conditions, resistance and resilience regimes, and ecological site descriptions. The SAP helps guide how and where the management efforts identified in the State Plan are prioritized to achieve landscape-scale conservation of GRSG and the sagebrush (*Artemisia* spp.) ecosystem.

Nevada Conservation Credit System. Administered by the Sagebrush Ecosystem Technical Team (SETT), the Nevada Conservation Credit System (CCS) is an approach to GRSG habitat protection that provides for fully compensating habitat impacts from man-made disturbances by long-term enhancement and protection of habitat to result in an overall benefit for the species, while allowing for anthropogenic disturbances that support the Nevada economy. The CCS was developed to meet requirements established by Nevada Revised Statutes Chapter 232.162 to fulfill compensatory mitigation requirements for anthropogenic disturbances to GRSG habitat on public lands in Nevada. The use of the CCS to offset impacts to GRSG became mandatory in Nevada with the adoption of Nevada Administrative Code 232.400-232.480 in 2019. The CCS is used to offset impacts from anthropogenic disturbances through habitat enhancement and protection that results in a net conservation benefit for GRSG habitat in Nevada. The CCS quantifies verified functional habitat value in the form of credits and quantifies the verified functional habitat value of impacts, both direct and indirect, in the form of debits.

The CCS fulfills the November 3, 2015, Presidential Memorandum: *Mitigating Impacts on Natural Resources from Development and Encouraging Related Private Investment* directive to ensure that federal policies are clear, work similarly across agencies, and are implemented consistently. The CCS meets the objective of encouraging private investment to achieve public natural resource conservation as an innovative way to finance successful stewardship and restoration projects that demonstrate a measurable net conservation gain of sagebrush habitat in Nevada.

The CCS is designed to accommodate private land credits in the system and the State Plan currently allows for credits to be generated on public land. However, procedures and instructions have not been adopted for federal agency engagement with the CCS to verify and enroll credits on public land.

14.3.5 Montana

Montana GRSG Habitat Conservation Program and EO 12-2015. In Montana, the GRSGS Conservation strategy is overseen by the Montana Sage-Grouse Oversight Team and the Sage-grouse Habitat Conservation Program, working to implement Executive Order 12-2015 and the Greater Sage-grouse Stewardship Act. Executive Order 12-2015 establishes specific requirements and limitations on development, being most restrictive in core areas near leks and less restrictive in general habitat and connectivity areas. Other components establish general practices that apply to everyone. The EO applies to all state agencies and all programs and activities of state government, including permitting programs, grant programs, and internal agency programs.

The MT Habitat Conservation Program facilitates implementation by consulting with permit applicants and project proponents to help applicants avoid negative impacts of development through minimization of impacts and address compensatory mitigation for impacts that can't be avoided or minimized. The mitigation hierarchy is applied by first working to avoid impacts and core area, then minimization through onsite practices, and as a last resort, compensatory mitigation to replace lost habitat. The Program will make recommendations to the applicant and the permitting agency.

While the MT HCP provides advice, and is not a regulatory entity, compliance with the EO is achieved through the issuing of state permits, grants or technical assistance, which contain requirements. In cases where exceptions or waivers to the EO are requested, these are decided by the Montana Sage Grouse Oversight Team. Implementation is mandatory for state agencies and federal agencies have committed to align their work to the approach, consistent with "all hands, all lands."

The compensatory mitigation aspects of the Montana Sage-Grouse Conservation Strategy are established through a Montana Sage Grouse Oversight Team (MSGOT) approved, Montana Mitigation System Policy Guidance Document for Greater Sage-Grouse and the Habitat Quantification Tool Technical Manual (HQT). The HQT and mitigation policy took effect January 12, 2019. The System draws on findings and science from the U.S. Fish and Wildlife Service's (USFWS) Conservation Objectives Report (COT), the 2015 USFWS Not Warranted Finding, and the recommendations of the Montana Greater Sage-Grouse Habitat Conservation Advisory Council. The approach relies on best available science, should incorporate new information, and is based on deliberations of the Montana Mitigation Stakeholders Team (Stakeholders Team). The HQT calculates the functional acres lost on a debit project and gained on a credit project. Functional acres are based on the quality and quantity of affected habitat. The policy guidance document applies multipliers for development projects to incentivize voluntary conservation and consistency with the Montana Sage-Grouse Habitat Conservation Plan or specific provisions of federal land use plans.

The Montana Policy Guidance defines the processes and information necessary to create, buy, or sell mitigation credits suitable for meeting sage grouse mitigation requirements within the State of Montana. The HQT calculates the functional acres lost on a debit project and gained on a credit project. Functional acres are based on the quality and quantity of affected habitat.

In 2005, Montana Fish Wildlife and Parks (FWP), released the Management Plan and Conservation Strategy for Sage-grouse in Montana, a product crafted in partnership with other key entities. The plan describes GRSG habitat, population dynamics, and provides a framework for developing local working groups. Overall, the plan outlines the envisioned approach for conservation and enhancement of sage-grouse habitats. This plan, along with newer science and information was used as key information in the development of the MT GRSG Conservation Strategy.

Montana FWP also manages the Upland Game Bird Enhancement Program which provides funds for various conservation actions including management changes, restoration projects, and easements. In addition, the department provides technical assistance to aid in the development and application of GRSG related conservation projects from federal, local, and non-profit partner organization programs.

14.3.6 North Dakota

Management Plan and Conservation Strategies for GRSG in North Dakota. The State of North Dakota Game and Fish Department released the Management Plan and Conservation Strategies for Greater Sage-Grouse in North Dakota in 2014. The plan provides recommendations on how to meet objectives from the FWS COT Report (2013). While the plan does not regulate development in sage-grouse habitat, it provides a framework for habitat conservation efforts across the varied ownership in ND GRSG habitat. The plan recommends a conservation hierarchy, starting with avoidance, and where that is not possible, minimization and mitigation.

In addition, the ND Game and Fish Department runs a Private Land Initiative program, that includes programs such as Conservation Reserve Cost Sharing, Working Lands, and Habitat Plots. These initiatives fund various conservation actions, including ones in GRSG habitats.

14.3.7 South Dakota

South Dakota GRSG Action Plan 2022-2026. GRSG are listed as a species of greatest conservation need in the 2014 South Dakota Wildlife Action Plan. Habitat areas, management approaches, population dynamics, and additional management options were part of the Sage-grouse Management Plan for South Dakota 2014 – 2018. The management plan was updated in 2022 with the release of Management of Greater Sage-Grouse in South Dakota. Information from the management plan was used to craft the South Dakota Greater Sage-Grouse Action Plan (2022-2026) which was released in early 2022. The plan recommends three priorities: core area mapping; habitat management; and collaboration. While the plan is not regulatory, it does provide both internal guidance to SD Game Fish & Parks and identifies the need for collaboration, establishment of good faith efforts, and environmental review to facilitate the common interest of GRSG conservation.

Additional contributions by the state for GRSG conservation are focused on providing capacity for collaborative habitat-related programs. SD GFP contributes funding to multiple partner efforts that overlap and work to leverage federal, state, and additional funding sources to apply restoration, enhancement, and protection actions to GRSG habitats in South Dakota.

14.3.8 Oregon

Oregon Sage-Grouse Action Plan and EO 15-18. The State of Oregon is in the process of updating its Oregon Sage-Grouse Conservation Assessment and Strategy. Oregon Department of Fish and Wildlife (ODFW) first developed a plan for the conservation and management of GRSG in Oregon in 2005. This document, the Greater Sage-Grouse Conservation Assessment and Strategy for Oregon (or "CAAS"), was last updated in 2011. The 2011 update to the CAAS included a process for defining and delineating the most important sage-grouse habitats in Oregon. These "Priority Areas for Conservation" (PACs) are necessary to conserve 90% of Oregon's GRSG population and include both core and low-density habitats. ODFW updated the GRSG habitat designation maps, and consequently the Oregon Fish and Wildlife Commission approved them in December 2023, which was not in time incorporation into the BLM's Draft analysis; it will be incorporated into the Final EIS.

The State plan implements direction from State EO 15-18 (September 15, 2015). ODFW Greater Sage-Grouse Conservation Strategy (Oregon Administrative Rules OAR 635-140-0000 – 0025) rules identify GRSG habitat, target population objectives, and mitigation hierarchy with specific information regarding mitigation. The State's Land and Conservation Development Commission (LCDC) also enacted OAR 660-023-0115 for GRSG conservation, which is the regulatory rule. All state agencies that carry out, fund, or permit actions within GRSG habitat were required to adopt OAR-660-023-0115.

Oregon has a Sage-grouse Mitigation Program, which is a product of Oregon's GRSG conservation efforts and addresses the threat of increasing development pressure in GRSG habitat. Proposed development projects in GRSG habitat that require a county or state permit, which includes private lands, and are identified as a conflicting use (e.g., any non-agriculture development over 5 acres), as outlined in OAR 660-023-0115(7), must coordinate with the Mitigation Program to ensure the Mitigation Hierarchy outlined in both OAR 660-023-0115 and OAR 635-140-0025 has been achieved. "Compensatory mitigation" is the third step in the mitigation hierarchy and means the replacement or enhancement of the function of habitat capable of supporting GRSG in greater numbers than predicted to be impacted by a development. ODFW operates a Habitat Quantification Tool (HQT), which was developed to measure projected outcomes of both new development and habitat restoration projects and to help target siting of credit and debit projects in the most beneficial locations for GRSG .

In 2012, the Oregon Sage-grouse Conservation Partnership (SageCon) was convened at the request of the Governor's office to formulate an "all lands, all threats" approach to GRSG conservation. This effort was to address both USFWS' GRSG listing decision in 2015 and support long-term community sustainability in central and eastern Oregon. SageCon continues to convene the partners involved in Oregon's sagebrush rangelands. The ODFW 2011 Conservation and Assessment Strategy and the 2015 Oregon Sage-grouse Action Plan identified Local Implementation Teams (LITs) for 5 geographic areas to be the hub of locally-led collaboration to achieve coordinated and supported implementation of strategic conservation actions on-the-ground. These LITs and other local entities work closely with BLM district and field offices to coordinate cross-jurisdictional activities to benefit GRSG habitat.

Additionally, private landowners are able to make a long-term commitment through CCAA's. Voluntary conservation agreements through Sage-Grouse Candidate Conservation Agreements with Assurances (CCAAs) are designed to support the ecological integrity and uplift of Oregon's privately owned sagebrush habitats. In these 30-year agreements between US Fish & Wildlife Service and a local entity (Soil & Water Conservation District or Watershed Council), enrolled properties are assessed for risks to sage-grouse and their habitat, and actions are identified to address those threats. Implementation funds can then be applied for from USDA NRCS and the Oregon Watershed Enhancement Board (OWEB).

14.3.9 Utah

Utah Conservation Plan for GRSG (January 2019) and EO/2015/002. The State of Utah updated its Conservation Plan for Greater Sage-Grouse in 2019. The plan implements direction from State EO 2015/002. The State plan identifies 11 Sage-Grouse Management Areas that encompass more than 90 percent of Utah's breeding GRSG populations. The plan notes that GRSG habitats outside the SGMAs are not required for long-term conservation of the species. The State's EO and associated plan combines voluntary and incentive-based programs on private, local government, State Trust lands, and state lands– with reasonable and cooperative regulatory programs on federally managed lands. The EO mandated that all relevant State agencies participate in the implementation of the Plan. State agencies have developed MOUs

with the Utah Division of Wildlife Resources and Public Lands Policy Coordinating Office. Those agreements set agency-specific directives related to the implementation of the executive order and the Plan.

The State of Utah also has a Compensatory Mitigation Program that was established, in part, by the Utah Legislature, Utah Administrative Rule (Compensatory Mitigation Program), and the State's Plan. The program includes rules, definitions and mechanisms for developing and tracking mitigation credits and debits. During project coordination, the Plan recommends that the regulatory entity or project proponent voluntarily implement the compensatory mitigation. The Program is administered by Utah's Department of Natural Resources, and recommends that for every one acre of functional GRSG habitat permanently disturbed, four acres of functional habitats or corridors should be created, restored and/or preserved.

Since 1996, the State has coordinated with Utah State University to facilitate local working group meetings in communities with occupied GRSG habitat. These groups have developed local GRSG conservation plans and meet regularly to coordinate and shape the state and national policies that directly affect them.

14.3.10 Wyoming

Greater Sage-grouse Core Area Protection Executive Order (2019-3). The State of Wyoming manages GRSG through Executive Order as the State's primary regulatory mechanism to conserve GRSG. The Executive Order establishes a conservation framework implemented at the scale of the State with the goal of precluding the need to list GRSG as threatened or endangered under the Endangered Species Act (ESA). Governor Freudenthal signed the first GRSG Core Area Protection Executive Order (SGEO) in 2008 (SGEO 2008-2) which was updated in 2010 (SGEO 2010-4). Each successive administration has updated and signed a new SGEO (Governor Mead SGEO 2011-5 and 2015-4; Governor Gordon SGEO 2019-3).

Wyoming's SGEO 2019-3 coordinates GRSG conservation actions across jurisdictional boundaries (i.e., "all lands approach"). The SGEO directs agencies and departments of the State of Wyoming to follow, consistent with statutory authority, the procedures outlined in the SGEO. On private lands incorporated into the strategy, only those activities which state agencies are required by state or federal law to review or approve are subject to the SGEO. Core population areas, connectivity areas and winter concentration areas identified as distinct habitat designations in the SGEO encompass approximately 15 million acres of GRSG habitat and 84% of the GRSG breeding population in the State. The SGEO recognizes and supports enrollment and expanded coverage of voluntary conservation programs such as USFWS's Candidate Conservation Agreements with Assurances (CCAA) and NRCS's Sage-Grouse Initiative (SGI). A statewide umbrella CCAA designed to promote conservation measures that reduce or remove threats to GRSG and to increase landowner participation by streamlining the CCAA enrollment process has been in effect in Wyoming since 2013. The State has distributed >$100M (since inception of the GRSG core area protection strategy) for on-the-ground projects, research and monitoring specific to GRSG conservation; these funds have generally been funneled through the Wyoming Wildlife and Natural Resource Trust (WWNRT) or the GRSG Local Working Groups (LWG).

The conservation framework established in the SGEO follows an avoidance, minimization, and compensatory mitigation (where appropriate) approach to GRSG conservation. Compensatory mitigation is required by statute for activities requiring a state permit that do not comply with the stipulations of the SGEO. The State's compensatory mitigation framework details the biological, replacement, durability, and additionality requirements for a parcel of land to be considered as a GRSG "conservation credit." The mitigation framework additionally defines "restoration credits" as a means of incentivizing the restoration of GRSG habitats that have been lost or severely impacted. Debit requirements for activities that exceed thresholds in core population areas are established by disturbance type and range from 5 to 10 debits per acre or per

type. Currently, a single GRSG mitigation bank on Pathfinder Ranches (Sweetwater River Conservancy) is functional in Wyoming, although several additional GRSG mitigation bank proposals are under consideration by the State.

14.4 Habitat Management Area, Locatable Mineral, and Fluid Mineral Allocation Information by Mid-scale HAF Group

When assessing the cumulative impact of the RMPA/EIS on GRSG and its habitat, there are multiple geographic scales that the BLM has considered. In 2015 and 2019, cumulative impacts to GRSG were analyzed using Management Zones identified by the Western Association of Fish and Wildlife Agencies (WAFWA). The WAFWA Management Zones were based on floristic provinces. Based on information that has become available since the previous efforts,

14.4.1 HAF Group 1

I. Habitat Management

Table 14-1. Habitat Management Areas within HAF 1

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only.

Approximate Acres of HMA in HAF 1					
Alternative 1					
PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**	**Total**
6,482,000	0	10,557,000	94,000	16,459,000	**33,592,000**
Alternative 2					
PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**	**Total**
6,482,000	0	10,557,000	94,000	16,459,000	**33,592,000**
Alternative 3					
PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**	**Total**
14,996,000	770,000	0	0	17,244,000	**33,009,000**
Alternative 4					
PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**	**Total**
6,779,000	770,000	8,123,000	94,000	17,244,000	**33,009,000**
Alternative 5					
PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**	**Total**
6,779,000	770,000	8,123,000	94,000	17,244,000	**33,009,000**
Alternative 6					
PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**	**Total**
6,779,000	770,000	8,123,000	94,000	17,244,000	**33,009,000**
Proposed RMP Amendment					
PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**	**Total**
5,965,000	770,000	8,216,000	0	17,244,000	**32,195,000**

Approximate Percent of HAF 1 that is HMA				
Alternative 1				
PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**
19.30%	0.00%	31.43%	0.28%	49.00%
Alternative 2				
PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**
4.63%	0.00%	31.43%	0.28%	49.00%

Approximate Percent of HAF 1 that is HMA				
Alternative 3				
PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**
45.43%	2.33%	0.00%	0.00%	52.24%
Alternative 4				
PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**
20.54%	2.33%	24.61%	0.28%	52.24%
Alternative 5				
PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**
20.54%	2.33%	24.61%	0.28%	52.24%
Alternative 6				
PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**
20.54%	2.33%	24.61%	0.28%	52.24%
Proposed RMP Amendment				
PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**
18.53%	2.39%	25.52%	0.00%	53.56%

II. Locatable Minerals

Table 14-2. Locatable Minerals Decisions within HAF 1

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. The acres for the locatable minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. For example, for locatable minerals, proposed mineral withdrawals are only proposed and considered for GRSG conservation under Alternative 1 and Alternative 3 in this RMP Amendment. All the other existing and proposed withdrawal acreage that is identified under other alternatives represent proposed or existing withdrawals that are either being proposed in other RMP efforts or existing withdrawals that are already in place. The information is provided for context and to facilitate the analysis of effects.

Approximate Acres of Locatable Minerals Decisions[2] in HAF 1 by Habitat Management Area Type						
Locatable Minerals	**Alternative 1**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	14,000	181,000	0	0	208,000	**403,000**
Recommended Withdrawals	981,000	0	0	0	24,000	**1,005,000**
Open	1,265,000	981,000	0	79,000	1,470,000	**3,794,000**
Total	**2,260,000**	**1,162,000**	**0**	**79,000**	**1,701,000**	**5,202,000**
Locatable Minerals	**Alternative 2**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	14,000	181,000	0	0	208,000	**403,000**
Recommended Withdrawals	981,000	0	0	0	24,000	**1,005,000**
Open	1,265,000	981,000	0	79,000	1,470,000	**3,794,000**
Total	**2,260,000**	**1,162,000**	**0**	**79,000**	**1,701,000**	**5,202,000**
Locatable Minerals	**Alternative 3**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	77,000	0	0	0	326,000	**403,000**
Recommended Withdrawals	3,118,000	0	0	0	23,000	**3,141,000**
Open	0	0	316,000	0	1,291,000	**1,607,000**
Total	**3,195,000**	**0**	**316,000**	**0**	**1,640,000**	**5,151,000**

Approximate Acres of Locatable Minerals Decisions[2] in HAF 1 by Habitat Management Area Type						
Locatable Minerals	**Alternative 4**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	19,000	59,000	0	0	326,000	**403,000**
Recommended Withdrawals	26,000	0	0	0	23,000	**48,000**
Open	2,203,000	811,000	316,000	79,000	1,291,000	**4,700,000**
Total	**2,247,000**	**870,000**	**316,000**	**79,000**	**1,640,000**	**5,151,000**
Locatable Minerals	**Alternative 5**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	19,000	59,000	0	0	326,000	**403,000**
Recommended Withdrawals	26,000	0	0	0	23,000	**48,000**
Open	2,203,000	811,000	316,000	79,000	1,291,000	**4,700,000**
Total	**2,247,000**	**870,000**	**316,000**	**79,000**	**1,640,000**	**5,151,000**
Locatable Minerals	**Alternative 6**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	19,000	59,000	0	0	326,000	**403,000**
Recommended Withdrawals	26,000	0	0	0	23,000	**48,000**
Open	2,203,000	811,000	316,000	79,000	1,291,000	**4,700,000**
Total	**2,247,000**	**870,000**	**316,000**	**79,000**	**1,640,000**	**5,151,000**
Locatable Minerals	**Proposed RMP Amendment**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	19,000	59,000	0	0	326,000	**403,000**
Recommended Withdrawals	26,000	0	0	0	23,000	**48,000**
Open	2,203,000	890,000	228,000	0	1,291,000	**4,612,000**
Total	**2,247,000**	**948,000**	**228,000**	**0**	**1,640,000**	**5,063,000**

Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 1					
Locatable Minerals	**Alternative 1**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Existing Withdrawals	3.47%	44.91%	0.00%	0.00%	51.61%
Recommended Withdrawals	97.61%	0.00%	0.00%	0.00%	2.39%
Open	33.34%	25.86%	0.00%	2.08%	38.75%
Total	**43.44%**	**22.34%**	**0.00%**	**1.52%**	**32.70%**
Locatable Minerals	**Alternative 2**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Existing Withdrawals	3.47%	44.91%	0.00%	0.00%	51.61%
Recommended Withdrawals	97.61%	0.00%	0.00%	0.00%	2.39%
Open	33.34%	25.86%	0.00%	2.08%	38.75%
Total	**43.44%**	**22.34%**	**0.00%**	**1.52%**	**32.70%**
Locatable Minerals	**Alternative 3**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Existing Withdrawals	19.11%	0.00%	0.00%	0.00%	80.89%
Recommended Withdrawals	99.27%	0.00%	0.00%	0.00%	0.73%
Open	0.00%	0.00%	19.66%	0.00%	80.34%
Total	**63.03%**	**0.00%**	**6.13%**	**0.00%**	**31.84%**
Locatable Minerals	**Alternative 4**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Existing Withdrawals	4.71%	14.64%	0.00%	0.00%	80.89%
Recommended Withdrawals	54.17%	0.00%	0.00%	0.00%	47.92%
Open	46.87%	17.26%	6.72%	1.68%	27.47%
Total	**43.62%**	**16.89%**	**6.13%**	**1.53%**	**31.84%**

Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 1					
Locatable Minerals	**Alternative 5**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Existing Withdrawals	4.71%	14.64%	0.00%	0.00%	80.89%
Recommended Withdrawals	54.17%	0.00%	0.00%	0.00%	47.92%
Open	46.87%	17.26%	6.72%	1.68%	27.47%
Total	**43.62%**	**16.89%**	**6.13%**	**1.53%**	**31.84%**
Locatable Minerals	**Alternative 6**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Existing Withdrawals	4.71%	14.64%	0.00%	0.00%	80.89%
Recommended Withdrawals	54.17%	0.00%	0.00%	0.00%	47.92%
Open	46.87%	17.26%	6.72%	1.68%	27.47%
Total	**43.62%**	**16.89%**	**6.13%**	**1.53%**	**31.84%**
Locatable Minerals	**Proposed RMP Amendment**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Existing Withdrawals	4.71%	14.64%	0.00%	0.00%	80.89%
Recommended Withdrawals	54.17%	0.00%	0.00%	0.00%	47.92%
Open	47.76%	19.29%	4.94%	0.00%	27.99%
Total	**44.38%**	**18.72%**	**4.50%**	**0.00%**	**32.39%**

III. Fluid Minerals (Oil & Gas)

Table 14-3. Fluid Minerals (Oil & Gas) Decisions within HAF 1

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. Calculations reflect only the portions of the HAF where data was available. All figures and tables are intended for Habitat Assessment Framework summary purposes only. These acres for fluid minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. The information is provided for context and to facilitate the analysis of effects. It is important to note that just because an area is open to leasing does not mean that it will be developed. Any development must be in conformance with the stipulations which may preclude development in some areas. The stipulation information has been considered in context with mineral potential, and drilling and economic trends to develop the Reasonably Forseeable Development Scenario (see **Appendix 12**) which estimates the amount of development anticipated across all land owerships for each alternative.

Approximate Acres of Fluid Minerals (Oil & Gas) Decisions[4] in HAF 1 by Habitat Management Area Type						
Fluid Minerals (Oil and Gas)	**Alternative 1**					
	PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	100,000	0	217,000	0	296,000	**612,000**
Open Major Stipulations	2,433,000	0	320,000	51,000	245,000	**3,049,000**
Open Moderate Stipulations	0	0	1,209,000	43,000	1,481,000	**2,736,000**
Open Standard Stipulations	0	0	297,000	0	219,000	**519,000**
Total	**2,532,000**	**0**	**2,043,000**	**93,000**	**2,241,000**	**6,915,000**

Approximate Acres of Fluid Minerals (Oil & Gas) Decisions[4] in HAF 1 by Habitat Management Area Type						
Fluid Minerals (Oil and Gas)	**Alternative 2**					
	PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	100,000	0	217,000	0	296,000	**612,000**
Open Major Stipulations	2,433,000	0	320,000	51,000	245,000	**3,049,000**
Open Moderate Stipulations	0	0	1,209,000	43,000	1,481,000	**2,736,000**
Open Standard Stipulations	0	0	297,000	0	219,000	**519,000**
Total	**2,532,000**	**0**	**2,043,000**	**93,000**	**2,241,000**	**6,915,000**
Fluid Minerals (Oil and Gas)	**Alternative 3**					
	PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	4,076,000	0	0	0	443,000	**4,519,000**
Open Major Stipulations	0	258,000	0	0	240,000	**498,000**
Open Moderate Stipulations	0	0	0	0	1,333,000	**1,333,000**
Open Standard Stipulations	0	0	0	0	226,000	**226,000**
Total	**4,076,000**	**258,000**	**0**	**0**	**2,242,000**	**6,577,000**
Fluid Minerals (Oil and Gas)	**Alternative 4**					
	PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	104,000	0	64,000	0	443,000	**611,000**
Open Major Stipulations	2,519,000	24,000	314,000	50,000	240,000	**3,147,000**
Open Moderate Stipulations	0	322,000	1,265,000	44,000	1,333,000	**2,963,000**
Open Standard Stipulations	0	0	0	0	226,000	**226,000**
Total	**2,623,000**	**347,000**	**1,643,000**	**93,000**	**2,242,000**	**6,948,000**
Fluid Minerals (Oil and Gas)	**Alternative 5**					
	PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	104,000	0	64,000	0	443,000	**611,000**
Open Major Stipulations	2,485,000	20,000	284,000	40,000	240,000	**3,069,000**
Open Moderate Stipulations	0	322,000	1,265,000	44,000	1,333,000	**2,963,000**
Open Standard Stipulations	0	0	0	0	226,000	**226,000**
Total	**2,589,000**	**342,000**	**1,613,000**	**84,000**	**2,242,000**	**6,870,000**
Fluid Minerals (Oil and Gas)	**Alternative 6**					
	PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	104,000	0	64,000	0	443,000	**611,000**
Open Major Stipulations	2,519,000	24,000	314,000	50,000	240,000	**3,147,000**
Open Moderate Stipulations	0	322,000	1,265,000	44,000	1,333,000	**2,963,000**
Open Standard Stipulations	0	0	0	0	226,000	**226,000**
Total	**2,623,000**	**347,000**	**1,643,000**	**93,000**	**2,242,000**	**6,948,000**
Fluid Minerals (Oil and Gas)	**Proposed RMP Amendment**					
	PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	**104,000**	**0**	**64,000**	**0**	**443,000**	**611,000**
Open Major Stipulations	**2,485,000**	**20,000**	**314,000**	**0**	**240,000**	**3,060,000**
Open Moderate Stipulations	**0**	**322,000**	**1,318,000**	**0**	**1,333,000**	**2,974,000**
Open Standard Stipulations	**0**	**0**	**0**	**0**	**225,000**	**225,000**
Total	**2,589,000**	**342,000**	**1,697,000**	**0**	**2,242,000**	**6,870,000**

Approximate % of Habitat Management Area by Fluid Minerals (Oil a& Gas) Decision[4] within Habitat in HAF 1					
Fluid Minerals (Oil and Gas)	**Alternative 1**				
	PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**
Closed	16.34%	0.00%	35.46%	0.00%	48.37%
Open Major Stipulations	79.80%	0.00%	10.50%	1.67%	8.04%
Open Moderate Stipulations	0.00%	0.00%	44.19%	1.57%	54.13%
Open Standard Stipulations	0.00%	0.00%	57.23%	0.00%	42.20%
Total	**36.62%**	**0.00%**	**29.54%**	**1.34%**	**32.41%**
Fluid Minerals (Oil and Gas)	**Alternative 2**				
	PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**
Closed	16.34%	0.00%	35.46%	0.00%	48.37%
Open Major Stipulations	79.80%	0.00%	10.50%	1.67%	8.04%
Open Moderate Stipulations	0.00%	0.00%	44.19%	1.57%	54.13%
Open Standard Stipulations	0.00%	0.00%	57.23%	0.00%	42.20%
Total	**36.62%**	**0.00%**	**29.54%**	**1.34%**	**32.41%**
Fluid Minerals (Oil and Gas)	**Alternative 3**				
	PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**
Closed	90.20%	0.00%	0.00%	0.00%	9.80%
Open Major Stipulations	0.00%	51.81%	0.00%	0.00%	48.19%
Open Moderate Stipulations	0.00%	0.00%	0.00%	0.00%	100.00%
Open Standard Stipulations	0.00%	0.00%	0.00%	0.00%	100.00%
Total	**61.97%**	**3.92%**	**0.00%**	**0.00%**	**34.09%**
Fluid Minerals (Oil and Gas)	**Alternative 4**				
	PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**
Closed	17.02%	0.00%	10.47%	0.00%	72.50%
Open Major Stipulations	80.04%	0.76%	9.98%	1.59%	7.63%
Open Moderate Stipulations	0.00%	10.87%	42.69%	1.48%	44.99%
Open Standard Stipulations	0.00%	0.00%	0.00%	0.00%	100.00%
Total	**39.75%**	**4.99%**	**23.65%**	**1.34%**	**32.27%**
Fluid Minerals (Oil and Gas)	**Alternative 5**				
	PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**
Closed	17.02%	0.00%	10.47%	0.00%	72.50%
Open Major Stipulations	80.97%	0.65%	9.25%	1.30%	7.82%
Open Moderate Stipulations	0.00%	10.87%	42.69%	1.48%	44.99%
Open Standard Stipulations	0.00%	0.00%	0.00%	0.00%	100.00%
Total	**37.69%**	**4.98%**	**23.48%**	**1.22%**	**32.63%**
Fluid Minerals (Oil and Gas)	**Alternative 6**				
	PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**
Closed	17.02%	0.00%	10.47%	0.00%	72.50%
Open Major Stipulations	80.04%	0.76%	9.98%	1.59%	7.63%
Open Moderate Stipulations	0.00%	10.87%	42.69%	1.48%	44.99%
Open Standard Stipulations	0.00%	0.00%	0.00%	0.00%	100.00%
Total	**37.75%**	**4.99%**	**23.65%**	**1.34%**	**32.27%**
Fluid Minerals (Oil and Gas)	**Proposed RMP Amendment**				
	PHMA	**CHMA**	**GHMA**	**RHMA**	**Non-HMA**
Closed	17.02%	0.00%	10.47%	0.00%	72.50%
Open Major Stipulations	81.20%	0.65%	10.26%	0.00%	7.84%
Open Moderate Stipulations	0.00%	10.82%	44.31%	0.00%	44.82%
Open Standard Stipulations	0.00%	0.00%	0.00%	0.00%	100.00%
Total	**37.68%**	**4.97%**	**24.70%**	**0.00%**	**32.63%**

14.4.2 HAF Group 2

I. Habitat Management

Table 14-4. Habitat Management Areas within HAF 2

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only.

Approximate Acres of HMA in HAF 2					
Alternative 1					
PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
7,981,000	23,522,000	0	351,000	15,832,000	**47,686,000**
Alternative 2					
PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
7,981,000	23,522,000	0	351,000	15,832,000	**47,686,000**
Alternative 3					
PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
31,835,000	0	0	0	15,938,000	**47,774,000**
Alternative 4					
PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
10,137,000	21,602,000	0	93,000	15,942,000	**47,774,000**
Alternative 5					
PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
8,275,000	23,281,000	0	93,000	15,942,000	**47,774,000**
Alternative 6					
PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
8,274,000	23,281,000	0	93,000	15,943,000	**47,774,000**
Proposed RMP Amendment					
PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
7,717,000	23,313,000	0	0	15,941,000	**47,774,000**

Approximate Percent of HAF 2 that is HMA				
Alternative 1				
PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
16.74%	49.33%	0.00%	0.74%	33.20%
Alternative 2				
PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
16.74%	49.33%	0.00%	0.74%	33.20%
Alternative 3				
PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
66.64%	0.00%	0.00%	0.00%	33.36%
Alternative 4				
PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
21.22%	45.22%	0.00%	0.19%	33.37%
Alternative 5				
PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
17.32%	48.72%	0.00%	0.19%	33.37%
Alternative 6				
PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
17.32%	48.73%	0.00%	0.19%	33.37%
Proposed RMP Amendment				
PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
16.15%	48.80%	0.00%	0.00%	33.37%

II. Locatable Minerals

Table 14-5. Locatable Minerals Decisions within HAF 2

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. The acres for the locatable minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. For example, for locatable minerals, proposed mineral withdrawals are only proposed and considered for GRSG conservation under Alternative 1 and Alternative 3 in this RMP Amendment. All the other existing and proposed withdrawal acreage that is identified under other alternatives represent proposed or existing withdrawals that are either being proposed in other RMP efforts or existing withdrawals that are already in place. The information is provided for context and to facilitate the analysis of effects.

Approximate Acres of Locatable Minerals Decisions[4] in HAF 2 by Habitat Management Area Type						
Locatable Minerals	**Alternative 1**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	10,000	57,000	0	0	233,000	**300,000**
Recommended Withdrawals	107,000	249,000	0	0	49,000	**405,000**
Open	4,438,000	9,329,000	0	93,000	872,000	**14,760,000**
Total	**4,555,000**	**9,635,000**	**0**	**93,000**	**1,153,000**	**15,465,000**
Locatable Minerals	**Alternative 2**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	10,000	57,000	0	0	233,000	**300,000**
Recommended Withdrawals	107,000	249,000	0	0	49,000	**405,000**
Open	4,438,000	9,329,000	0	93,000	872,000	**14,760,000**
Total	**4,555,000**	**9,635,000**	**0**	**93,000**	**1,153,000**	**15,465,000**
Locatable Minerals	**Alternative 3**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	75,000	0	0	0	226,000	**300,000**
Recommended Withdrawals	13,855,000	0	0	0	37,000	**13,954,000**
Open	437,000	0	0	0	782,000	**1,219,000**
Total	**14,367,000**	**0**	**0**	**0**	**1,044,000**	**15,473,000**
Locatable Minerals	**Alternative 4**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	14,000	60,000	0	200	226,000	**300,000**
Recommended Withdrawals	143,000	223,000	0	0	38,000	**405,000**
Open	5,714,000	8,246,000	0	22,000	783,000	**14,764,000**
Total	**5,871,000**	**8,529,000**	**0**	**22,000**	**1,047,000**	**15,469,000**
Locatable Minerals	**Alternative 5**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	12,000	62,000	0	0	226,000	**300,000**
Recommended Withdrawals	120,000	246,000	0	0	38,000	**405,000**
Open	4,548,000	9,283,000	0	22,000	783,000	**14,764,000**
Total	**4,680,000**	**9,591,000**	**0**	**22,000**	**1,047,000**	**15,469,000**
Locatable Minerals	**Alternative 6**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	12,000	62,000	0	0	226,000	**300,000**
Recommended Withdrawals	120,000	246,000	0	0	38,000	**405,000**
Open	4,547,000	9,283,000	0	22,000	783,000	**14,764,000**
Total	**4,680,000**	**9,591,000**	**0**	**22,000**	**1,047,000**	**15,469,000**

Approximate Acres of Locatable Minerals Decisions[4] in HAF 2 by Habitat Management Area Type						
Locatable Minerals	**Proposed RMP Amendment**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Existing Withdrawals	12,000	62,000	0	0	226,000	300,000
Recommended Withdrawals	120,000	246,000	0	0	38,000	405,000
Open	4,467,000	9,284,000	0	0	783,000	14,764,000
Total	**4,599,000**	**9,593,000**	**0**	**0**	**1,047,000**	**15,469,000**

Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 2					
Locatable Minerals	**Alternative 1**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Existing Withdrawals	3.33%	19.00%	0.00%	0.00%	77.67%
Recommended Withdrawals	26.42%	61.48%	0.00%	0.00%	12.10%
Open	30.07%	63.20%	0.00%	0.63%	5.91%
Total	**29.45%**	**62.30%**	**0.00%**	**0.60%**	**7.46%**
Locatable Minerals	**Alternative 2**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Existing Withdrawals	3.33%	19.00%	0.00%	0.00%	77.67%
Recommended Withdrawals	26.42%	61.48%	0.00%	0.00%	12.10%
Open	30.07%	63.20%	0.00%	0.63%	5.91%
Total	**29.45%**	**62.30%**	**0.00%**	**0.60%**	**7.46%**
Locatable Minerals	**Alternative 3**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Existing Withdrawals	25.00%	0.00%	0.00%	0.00%	75.33%
Recommended Withdrawals	99.29%	0.00%	0.00%	0.00%	0.27%
Open	35.85%	0.00%	0.00%	0.00%	64.15%
Total	**92.85%**	**0.00%**	**0.00%**	**0.00%**	**6.75%**
Locatable Minerals	**Alternative 4**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Existing Withdrawals	4.67%	20.00%	0.00%	0.07%	75.33%
Recommended Withdrawals	35.31%	55.06%	0.00%	0.00%	9.38%
Open	38.70%	55.85%	0.00%	0.15%	5.30%
Total	**37.95%**	**55.14%**	**0.00%**	**0.14%**	**6.77%**
Locatable Minerals	**Alternative 5**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Existing Withdrawals	4.00%	20.67%	0.00%	0.00%	75.33%
Recommended Withdrawals	29.63%	60.74%	0.00%	0.00%	9.38%
Open	30.80%	62.88%	0.00%	0.15%	5.30%
Total	**30.25%**	**62.00%**	**0.00%**	**0.14%**	**6.77%**
Locatable Minerals	**Alternative 6**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Existing Withdrawals	4.00%	20.67%	0.00%	0.00%	75.33%
Recommended Withdrawals	29.63%	60.74%	0.00%	0.00%	9.63%
Open	31.70%	62.88%	0.00%	0.15%	5.30%
Total	**30.25%**	**62.00%**	**0.00**	**0.14%**	**6.77%**
Locatable Minerals	**Proposed RMP Amendment**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Existing Withdrawals	4.00%	20.67%	0.00%	0.00%	75.33%
Recommended Withdrawals	29.63%	60.74%	0.00%	0.00%	9.38%
Open	30.26%	62.88%	0.00%	0.00%	5.30%
Total	**29.73%**	**62.01%**	**0.00%**	**0.00%**	**6.77%**

III. Fluid Minerals (Oil & Gas)

Table 14-6. Fluid Minerals (Oil & Gas) Decisions within HAF 2

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. These acres for fluid minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. The information is provided for context and to facilitate the analysis of effects. It is important to note that just because an area is open to leasing does not mean that it will be developed. Any development must be in conformance with the stipulations which may preclude development in some areas. The stipulation information has been considered in context with mineral potential, and drilling and economic trends to develop the Reasonably Foreseeable Development Scenario (see **Appendix 12**) which estimates the amount of development anticipated across all land ownership for each alternative.

Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 2 by Habitat Management Area Type						
Fluid Minerals (Oil and Gas)	**Alternative 1**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	166,000	403,000	0	0	258,000	**827,000**
Open Major Stipulations	2,622,000	1,720,000	0	186,000	251,000	**4,782,000**
Open Moderate Stipulations	2,229,000	5,709,000	0	20,000	756,000	**8,714,000**
Open Standard Stipulations	5,000	3,113,000	0	0	314,000	**3,458,000**
Total	**5,021,000**	**10,945,000**	**0**	**206,000**	**1,578,000**	**17,780,000**
Fluid Minerals (Oil and Gas)	**Alternative 2**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	166,000	403,000	0	0	258,000	**827,000**
Open Major Stipulations	2,622,000	1,720,000	0	186,000	251,000	**4,782,000**
Open Moderate Stipulations	2,229,000	5,709,000	0	20,000	756,000	**8,714,000**
Open Standard Stipulations	5,000	3,113,000	0	0	314,000	**3,458,000**
Total	**5,021,000**	**10,945,000**	**0**	**206,000**	**1,578,000**	**17,780,000**
Fluid Minerals (Oil and Gas)	**Alternative 3**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	15,615,000	0	0	0	248,000	**15,928,000**
Open Major Stipulations	130,000	0	0	0	241,000	**371,000**
Open Moderate Stipulations	220,000	0	0	0	707,000	**926,000**
Open Standard Stipulations	116,000	0	0	0	256,000	**372,000**
Total	**16,081,000**	**0**	**0**	**0**	**1,452,000**	**17,597,000**
Fluid Minerals (Oil and Gas)	**Alternative 4**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	201,000	377,000	0	0	248,000	**827,000**
Open Major Stipulations	6,028,000	1,439,000	0	14,000	241,000	**7,727,000**
Open Moderate Stipulations	162,000	5,200,000	0	20,000	911,000	**6,306,000**
Open Standard Stipulations	14,000	2,646,000	0	0	257,000	**2,963,000**
Total	**6,405,000**	**9,662,000**	**0**	**35,000**	**1,657,000**	**17,823,000**
Fluid Minerals (Oil and Gas)	**Alternative 5**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	174,000	404,000	0	0	248,000	**827,000**
Open Major Stipulations	2,794,000	1,665,000	73,000	14,000	241,000	**4,787,000**
Open Moderate Stipulations	2,239,000	5,866,000	51,000	20,000	911,000	**9,087,000**
Open Standard Stipulations	11,000	2,734,000	1,000	0	257,000	**3,003,000**
Total	**5,218,000**	**10,670,000**	**124,000**	**35,000**	**1,657,000**	**17,704,000**

Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 2 by Habitat Management Area Type						
Fluid Minerals (Oil and Gas)	**Alternative 6**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	174,000	404,000	0	0	248,000	**827,000**
Open Major Stipulations	2,851,000	1,673,000	73,000	14,000	241,000	**4,852,000**
Open Moderate Stipulations	2,227,000	5,866,000	51,000	20,000	911,000	**9,075,000**
Open Standard Stipulations	11,000	2,734,000	1,000	0	257,000	**3,003,000**
Total	**5,263,000**	**10,677,000**	**124,000**	**35,000**	**1,657,000**	**17,756,000**
Fluid Minerals (Oil and Gas)	**Proposed RMP Amendment**					
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**	**Total**
Closed	175,000	408,000	0	0	248,000	**831,000**
Open Major Stipulations	2,682,000	1,653,000	73,000	0	241,000	**4,770,000**
Open Moderate Stipulations	2,240,000	5,875,000	51,000	0	911,000	**9,097,000**
Open Standard Stipulations	11,000	2,736,000	1,000	0	257,000	**3,004,000**
Total	**5,108,000**	**10,672,000**	**124,000**	**0**	**1,657,000**	**17,703,000**

Approximate % of Habitat Management Area by Fluid Minerals (Oil & Gas) Decision in HAF 2					
Fluid Minerals (Oil and Gas)	**Alternative 1**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Closed	24.30%	45.59%	0.00%	0.00%	29.99%
Open Major Stipulations	78.01%	18.62%	0.00%	0.18%	3.12%
Open Moderate Stipulations	2.57%	82.46%	0.00%	0.32%	14.45%
Open Standard Stipulations	0.47%	89.30%	0.00%	0.00%	8.67%
Total	**35.94%**	**54.21%**	**0.00%**	**0.20%**	9.30%
Fluid Minerals (Oil and Gas)	**Alternative 2**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Closed	20.07%	48.73%	0.00%	0.00%	**31.20%**
Open Major Stipulations	54.83%	35.97%	0.00%	3.89%	**5.25%**
Open Moderate Stipulations	25.58%	65.52%	0.00%	0.23%	**8.68%**
Open Standard Stipulations	0.14%	90.02%	0.00%	0.00%	**9.08%**
Total	**28.24%**	**61.56%**	**0.00%**	**1.16%**	**8.88%**
Fluid Minerals (Oil and Gas)	**Alternative 3**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Closed	98.03%	0.00%	0.00%	0.00%	1.56%
Open Major Stipulations	35.04%	0.00%	0.00%	0.00%	64.96%
Open Moderate Stipulations	23.76%	0.00%	0.00%	0.00%	76.35%
Open Standard Stipulations	31.18%	0.00%	0.00%	0.00%	68.82%
Total	**91.38%**	**0.00%**	**0.00%**	**0.00%**	8.25%
Fluid Minerals (Oil and Gas)	**Alternative 4**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Closed	24.30%	45.59%	0.00%	0.00%	29.99%
Open Major Stipulations	78.01%	18.62%	0.00%	0.18%	3.12%
Open Moderate Stipulations	2.57%	82.46%	0.00%	0.32%	14.45%
Open Standard Stipulations	0.47%	89.30%	0.00%	0.00%	8.67%
Total	**35.94%**	**54.21%**	**0.00%**	**0.20%**	9.30%
Fluid Minerals (Oil and Gas)	**Alternative 5**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Closed	21.04%	48.85%	0.00%	0.00%	29.99%
Open Major Stipulations	58.37%	34.78%	1.52%	0.29%	5.03%
Open Moderate Stipulations	24.64%	64.55%	0.56%	0.22%	10.03%
Open Standard Stipulations	0.37%	91.04%	0.03%	0.00%	8.56%
Total	**29.47%**	**60.27%**	**0.70%**	**0.20%**	9.36%

Approximate % of Habitat Management Area by Fluid Minerals (Oil & Gas) Decision in HAF 2					
Fluid Minerals (Oil and Gas)	**Alternative 6**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Closed	21.04%	48.85%	0.00%	0.00%	29.99%
Open Major Stipulations	58.76%	34.48%	1.50%	0.29%	4.97%
Open Moderate Stipulations	24.54%	64.64%	0.56%	0.22%	10.04%
Open Standard Stipulations	0.37%	91.04%	0.03%	0.00%	8.56%
Total	**29.64%**	**60.13%**	**0.70%**	**0.20%**	9.33%
Fluid Minerals (Oil and Gas)	**Proposed RMP Amendment**				
	PHMA	**GHMA**	**CHMA**	**RHMA**	**Non-HMA**
Closed	21.05%	49.09%	0.00%	0.00%	29.84%
Open Major Stipulations	56.23%	34.65%	1.53%	0.00%	5.05%
Open Moderate Stipulations	24.62%	64.58%	0.56%	0.00%	10.01%
Open Standard Stipulations	0.37%	91.08%	0.03%	0.00%	8.56%
Total	**28.85%**	**60.28%**	**0.70%**	**0.00%**	**9.36%**

14.4.3 HAF Group 3

I. Habitat Management

Table 14-7. Habitat Management Areas within HAF 3

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only.

Approximate Acres of HMA in HAF 3					
Alternative 1					
PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
13,883,000	13,348,000	69,000	340,000	20,021,000	**47,750,000**
Alternative 2					
PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
14,347,000	12,553,000	69,000	296,000	20,486,000	**47,750,000**
Alternative 3					
PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
28,745,000	0	0	340,000	18,724,000	**47,810,000**
Alternative 4					
PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
15,901,000	12,607,000	106,000	340,000	18,854,000	**47,810,000**
Alternative 5					
PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
14,226,000	13,911,000	105,000	340,000	19,227,000	**47,810,000**
Alternative 6					
PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
14,226,000	13,911,000	105,000	340,000	19,227,000	**47,810,000**
Proposed RMP Amendment					
PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
13,961,000	14,022,000	105,000	341,000	18,987,000	**47,505,000**

Approximate Percent of HAF 3 that is HMA				
Alternative 1				
PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
29.07%	27.95%	0.14%	0.71%	41.93%
Alternative 2				
PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
30.05%	26.29%	0.14%	0.62%	42.90%
Alternative 3				
PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
60.12%	0.00%	0.00%	0.71%	39.16%
Alternative 4				
PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
33.27%	26.37%	0.22%	0.71%	29.44%
Alternative 5				
PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
29.76%	29.10%	0.22%	0.71%	40.22%
Alternative 6				
PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
29.76%	29.10%	0.22%	0.71%	40.22%
Proposed RMP Amendment				
PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
29.34%	29.52%	0.22%	0.72%	39.97%

II. Locatable Minerals

Table 14-8. Locatable Minerals Decisions within HAF 3

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. The acres for the locatable minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. For example, for locatable minerals, proposed mineral withdrawals are only proposed and considered for GRSG conservation under Alternative 1 and Alternative 3 in this RMP Amendment. All the other existing and proposed withdrawal acreage that is identified under other alternatives represent proposed or existing withdrawals that are either being proposed in other RMP efforts or existing withdrawals that are already in place. The information is provided for context and to facilitate the analysis of effects.

Approximate Acres of Locatable Minerals Decisions in HAF 3 by Habitat Management Area Type						
Locatable Minerals	**Alternative 1**					
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
Existing Withdrawals	1,916,000	2,258,000	7,000	0	3,331,000	**7,517,000**
Recommended Withdrawals	1,001,000	221,000	0	0	330,000	**1,555,000**
Open	6,312,000	5,381,000	27,000	0	6,471,000	**18,348,000**
Total	**9,230,000**	**7,861,000**	**33,322**	**0**	**10,131,000**	**27,420,000**
Locatable Minerals	**Alternative 2**					
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
Existing Withdrawals	1,916,000	2,106,000	7,000	0	3,488,000	**7,517,000**
Recommended Withdrawals	654,000	214,000	0	0	353,000	**1,220,000**
Open	6,748,000	5,239,000	27,000	137,000	6,414,000	**18,566,000**
Total	**9,317,000**	**7,559,000**	**33,000**	**138,000**	**10,255,000**	**27,303,000**

Approximate Acres of Locatable Minerals Decisions in HAF 3 by Habitat Management Area Type						
Locatable Minerals	**Alternative 3**					
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
Existing Withdrawals	4,260,000	0	0	5,000	3,253,000	**7,517,000**
Recommended Withdrawals	12,881,000	0	0	2,000	343,000	**13,238,000**
Open	467,000	0	0	155,000	5,972,000	**6,599,000**
Total	**17,608,000**	**0**	**0**	**163,000**	**9,567,000**	**27,354,000**
Locatable Minerals	**Alternative 4**					
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
Existing Withdrawals	2,225,000	1,993,000	13,000	5,000	3,273,000	**7,509,000**
Recommended Withdrawals	659,000	192,000	0	2,000	319,000	**1,173,000**
Open	7,515,000	5,000,000	40,000	155,000	6,007,000	**18,718,000**
Total	**10,399,000**	**7,185,000**	**53,000**	**163,000**	**9,599,000**	**27,400,000**
Locatable Minerals	**Alternative 5**					
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
Existing Withdrawals	2,004,000	2,085,000	7,000	5,000	3,405,000	**7,507,000**
Recommended Withdrawals	622,000	223,000	0	2,000	326,000	**1,174,000**
Open	6,705,000	5,772,000	43,000	155,000	6,057,000	**18,749,000**
Total	**9,332,000**	**8,081,000**	**50,000**	**163,000**	**9,788,000**	**27,431,000**
Locatable Minerals	**Alternative 6**					
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
Existing Withdrawals	2,004,000	2,085,000	7,000	5,000	3,405,000	**7,507,000**
Recommended Withdrawals	622,000	223,000	0	2,000	326,000	**1,174,000**
Open	6,705,000	5,772,000	43,000	155,000	6,057,000	**18,732,000**
Total	**9,332,000**	**8,081,000**	**50,000**	**163,000**	**9,788,000**	**27,414,000**
Locatable Minerals	**Proposed RMP Amendment**					
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
Existing Withdrawals	1,997,000	2,165,000	7,000	5,000	3,329,000	**7,507,000**
Recommended Withdrawals	622,000	222,000	0	2,000	326,000	**1,174,000**
Open	6,749,000	5,684,000	43,000	155,000	6,030,000	**18,732,000**
Total	**9,368,000**	**8,071,000**	**50,000**	**163,000**	**9,685,000**	**27,413,000**

Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 3					
Locatable Minerals	**Alternative 1**				
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
Existing Withdrawals	25.49%	30.04%	0.09%	0.00%	44.31%
Recommended Withdrawals	64.37%	14.21%	0.00%	0.00%	21.22%
Open	34.40%	29.33%	0.15%	0.00%	35.27%
Total	**33.66%**	**28.67%**	**0.12%**	**0.00%**	**36.95%**
Locatable Minerals	**Alternative 2**				
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
Existing Withdrawals	25.49%	28.02%	0.09%	0.00%	46.40%
Recommended Withdrawals	53.61%	17.54%	0.00%	0.00%	28.93%
Open	36.35%	28.22%	0.15%	0.74%	34.55%
Total	**34.12%**	**27.69%**	**0.12%**	**0.51%**	**37.56%**
Locatable Minerals	**Alternative 3**				
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
Existing Withdrawals	56.67%	0.00%	0.00%	0.07%	43.28%
Recommended Withdrawals	97.30%	0.00%	0.00%	0.02%	2.59%
Open	7.08%	0.00%	0.00%	2.35%	90.50%
Total	**64.37%**	**0.00%**	**0.00%**	**0.60%**	**34.97%**

Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 3					
Locatable Minerals	**Alternative 4**				
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
Existing Withdrawals	29.63%	26.54%	0.17%	0.07%	43.59%
Recommended Withdrawals	56.18%	16.37%	0.00%	0.17%	27.20%
Open	40.15%	26.71%	0.21%	0.83%	32.09%
Total	**37.95%**	**26.22%**	**0.19%**	**0.59%**	**35.03%**
Locatable Minerals	**Alternative 5**				
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
Existing Withdrawals	26.70%	27.77%	0.09%	0.07%	45.36%
Recommended Withdrawals	52.98%	18.99%	0.00%	0.17%	27.77%
Open	35.76%	30.79%	0.23%	0.83%	32.31%
Total	**34.02%**	**29.46%**	**0.18%**	**0.59%**	**35.68%**
Locatable Minerals	**Alternative 6**				
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
Existing Withdrawals	26.70%	27.77%	0.09%	0.07%	45.36%
Recommended Withdrawals	52.98%	18.99%	0.00%	0.17%	27.77%
Open	35.79%	30.81%	0.23%	0.83%	32.34%
Total	**34.04%**	**29.48%**	**0.18%**	**0.59%**	**35.70%**
Locatable Minerals	**Proposed RMP Amendment**				
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
Existing Withdrawals	26.60%	28.84%	0.09%	0.07%	44.35%
Recommended Withdrawals	52.98%	18.91%	0.00%	0.17%	27.77%
Open	36.03%	30.34%	0.23%	0.83%	32.19%
Total	**34.17%**	**29.44%**	**0.18%**	**0.59%**	**35.33%**

III. Fluid Minerals (Oil & Gas)

Table 14-9. Fluid Mineral (Oil & Gas) Decisions within HAF 3

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. These acres for fluid minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. The information is provided for context and to facilitate the analysis of effects. It is important to note that just because an area is open to leasing does not mean that it will be developed. Any development must be in conformance with the stipulations which may preclude development in some areas. The stipulation information has been considered in context with mineral potential, and drilling and economic trends to develop the Reasonably Foreseeable Development Scenario (see **Appendix 12**) which estimates the amount of development anticipated across all land ownership for each alternative.

Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 3 by Habitat Management Area Type						
Fluid Mineral (Oil & Gas) Decisions	**Alternative 1**					
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
Closed	1,308,000	952,000	7,000	9,000	3,365,000	**5,640,000**
Open Major Stipulations	2,966,000	996,000	23,000	57,000	1,466,000	**5,508,000**
Open Moderate Stipulations	5,033,000	4,654,000	0	101,000	3,021,000	**12,810,000**
Open Standard Stipulations	0	1,262,000	0	9,000	1,057,000	**2,321,000**
Total	**9,307,000**	**7,863,000**	**29,000**	**168,000**	**8,910,000**	**26,279,000**

Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 3 by Habitat Management Area Type						
Fluid Mineral (Oil & Gas) Decisions	**Alternative 2**					
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
Closed	1,027,000	890,000	7,000	0	3,492,000	**5,417,000**
Open Major Stipulations	3,486,000	860,000	23,000	54,000	1,721,000	**6,143,000**
Open Moderate Stipulations	5,047,000	4,582,000	0	80,000	3,296,000	**13,006,000**
Open Standard Stipulations	0	1,296,000	0	8,000	1,369,000	**2,675,000**
Total	**9,561,000**	**7,628,000**	**29,000**	**143,000**	**9,878,000**	**27,241,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 3**					
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
Closed	17,146,000	0	0	8,000	3,255,000	**20,420,000**
Open Major Stipulations	206,000	0	0	58,000	1,477,000	**1,741,000**
Open Moderate Stipulations	217,000	0	0	100,000	2,476,000	**2,796,000**
Open Standard Stipulations	50,000	0	0	1,000	994,000	**1,047,000**
Total	**17,619,000**	**0**	**0**	**168,000**	**8,201,000**	**26,005,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 4**					
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
Closed	1,078,000	940,000	19,000	8,000	3,256,000	**5,301,000**
Open Major Stipulations	9,564,000	1,093,000	17,000	58,000	1,476,000	**12,208,000**
Open Moderate Stipulations	0	4,007,000	0	100,000	2,788,300	**6,906,000**
Open Standard Stipulations	13,000	1,050,000	11,000	1,000	996,000	**2,077,000**
Total	**10,656,000**	**7,089,000**	**47,000**	**168,000**	**8,516,000**	**26,492,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 5**					
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
Closed	1,015,000	996,000	17,000	8,000	3,265,000	**5,301,000**
Open Major Stipulations	3,224,000	1,080,000	13,000	58,000	1,478,000	**5,853,000**
Open Moderate Stipulations	5,294,000	4,713,000	0	100,000	2,862,000	**12,969,000**
Open Standard Stipulations	0	1,202,000	8,000	1,000	1,059,000	**2,270,000**
Total	**9,533,000**	**7,990,000**	**38,000**	**168,000**	**8,663,000**	**26,392,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 6**					
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
Closed	1,015,000	996,000	17,000	8,000	3,265,000	**5,301,000**
Open Major Stipulations	3,581,000	1,080,000	13,000	58,000	1,478,000	**6,210,000**
Open Moderate Stipulations	4,938,000	4,713,000	0	100,000	2,862,000	**12,613,000**
Open Standard Stipulations	0	1,202,000	8,000	1,000	1,059,000	**2,270,000**
Total	**9,534,000**	**7,990,000**	**38,000**	**168,000**	**8,663,000**	**26,393,000**
Fluid Mineral (Oil & Gas) Decisions	**Proposed RMP Amendment**					
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**	**Total**
Closed	1,461,000	1,036,000	17,000	8,000	3,268,000	**5,830,000**
Open Major Stipulations	3,055,000	996,000	13,000	58,000	1,473,000	**5,599,000**
Open Moderate Stipulations	5,049,000	4,750,000	0	100,000	2,816,000	**12,725,000**
Open Standard Stipulations	0	1,197,000	8,000	1,000	1,022,000	**2,237,000**
Total	**9,565,000**	**7,979,000**	**38,000**	**168,000**	**8,579,000**	**26,391,000**

Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 3					
Fluid Mineral (Oil & Gas) Decisions	**Alternative 1**				
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
Closed	23.19%	16.88%	0.12%	0.16%	59.66%
Open Major Stipulations	53.85%	18.08%	0.42%	1.03%	26.62%
Open Moderate Stipulations	39.29%	36.33%	0.00%	0.79%	23.58%
Open Standard Stipulations	0.00%	54.37%	0.00%	0.39%	45.54%
Total	**35.42%**	**29.92%**	**0.11%**	**0.64%**	**33.91%**

Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 3					
Fluid Mineral (Oil & Gas) Decisions	**Alternative 2**				
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
Closed	18.96%	16.43%	0.13%	0.00%	64.46%
Open Major Stipulations	56.75%	14.00%	0.37%	0.88%	28.02%
Open Moderate Stipulations	38.81%	35.23%	0.00%	0.62%	25.34%
Open Standard Stipulations	0.00%	48.45%	0.00%	0.30%	51.18%
Total	**35.10%**	**28.00%**	**0.11%**	**0.52%**	**36.26%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 3**				
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
Closed	83.97%	0.00%	0.00%	0.04%	15.94%
Open Major Stipulations	11.83%	0.00%	0.00%	3.33%	84.84%
Open Moderate Stipulations	7.76%	0.00%	0.00%	3.58%	88.56%
Open Standard Stipulations	4.78%	0.00%	0.00%	0.10%	94.94%
Total	**67.75%**	**0.00%**	**0.00%**	**0.65%**	**31.54%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 4**				
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
Closed	20.34%	17.73%	0.36%	0.15%	61.42%
Open Major Stipulations	78.34%	8.95%	0.14%	0.48%	12.09%
Open Moderate Stipulations	0.00%	58.04%	0.00%	1.45%	40.38%
Open Standard Stipulations	0.63%	50.55%	0.53%	0.05%	47.95%
Total	**40.22%**	**26.76%**	**0.18%**	**0.63%**	**32.15%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 5**				
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
Closed	19.15%	18.79%	0.32%	0.15%	61.59%
Open Major Stipulations	55.08%	18.45%	0.22%	0.99%	25.25%
Open Moderate Stipulations	40.82%	36.34%	0.00%	0.77%	22.07%
Open Standard Stipulations	0.00%	52.95%	0.35%	0.04%	46.65%
Total	**36.12%**	**30.27%**	**0.13%**	**0.64%**	**32.82%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 6**				
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
Closed	19.15%	18.79%	0.32%	0.15%	61.59%
Open Major Stipulations	57.67%	17.39%	0.21%	0.93%	23.80%
Open Moderate Stipulations	39.12%	37.34%	0.00%	0.79%	22.67%
Open Standard Stipulations	0.00%	52.95%	0.35%	0.04%	46.65%
Total	**36.12%**	**30.27%**	**0.14%**	**0.64%**	**32.82%**
Fluid Mineral (Oil & Gas) Decisions	**Proposed RMP Amendment**				
	PHMA	**GHMA**	**IHMA**	**LCHMA**	**Non-HMA**
Closed	25.06%	17.77%	0.29%	0.14%	56.05%
Open Major Stipulations	54.56%	17.79%	0.23%	1.04%	26.31%
Open Moderate Stipulations	39.68%	37.33%	0.00%	0.79%	22.13%
Open Standard Stipulations	0.00%	53.51%	0.36%	0.04%	45.69%
Total	**36.24%**	**30.23%**	**0.14%**	**0.64%**	**32.51%**

14.4.4 HAF Group 4

I. Habitat Management

Table 14-10. Habitat Management Areas within HAF 4

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only.

Approximate Acres of HMA in HAF 4			
Alternative 1			
PHMA	**GHMA**	**Non-HMA**	**Total**
2,566,000	1,152,000	11,147,000	**14,865,000**
Alternative 2			
PHMA	**GHMA**	**Non-HMA**	**Total**
2,566,000	0	12,299,000	**14,865,000**
Alternative 3			
PHMA	**GHMA**	**Non-HMA**	**Total**
5,035,000	0	9,902,000	**14,937,000**
Alternative 4			
PHMA	**GHMA**	**Non-HMA**	**Total**
2,673,000	1,854,000	10,398,000	**14,924,000**
Alternative 5			
PHMA	**GHMA**	**Non-HMA**	**Total**
1,802,000	668,000	12,394,000	**14,865,000**
Alternative 6			
PHMA	**GHMA**	**Non-HMA**	**Total**
1,802,000	668,000	12,394,000	**14,865,000**
Proposed RMP Amendment			
PHMA	**GHMA**	**Non-HMA**	**Total**
2,635,000	1,015,000	11,077,000	**14,907,000**

Approximate Percent of HAF 4 that is HMA		
Alternative 1		
PHMA	**GHMA**	**Non-HMA**
17.26%	7.75%	74.99%
Alternative 2		
PHMA	**GHMA**	**Non-HMA**
17.26%	0.00%	82.74%
Alternative 3		
PHMA	**GHMA**	**Non-HMA**
33.71%	0.00%	66.29%
Alternative 4		
PHMA	**GHMA**	**Non-HMA**
17.91%	12.42%	69.67%
Alternative 5		
PHMA	**GHMA**	**Non-HMA**
12.12%	4.49%	83.38%
Alternative 6		
PHMA	**GHMA**	**Non-HMA**
12.12%	4.49%	83.38%
Proposed RMP Amendment		
PHMA	**GHMA**	**Non-HMA**
17.68%	6.81%	74.31%

II. Locatable Minerals

Table 14-11. Locatable Minerals Decisions within HAF 4

Acreages and Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. The acres for the locatable minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. For example, for locatable minerals, proposed mineral withdrawals are only proposed and considered for GRSG conservation under Alternative 1 and Alternative 3 in this RMP Amendment. All the other existing and proposed withdrawal acreage that is identified under other alternatives represent proposed or existing withdrawals that are either being proposed in other RMP efforts or existing withdrawals that are already in place. The information is provided for context and to facilitate the analysis of effects.

Approximate Acres of Locatable Minerals Decisions in HAF 4 by Habitat Management Area Type				
Locatable Minerals	**Alternative 1**			
	PHMA	**GHMA**	**Non-HMA**	**Total**
Existing Withdrawals	46,000	192,000	1,959,000	**2,197,000**
Recommended Withdrawals	4,000	0	2,000	**6,000**
Open	1,783,000	188,000	5,594,000	**7,565,000**
Total	**1,832,000**	**380,000**	**7,555,000**	**9,768,000**
Locatable Minerals	**Alternative 2**			
	PHMA	**GHMA**	**Non-HMA**	**Total**
Existing Withdrawals	46,000	0	2,151,000	**2,197,000**
Recommended Withdrawals	3,600	0	2,000	**6,000**
Open	1,783,000	0	5,782,000	**7,565,000**
Total	**1,832,000**	**0**	**7,935,000**	**9,768,000**
Locatable Minerals	**Alternative 3**			
	PHMA	**GHMA**	**Non-HMA**	**Total**
Existing Withdrawals	355,000	0	1,842,000	**2,197,000**
Recommended Withdrawals	1,847,000	0	1,000	**1,870,000**
Open	1,036,000	0	4,750,000	**5,744,000**
Total	**3,239,000**	**0**	**6,593,000**	**9,811,000**
Locatable Minerals	**Alternative 4**			
	PHMA	**GHMA**	**Non-HMA**	**Total**
Existing Withdrawals	115,000	233,000	1,849,000	**2,197,000**
Recommended Withdrawals	4,000	0	2,000	**6,000**
Open	1,774,000	889,000	4,917,000	**7,622,000**
Total	**1,893,000**	**1,122,000**	**6,768,000**	**9,825,000**
Locatable Minerals	**Alternative 5**			
	PHMA	**GHMA**	**Non-HMA**	**Total**
Existing Withdrawals	22,000	0	2,173,000	**2,196,000**
Recommended Withdrawals	4,000	0	2,000	**6,000**
Open	1,228,000	505,000	5,849,000	**7,625,000**
Total	**1,254,000**	**506,000**	**8,024,000**	**9,827,000**
Locatable Minerals	**Alternative 6**			
	PHMA	**GHMA**	**Non-HMA**	**Total**
Existing Withdrawals	22,000	0	2,173,000	**2,196,000**
Recommended Withdrawals	4,000	0	2,000	**6,000**
Open	1,228,000	505,000	5,849,000	**7,625,000**
Total	**1,254,000**	**506,000**	**8,024,000**	**9,827,000**

Approximate Acres of Locatable Minerals Decisions in HAF 4 by Habitat Management Area Type				
Locatable Minerals	**Proposed RMP Amendment**			
	PHMA	**GHMA**	**Non-HMA**	**Total**
Existing Withdrawals	114,000	142,000	1,929,000	**2,196,000**
Recommended Withdrawals	4,000	0	2,000	**6,000**
Open	1,750,000	349,000	5,365,000	**7,599,000**
Total	**1,867,000**	**491,000**	**7,295,000**	**9,800,000**

Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 4			
Locatable Minerals	**Alternative 1**		
	PHMA	**GHMA**	**Non-HMA**
Existing Withdrawals	2.09%	8.74%	89.17%
Recommended Withdrawals	66.67%	0.00%	33.33%
Open	23.57%	2.49%	73.95%
Total	**18.76%**	**3.89%**	**77.34%**
Locatable Minerals	**Alternative 2**		
	PHMA	**GHMA**	**Non-HMA**
Existing Withdrawals	2.09%	0.00%	97.91%
Recommended Withdrawals	60.00%	0.00%	33.33%
Open	23.57%	0.00%	76.43%
Total	**18.76%**	**0.00%**	**81.23%**
Locatable Minerals	**Alternative 3**		
	PHMA	**GHMA**	**Non-HMA**
Existing Withdrawals	16.16%	0.00%	83.84%
Recommended Withdrawals	98.77%	0.00%	0.05%
Open	18.04%	0.00%	82.69%
Total	**33.01%**	**0.00%**	**67.20%**
Locatable Minerals	**Alternative 4**		
	PHMA	**GHMA**	**Non-HMA**
Existing Withdrawals	5.23%	10.61%	84.16%
Recommended Withdrawals	66.67%	0.00%	33.33%
Open	23.27%	11.66%	64.90%
Total	**19.27%**	**11.42%**	**68.89%**
Locatable Minerals	**Alternative 5**		
	PHMA	**GHMA**	**Non-HMA**
Existing Withdrawals	1.00%	0.00%	98.95%
Recommended Withdrawals	66.67%	0.00%	33.33%
Open	16.10%	6.62%	76.71%
Total	**12.76%**	**5.15%**	**81.65%**
Locatable Minerals	**Alternative 6**		
	PHMA	**GHMA**	**Non-HMA**
Existing Withdrawals	1.00%	0.00%	98.95%
Recommended Withdrawals	66.67%	0.00%	33.33%
Open	16.10%	6.62%	76.71%
Total	**13.19%**	**5.15%**	**81.65%**
Locatable Minerals	**Proposed RMP Amendment**		
	PHMA	**GHMA**	**Non-HMA**
Existing Withdrawals	5.19%	6.47%	87.84%
Recommended Withdrawals	66.67%	0.00%	33.33%
Open	23.03%	4.59%	70.60%
Total	**19.05%**	**5.01%**	**74.44%**

III. Fluid Minerals (Oil & Gas)

Table 14-12. Fluid Mineral (Oil & Gas) Decisions within HAF 4

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. These acres for fluid minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. The information is provided for context and to facilitate the analysis of effects. It is important to note that just because an area is open to leasing does not mean that it will be developed. Any development must be in conformance with the stipulations which may preclude development in some areas. The stipulation information has been considered in context with mineral potential, and drilling and economic trends to develop the Reasonably Foreseeable Development Scenario (see **Appendix 12**) which estimates the amount of development anticipated across all land ownership for each alternative.

Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 4 by Habitat Management Area Type				
Fluid Mineral (Oil & Gas) Decisions	**Alternative 1**			
	PHMA	**GHMA**	**Non-HMA**	**Total**
Closed	53,000	28,000	1,321,000	**1,402,000**
Open Major Stipulations	1,775,000	27,000	2,185,000	**3,987,000**
Open Moderate Stipulations	0	186,000	1,578,000	**1,764,000**
Open Standard Stipulations	0	105,000	1,760,000	**1,865,000**
Total	**1,828,000**	**346,000**	**6,843,000**	**9,017,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 2**			
	PHMA	**GHMA**	**Non-HMA**	**Total**
Closed	53,000	0	1,349,000	**1,402,000**
Open Major Stipulations	1,774,000	0	2,212,000	**3,986,000**
Open Moderate Stipulations	0	0	1,763,000	**1,764,000**
Open Standard Stipulations	0	0	1,865,000	**1,865,000**
Total	**1,827,000**	**0**	**7,189,000**	**9,016,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 3**			
	PHMA	**GHMA**	**Non-HMA**	**Total**
Closed	2,069,000	0	1,270,000	**3,352,000**
Open Major Stipulations	890,000	0	1,904,000	**2,759,000**
Open Moderate Stipulations	127,000	0	1,274,000	**1,400,000**
Open Standard Stipulations	58,000	0	1,488,000	**1,545,000**
Total	**3,102,000**	**0**	**5,935,000**	**9,057,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 4**			
	PHMA	**GHMA**	**Non-HMA**	**Total**
Closed	68,000	63,000	1,270,000	**1,402,000**
Open Major Stipulations	1,813,000	284,000	1,917,000	**4,015,000**
Open Moderate Stipulations	2,000	403,000	1,303,000	**1,721,000**
Open Standard Stipulations	4,000	298,000	1,602,000	**1,904,000**
Total	**1,887,000**	**1,049,000**	**6,092,000**	**9,042,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 5**			
	PHMA	**GHMA**	**Non-HMA**	**Total**
Closed	40,000	1,000	1,354,000	**1,402,000**
Open Major Stipulations	1,211,000	98,000	2,200,000	**3,530,000**
Open Moderate Stipulations	0	69,000	1,780,000	**1,863,000**
Open Standard Stipulations	4,000	302,000	1,917,000	**2,224,000**
Total	**1,254,000**	**470,000**	**7,252,000**	**9,018,000**

Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 4 by Habitat Management Area Type				
Fluid Mineral (Oil & Gas) Decisions	**Alternative 6**			
	PHMA	**GHMA**	**Non-HMA**	**Total**
Closed	46,000	1,000	1,354,000	**1,402,000**
Open Major Stipulations	1,232,000	98,000	2,200,000	**3,530,000**
Open Moderate Stipulations	14,000	69,000	1,780,000	**1,863,000**
Open Standard Stipulations	5,000	302,000	1,917,000	**2,224,000**
Total	**1,296,000**	**470,000**	**7,252,000**	**9,018,000**
Fluid Mineral (Oil & Gas) Decisions	**Proposed RMP Amendment**			
	PHMA	**GHMA**	**Non-HMA**	**Total**
Closed	68,000	31,000	1,303,000	**1,402,000**
Open Major Stipulations	1,718,000	48,000	2,159,000	**3,929,000**
Open Moderate Stipulations	27,000	241,000	1,437,000	**1,760,000**
Open Standard Stipulations	5,000	140,000	1,690,000	**1,896,000**
Total	**1,818,000**	**459,000**	**6,588,000**	**8,987,000**

Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 4			
Fluid Mineral (Oil & Gas) Decisions	**Alternative 1**		
	PHMA	**GHMA**	**Non-HMA**
Closed	3.78%	2.00%	94.22%
Open Major Stipulations	44.52%	0.68%	54.80%
Open Moderate Stipulations	0.00%	10.54%	89.46%
Open Standard Stipulations	0.00%	5.63%	94.37%
Total	**20.27%**	**3.84%**	**75.89%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 2**		
	PHMA	**GHMA**	**Non-HMA**
Closed	3.78%	0.00%	96.22%
Open Major Stipulations	44.51%	0.00%	55.49%
Open Moderate Stipulations	0.00%	0.00%	99.94%
Open Standard Stipulations	0.00%	0.00%	100.00%
Total	**20.26%**	**0.00%**	**79.74%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 3**		
	PHMA	**GHMA**	**Non-HMA**
Closed	61.72%	0.00%	37.89%
Open Major Stipulations	32.26%	0.00%	69.01%
Open Moderate Stipulations	9.07%	0.00%	91.00%
Open Standard Stipulations	3.75%	0.00%	96.31%
Total	**34.25%**	**0.00%**	**65.53%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 4**		
	PHMA	**GHMA**	**Non-HMA**
Closed	4.85%	4.49%	90.58%
Open Major Stipulations	45.16%	7.07%	47.75%
Open Moderate Stipulations	0.12%	23.42%	75.71%
Open Standard Stipulations	0.21%	15.65%	84.14%
Total	**20.86%**	**11.60%**	**67.37%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 5**		
	PHMA	**GHMA**	**Non-HMA**
Closed	2.85%	0.07%	96.58%
Open Major Stipulations	34.31%	2.78%	62.32%
Open Moderate Stipulations	0.00%	3.70%	95.54%
Open Standard Stipulations	0.18%	13.58%	86.20%
Total	**13.91%**	**5.21%**	**80.42%**

Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 4			
Fluid Mineral (Oil & Gas) Decisions	**Alternative 6**		
	PHMA	**GHMA**	**Non-HMA**
Closed	3.28%	0.07%	96.58%
Open Major Stipulations	34.90%	2.78%	62.32%
Open Moderate Stipulations	0.75%	3.70%	95.54%
Open Standard Stipulations	0.22%	13.58%	86.20%
Total	**14.37%**	**5.21%**	**80.42%**
Fluid Mineral (Oil & Gas) Decisions	**Proposed RMP Amendment**		
	PHMA	**GHMA**	**Non-HMA**
Closed	4.85%	2.21%	92.94%
Open Major Stipulations	43.73%	1.22%	54.95%
Open Moderate Stipulations	1.53%	13.69%	81.65%
Open Standard Stipulations	0.26%	7.38%	89.14%
Total	**20.23%**	**5.11%**	**73.31%**

14.4.5 HAF Group 5

I. Habitat Management

Table 14-13. Habitat Management Areas within HAF 5

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only.

Approximate Acres of HMA in HAF 5				
Alternative 1				
PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
4,578,000	5,031,000	4,360,000	21,225,000	**35,193,000**
Alternative 2				
PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
4,242,000	4,207,000	4,056,000	22,688,000	**35,193,000**
Alternative 3				
PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
13,423,000	0	0	21,789,000	**35,212,000**
Alternative 4				
PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
5,729,000	3,324,000	4,355,000	21,804,000	**35,212,000**
Alternative 5				
PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
5,684,000	2,785,000	3,679,000	23,052,000	**35,200,000**
Alternative 6				
PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
5,684,000	2,785,000	3,679,000	23,052,000	**35,200,000**
Proposed RMP Amendment				
PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
5,083,000	2,763,000	3,670,000	22,887,000	**34,546,000**

Approximate Percent of HAF 5 that is HMA			
Alternative 1			
PHMA	**GHMA**	**OHMA**	**Non-HMA**
13.01%	14.30%	12.39%	60.31%
Alternative 2			
PHMA	**GHMA**	**OHMA**	**Non-HMA**
12.05%	11.95%	11.53%	64.47%
Alternative 3			
PHMA	**GHMA**	**OHMA**	**Non-HMA**
38.12%	0.00%	0.00%	61.88%
Alternative 4			
PHMA	**GHMA**	**OHMA**	**Non-HMA**
16.27%	9.44%	12.67%	62.21%
Alternative 5			
PHMA	**GHMA**	**OHMA**	**Non-HMA**
16.15%	7.92%	10.45%	65.49%
Alternative 6			
PHMA	**GHMA**	**OHMA**	**Non-HMA**
16.15%	7.92%	10.45%	65.49%
Proposed RMP Amendment			
PHMA	**GHMA**	**OHMA**	**On-HMA**
14.71%	7.80%	10.62%	66.25%

II. Locatable Minerals

Table 14-14. Locatable Minerals Decisions within HAF 5

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. The acres for the locatable minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. For example, for locatable minerals, proposed mineral withdrawals are only proposed and considered for GRSG conservation under Alternative 1 and Alternative 3 in this RMP Amendment. All the other existing and proposed withdrawal acreage that is identified under other alternatives represent proposed or existing withdrawals that are either being proposed in other RMP efforts or existing withdrawals that are already in place. The information is provided for context and to facilitate the analysis of effects.

Approximate Acres of Locatable Minerals Decisions in HAF 5 by Habitat Management Area Type					
Locatable Minerals	**Alternative 1**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	70,000	248,000	115,000	1,283,000	**1,716,000**
Recommended Withdrawals	0	0	0	0	**0**
Open	3,948,000	4,160,000	3,726,000	16,785,000	**28,618,000**
Total	**4,019,000**	**4,407,000**	**3,841,000**	**18,068,000**	**30,335,000**
Locatable Minerals	**Alternative 2**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	16,000	100,000	42,000	1,283,000	**1,441,000**
Recommended Withdrawals	0	0	0	0	**0**
Open	3,666,000	3,485,000	3,495,000	16,795,000	**27,441,000**
Total	**3,683,000**	**3,585,000**	**3,537,000**	**18,078,000**	**28,882,000**

Approximate Acres of Locatable Minerals Decisions in HAF 5 by Habitat Management Area Type					
Locatable Minerals	**Alternative 3**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	523,000	0	0	1,193,000	**1,716,000**
Recommended Withdrawals	9,983,000	0	0	0	**9,997,000**
Open	1,248,000	0	0	17,405,000	**18,653,000**
Total	**11,755,000**	**0**	**0**	**18,598,000**	**30,366,000**
Locatable Minerals	**Alternative 4**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	197,000	215,000	101,000	1,193,000	**1,706,000**
Recommended Withdrawals	0	0	0	0	**0**
Open	4,875,000	2,685,000	3,669,000	17,418,000	**28,647,000**
Total	**5,072,000**	**2,900,000**	**3,770,000**	**18,611,000**	**30,353,000**
Locatable Minerals	**Alternative 5**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	196,000	212,000	98,000	1,210,000	**1,716,000**
Recommended Withdrawals	0	0	0	0	**0**
Open	4,836,000	2,256,000	3,158,000	18,326,000	**28,576,000**
Total	**5,032,000**	**2,468,000**	**3,255,000**	**19,537,000**	**30,292,000**
Locatable Minerals	**Alternative 6**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	196,000	212,000	98,000	1,210,000	**1,716,000**
Recommended Withdrawals	0	0	0	0	**0**
Open	4,836,000	2,256,000	3,158,000	18,326,000	**28,576,000**
Total	**5,032,000**	**2,468,000**	**3,255,000**	**19,537,000**	**30,292,000**
Locatable Minerals	**Proposed RMP Amendment**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	196,000	214,000	98,000	1,209,000	**1,716,000**
Recommended Withdrawals	0	0	0	0	**0**
Open	4,889,000	2,231,000	3,149,000	18,189,000	**28,576,000**
Total	**5,085,000**	**2,444,000**	**3,246,000**	**19,398,000**	**30,292,000**

Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 5				
Locatable Minerals	**Alternative 1**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	4.08%	14.45%	6.70%	74.77%
Recommended Withdrawals	0.00%	0.00%	0.00%	0.00%
Open	13.80%	14.54%	13.02%	58.65%
Total	**13.25%**	**14.53%**	**12.66%**	**59.56%**
Locatable Minerals	**Alternative 2**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	1.11%	6.94%	2.91%	89.04%
Recommended Withdrawals	0.00%	0.00%	0.00%	0.00%
Open	13.36%	12.70%	12.74%	61.20%
Total	**12.75%**	**12.41%**	**12.25%**	**62.59%**
Locatable Minerals	**Alternative 3**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	30.48%	0.00%	0.00%	69.52%
Recommended Withdrawals	99.86%	0.00%	0.00%	0.00%
Open	6.69%	0.00%	0.00%	93.31%
Total	**38.71%**	**0.00%**	**0.00%**	**61.25%**

Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 5				
Locatable Minerals	**Alternative 4**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	11.55%	12.60%	5.92%	69.93%
Recommended Withdrawals	0.00%	0.00%	0.00%	0.00%
Open	17.02%	9.37%	12.81%	60.80%
Total	**16.71%**	**9.55%**	**12.42%**	**61.32%**
Locatable Minerals	**Alternative 5**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	11.42%	12.35%	5.71%	70.51%
Recommended Withdrawals	0.00%	0.00%	0.00%	0.00%
Open	16.92%	7.89%	11.05%	64.13%
Total	**16.61%**	**8.15%**	**10.75%**	**64.50%**
Locatable Minerals	**Alternative 6**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	11.42%	12.35%	5.71%	70.51%
Recommended Withdrawals	0.00%	0.00%	0.00%	0.00%
Open	16.92%	7.89%	11.05%	64.12%
Total	**16.61%**	**8.15%**	**10.74%**	**64.48%**
Locatable Minerals	**Proposed RMP Amendment**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	11.42%	12.47%	5.71%	70.45%
Recommended Withdrawals	0.00%	0.00%	0.00%	0.00%
Open	17.11%	7.81%	11.02%	63.65%
Total	**16.79%**	**8.07%**	**10.72%**	**64.04%**

III. Fluid Minerals (Oil & Gas)

Table 14-15. Fluid Mineral (Oil & Gas) Decisions within HAF 5

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. These acres for fluid minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. The information is provided for context and to facilitate the analysis of effects. It is important to note that just because an area is open to leasing does not mean that it will be developed. Any development must be in conformance with the stipulations which may preclude development in some areas. The stipulation information has been considered in context with mineral potential, and drilling and economic trends to develop the Reasonably Foreseeable Development Scenario (see **Appendix 12**) which estimates the amount of development anticipated across all land ownership for each alternative.

Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 5 by Habitat Management Area Type					
Fluid Mineral (Oil & Gas) Decisions	**Alternative 1**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	152,000	323,000	219,000	2,420,000	**3,115,000**
Open Major Stipulations	3,867,000	0	0	16,000	**3,883,000**
Open Moderate Stipulations	0	4,078,000	0	64,000	**4,141,000**
Open Standard Stipulations	0	7,000	3,622,000	15,493,000	**19,122,000**
Total	**4,019,000**	**4,408,000**	**3,842,000**	**17,993,000**	**30,262,000**

Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 5 by Habitat Management Area Type					
Fluid Mineral (Oil & Gas) Decisions	**Alternative 2**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	98,000	175,000	147,000	2,420,000	**2,840,000**
Open Major Stipulations	3,585,000	0	0	16,000	**3,601,000**
Open Moderate Stipulations	0	3,410,000	0	67,000	**3,477,000**
Open Standard Stipulations	0	0	3,391,000	15,500,000	**18,891,000**
Total	**3,683,000**	**3,585,000**	**3,538,000**	**18,003,000**	**28,809,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 3**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	11,088,000	0	0	2,259,000	**13,360,000**
Open Major Stipulations	238,000	0	0	23,000	**261,000**
Open Moderate Stipulations	407,000	0	0	160,000	**566,000**
Open Standard Stipulations	13,000	0	0	14,941,000	**14,954,000**
Total	**11,745,000**	**0**	**0**	**17,383,000**	**29,141,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 4**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	285,000	333,000	239,000	2,259,000	**3,115,000**
Open Major Stipulations	4,422,000	13,000	12,000	23,000	**4,469,000**
Open Moderate Stipulations	136,000	2,151,000	26,000	163,000	**2,477,000**
Open Standard Stipulations	230,000	403,000	3,494,000	16,089,000	**20,228,000**
Total	**5,072,000**	**2,900,000**	**3,770,000**	**18,534,000**	**30,289,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 5**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	282,000	269,000	174,000	2,390,000	**3,115,000**
Open Major Stipulations	4,388,000	12,000	12,000	24,000	**4,435,000**
Open Moderate Stipulations	136,000	1,982,000	26,000	210,000	**2,354,000**
Open Standard Stipulations	229,000	207,000	3,053,000	16,876,000	**20,365,000**
Total	**5,035,000**	**2,470,000**	**3,264,000**	**19,500,000**	**30,269,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 6**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	282,000	269,000	174,000	2,390,000	**3,115,000**
Open Major Stipulations	4,388,000	12,000	12,000	24,000	**4,435,000**
Open Moderate Stipulations	136,000	1,982,000	26,000	210,000	**2,354,000**
Open Standard Stipulations	229,000	207,000	3,053,000	16,876,000	**20,365,000**
Total	**5,035,000**	**2,470,000**	**3,264,000**	**19,500,000**	**30,269,000**
Fluid Mineral (Oil & Gas) Decisions	**Proposed RMP Amendment**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	786,000	153,000	64,000	610,000	**1,613,000**
Open Major Stipulations	3,936,000	12,000	12,000	23,000	**3,984,000**
Open Moderate Stipulations	0	1,816,000	0	35,000	**1,877,000**
Open Standard Stipulations	229,000	222,000	3,154,000	16,768,000	**20,464,000**
Total	**4,951,000**	**2,202,000**	**3,230,00**	**17,436,000**	**27,937,000**

Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 5				
Fluid Mineral (Oil & Gas) Decisions	**Alternative 1**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Closed	4.88%	10.37%	7.03%	77.69%
Open Major Stipulations	99.59%	0.00%	0.00%	0.41%
Open Moderate Stipulations	0.00%	98.48%	0.00%	1.55%
Open Standard Stipulations	0.00%	0.04%	18.94%	81.02%
Total	**13.28%**	**14.57%**	**12.70%**	**59.46%**

Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 5				
Fluid Mineral (Oil & Gas) Decisions	**Alternative 2**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Closed	3.45%	6.16%	5.18%	85.21%
Open NSO	99.56%	0.00%	0.00%	0.44%
Open CSU/TL	0.00%	98.07%	0.00%	1.93%
Open Standard Stipulations	0.00%	0.00%	17.95%	82.05%
Total	**12.78%**	**12.44%**	**12.28%**	**62.49%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 3**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Closed	82.99%	0.00%	0.00%	16.91%
Open Major Stipulations	91.19%	0.00%	0.00%	8.81%
Open Moderate Stipulations	71.91%	0.00%	0.00%	28.27%
Open Standard Stipulations	0.09%	0.00%	0.00%	99.91%
Total	**40.30%**	**0.00%**	**0.00%**	**59.65%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 4**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Closed	9.15%	10.69%	7.67%	72.52%
Open Major Stipulations	98.95%	0.29%	0.27%	0.51%
Open Moderate Stipulations	5.49%	86.84%	1.05%	6.58%
Open Standard Stipulations	1.14%	1.99%	17.27%	79.54%
Total	**16.75%**	**9.57%**	**12.45%**	**61.19%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 5**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Closed	9.05%	8.64%	5.59%	76.73%
Open Major Stipulations	98.94%	0.27%	0.27%	0.54%
Open Moderate Stipulations	5.77%	84.20%	1.10%	8.92%
Open Standard Stipulations	1.12%	1.02%	14.99%	82.88%
Total	**16.63%**	**8.16%**	**10.78%**	**64.42%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 6**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Closed	9.05%	8.64%	5.59%	76.73%
Open Major Stipulations	98.94%	0.27%	0.27%	0.54%
Open Moderate Stipulations	5.80%	84.20%	1.11%	8.96%
Open Standard Stipulations	1.12%	1.02%	14.99%	82.87%
Total	**16.63%**	**8.16%**	**10.78%**	**64.42%**
Fluid Mineral (Oil & Gas) Decisions	**Proposed RMP Amendment**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Closed	48.73%	9.49%	3.97%	37.82%
Open Major Stipulations	98.80%	0.30%	0.30%	0.58%
Open Moderate Stipulations	0.00%	96.75%	0.00%	1.86%
Open Standard Stipulations	1.12%	1.08%	15.41%	81.94%
Total	**17.72%**	**7.88%**	**11.56%**	**62.40%**

14.4.6 HAF Group 6

I. Habitat Management

Table 14-16. Habitat Management Areas within HAF 6

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only.

Approximate Acres of HMA in HAF 6					
Alternative 1					
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
13,224,000	8,704,000	1,793,000	1,404,000	16,456,000	**41,581,000**
Alternative 2					
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
12,605,000	8,420,000	1,863,000	1,282,000	17,411,000	**41,581,000**
Alternative 3					
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
24,571,000	0	0	0	17,014,000	**41,585,000**
Alternative 4					
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
13,937,000	7,294,000	1,781,000	1,560,000	17,014,000	**41,585,000**
Alternative 5					
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
13,652,000	7,021,000	1,609,000	1,270,000	18,022,000	**41,574,000**
Alternative 6					
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
13,652,000	7,021,000	1,609,000	1,270,000	18,022,000	**41,574,000**
Proposed RMP Amendment					
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
11,772,000	6,961,000	1,609,000	1,259,000	18,022,000	**39,624,000**

Approximate Percent of HAF 6 that is HMA				
Alternative 1				
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
31.80%	20.93%	4.31%	3.38%	39.58%
Alternative 2				
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
30.31%	20.25%	4.48%	3.08%	41.87%
Alternative 3				
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
59.09%	0.00%	0.00%	0.00%	40.91%
Alternative 4				
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
33.51%	17.54%	4.29%	3.75%	40.91%
Alternative 5				
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
32.84%	16.89%	3.87%	3.05%	43.35%
Alternative 6				
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
32.84%	16.89%	3.87%	3.05%	43.35%
Proposed RMP Amendment				
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
29.71%	17.57%	4.06%	3.18%	45.48%

II. Locatable Minerals

Table 14-17. Locatable Minerals Decisions within HAF 6

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. The acres for the locatable minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. For example, for locatable minerals, proposed mineral withdrawals are only proposed and considered for GRSG conservation under Alternative 1 and Alternative 3 in this RMP Amendment. All the other existing and proposed withdrawal acreage that is identified under other alternatives represent proposed or existing withdrawals that are either being proposed in other RMP efforts or existing withdrawals that are already in place. The information is provided for context and to facilitate the analysis of effects.

Approximate Acres of Locatable Minerals Decisions in HAF 6 by Habitat Management Area Type						
Locatable Minerals	**Alternative 1**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	620,000	620,000	127,000	21,000	1,052,000	**2,440,000**
Recommended Withdrawals	3,541,000	357,000	0	184,000	90,000	**4,172,000**
Open	5,727,000	4,907,000	1,359,000	780,000	5,593,000	**18,367,000**
Total	**9,888,000**	**5,884,000**	**1,486,000**	**985,000**	**6,735,000**	**24,978,000**
Locatable Minerals	**Alternative 2**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	561,000	564,000	127,000	0	1,052,000	**2,304,000**
Recommended Withdrawals	1,487,000	0	0	0	0	**1,488,000**
Open	8,647,000	5,036,000	1,424,000	863,000	5,686,000	**21,656,000**
Total	**10,696,000**	**5,601,000**	**1,551,000**	**863,000**	**6,738,000**	**25,448,000**
Locatable Minerals	**Alternative 3**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	1,323,000	0	0	0	1,082,000	**2,405,000**
Recommended Withdrawals	15,659,000	0	0	0	71,000	**15,731,000**
Open	1,289,000	0	0	0	6,292,000	**7,581,000**
Total	**18,271,000**	**0**	**0**	**0**	**7,445,000**	**25,717,000**
Locatable Minerals	**Alternative 4**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	661,000	516,000	125,000	21,000	1,082,000	**2,405,000**
Recommended Withdrawals	422,000	54,000	0	33,000	51,000	**559,000**
Open	9,298,000	4,216,000	1,337,000	901,000	6,293,000	**22,045,000**
Total	**10,380,000**	**4,786,000**	**1,462,000**	**955,000**	**7,425,000**	**25,009,000**
Locatable Minerals	**Alternative 5**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	660,000	428,000	96,000	21,000	1,195,000	**2,400,000**
Recommended Withdrawals	401,000	69,000	7,000	33,000	51,000	**560,000**
Open	9,135,000	4,207,000	1,231,000	757,000	6,716,000	**22,046,000**
Total	**10,196,000**	**4,704,000**	**1,334,000**	**810,000**	**7,962,000**	**25,006,000**
Locatable Minerals	**Alternative 6**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	660,000	428,000	96,000	21,000	1,195,000	**2,400,000**
Recommended Withdrawals	401,000	69,000	7,000	33,000	50,000	**560,000**
Open	9,135,000	4,207,000	1,231,000	757,000	6,716,000	**22,046,000**
Total	**10,196,000**	**4,704,000**	**1,334,000**	**810,000**	**7,962,000**	**25,006,000**

Approximate Acres of Locatable Minerals Decisions in HAF 6 by Habitat Management Area Type						
Locatable Minerals	**Proposed RMP Amendment**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	660,000	428,000	96,000	21,000	1,195,000	**2,400,000**
Recommended Withdrawals	401,000	69,000	7,000	33,000	51,000	**560,000**
Open	9,201,000	4,150,000	1,231,000	747,000	6,716,000	**22,046,000**
Total	**10,262,000**	**4,647,000**	**1,334,000**	**801,000**	**7,962,000**	**25,006,000**

Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 6					
Locatable Minerals	**Alternative 1**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	25.41%	25.41%	5.20%	0.86%	43.11%
Recommended Withdrawals	84.88%	8.56%	0.00%	4.41%	2.16%
Open	31.18%	26.72%	7.40%	4.25%	30.45%
Total	**39.59%**	**23.56%**	**5.95%**	**3.94%**	**26.96%**
Locatable Minerals	**Alternative 2**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	24.35%	24.48%	5.51%	0.00%	45.66%
Recommended Withdrawals	99.93%	0.00%	0.00%	0.00%	0.00%
Open	39.93%	23.25%	6.58%	3.99%	26.26%
Total	**42.03%**	**22.01%**	**6.09%**	**3.39%**	**26.48%**
Locatable Minerals	**Alternative 3**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	55.01%	0.00%	0.00%	0.00%	44.99%
Recommended Withdrawals	99.54%	0.00%	0.00%	0.00%	0.45%
Open	17.00%	0.00%	0.00%	0.00%	83.00%
Total	**71.05%**	**0.00%**	**0.00%**	**0.00%**	**28.95%**
Locatable Minerals	**Alternative 4**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	27.48%	21.46%	5.20%	0.87%	44.99%
Recommended Withdrawals	75.49%	9.66%	0.00%	5.90%	9.12%
Open	42.18%	19.12%	6.06%	4.09%	28.54%
Total	**41.51%**	**19.14%**	**5.85%**	**3.82%**	**28.97%**
Locatable Minerals	**Alternative 5**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	27.50%	17.83%	4.00%	0.88%	49.79%
Recommended Withdrawals	71.61%	12.32%	1.25%	5.89%	9.11%
Open	41.44%	19.08%	5.58%	3.43%	30.46%
Total	**40.77%**	**18.81%**	**5.33%**	**3.24%**	**31.84%**
Locatable Minerals	**Alternative 6**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	27.50%	17.83%	4.00%	0.88%	49.79%
Recommended Withdrawals	71.61%	12.32%	1.25%	5.89%	9.11%
Open	41.44%	19.08%	5.58%	3.43%	30.46%
Total	**40.77%**	**18.81%**	**5.33%**	**3.24%**	**31.84%**
Locatable Minerals	**Proposed RMP Amendment**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	27.50%	17.83%	4.00%	0.88%	49.79%
Recommended Withdrawals	71.61%	12.32%	1.25%	5.89%	9.11%
Open	41.74%	18.82%	5.58%	3.39%	30.46%
Total	**41.04%**	**18.58%**	**5.33%**	**3.20%**	**31.84%**

III. Fluid Minerals (Oil & Gas)

Table 14-18. Fluid Mineral (Oil & Gas) Decisions within HAF 6

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. These acres for fluid minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. The information is provided for context and to facilitate the analysis of effects. It is important to note that just because an area is open to leasing does not mean that it will be developed. Any development must be in conformance with the stipulations which may preclude development in some areas. The stipulation information has been considered in context with mineral potential, and drilling and economic trends to develop the Reasonably Foreseeable Development Scenario (see **Appendix 12**) which estimates the amount of development anticipated across all land ownership for each alternative.

Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 6 by Habitat Management Area Type						
Fluid Mineral (Oil & Gas) Decisions	**Alternative 1**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,324,000	1,336,000	247,000	42,000	1,584,000	**4,532,000**
Open Major Stipulations	8,569,000	200,000	1,201,000	0	349,000	**10,319,000**
Open Moderate Stipulations	0	4,256,000	0	0	669,000	**4,925,000**
Open Standard Stipulations	0	3,000	0	944,000	4,311,000	**5,258,000**
Total	**9,893,000**	**5,794,000**	**1,447,000**	**985,000**	**6,913,000**	**25,033,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 2**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,265,000	1,280,000	247,000	21,000	1,584,000	**4,396,000**
Open Major Stipulations	8,013,000	202,000	1,265,000	0	349,000	**9,829,000**
Open Moderate Stipulations	0	4,027,000	0	0	672,000	**4,699,000**
Open Standard Stipulations	0	3,000	0	842,000	4,311,000	**5,156,000**
Total	**9,278,000**	**5,511,000**	**1,512,000**	**863,000**	**6,916,000**	**24,080,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 3**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	17,378,000	0	0	0	1,505,000	**18,884,000**
Open Major Stipulations	824,000	0	0	0	407,000	**1,231,000**
Open Moderate Stipulations	194,000	0	0	0	707,000	**901,000**
Open Standard Stipulations	463,000	0	0	0	4,730,000	**5,193,000**
Total	**18,858,000**	**0**	**0**	**0**	**7,350,000**	**26,209,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 4**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,400,000	1,252,000	265,000	42,000	1,572,000	**4,532,000**
Open Major Stipulations	8,771,000	211,000	1,044,000	33,000	408,000	**10,467,000**
Open Moderate Stipulations	45,000	4,229,000	2,000	20,000	707,000	**5,003,000**
Open Standard Stipulations	172,000	111,000	73,000	859,000	4,858,000	**6,074,000**
Total	**10,389,000**	**2,900,000**	**1,383,000**	**955,000**	**7,546,000**	**26,076,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 5**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,392,000	1,101,000	251,000	42,000	1,746,000	**4,532,000**
Open Major Stipulations	8,586,000	291,000	987,000	33,000	412,000	**10,310,000**
Open Moderate Stipulations	45,000	2,939,000	10,000	20,000	890,000	**3,904,000**
Open Standard Stipulations	23,000	1,436,000	1,000	715,000	5,069,000	**7,244,000**
Total	**10,046,000**	**5,767,000**	**1,249,000**	**811,000**	**8,117,000**	**25,990,000**

Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 6 by Habitat Management Area Type						
Fluid Mineral (Oil & Gas) Decisions	**Alternative 6**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,392,000	1,101,000	251,000	42,000	1,746,000	**4,532,000**
Open Major Stipulations	8,586,000	291,000	987,000	33,000	412,000	**10,310,000**
Open Moderate Stipulations	44,000	2,939,000	10,000	20,000	890,000	**3,904,000**
Open Standard Stipulations	23,000	1,436,000	1,000	715,000	5,069,000	**7,244,000**
Total	**10,046,000**	**5,767,000**	**1,249,000**	**811,000**	**8,117,000**	**25,990,000**
Fluid Mineral (Oil & Gas) Decisions	**Proposed RMP Amendment**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	2,751,000	1,088,000	251,000	21,000	1,596,000	**5,707,000**
Open Major Stipulations	7,292,000	291,000	987,000	33,000	412,000	**9,015,000**
Open Moderate Stipulations	0	4,206,000	10,000	0	857,000	**5,074,000**
Open Standard Stipulations	23,000	94,000	1,000	726,000	5,069,000	**5,914,000**
Total	**10,066,000**	**5,680,000**	**1,249,000**	**781,000**	**7,935,000**	**25,710,000**

Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 6					
Fluid Mineral (Oil & Gas) Decisions	**Alternative 1**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Closed	29.21%	29.48%	5.45%	0.93%	34.95%
Open Major Stipulations	83.04%	1.94%	11.64%	0.00%	3.38%
Open Moderate Stipulations	0.00%	86.42%	0.00%	0.00%	13.58%
Open Standard Stipulations	0.00%	0.06%	0.00%	17.95%	81.99%
Total	**39.52%**	**23.15%**	**5.78%**	**3.93%**	**27.62%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 2**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Closed	28.78%	29.12%	5.62%	0.48%	36.03%
Open NSO	81.52%	2.06%	12.87%	0.00%	3.55%
Open CSU/TL	0.00%	85.70%	0.00%	0.00%	14.30%
Open Standard Stipulations	0.00%	0.06%	0.00%	16.33%	83.61%
Total	**38.53%**	**22.89%**	**6.28%**	**3.58%**	**28.72%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 3**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Closed	92.02%	0.00%	0.00%	0.00%	7.97%
Open Major Stipulations	66.94%	0.00%	0.00%	0.00%	33.06%
Open Moderate Stipulations	21.53%	0.00%	0.00%	0.00%	78.47%
Open Standard Stipulations	8.92%	0.00%	0.00%	0.00%	91.08%
Total	**71.95%**	**0.00%**	**0.00%**	**0.00%**	**28.04%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 4**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Closed	30.89%	27.63%	5.85%	0.93%	34.69%
Open NSO	83.80%	2.02%	9.97%	0.32%	3.90%
Open CSU/TL	0.90%	84.53%	0.04%	0.40%	14.13%
Open Standard Stipulations	2.83%	1.83%	1.20%	14.14%	79.98%
Total	**39.84%**	**11.12%**	**5.30%**	**3.66%**	**28.94%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 5**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Closed	30.71%	24.29%	5.54%	0.93%	38.53%
Open NSO	83.28%	2.82%	9.57%	0.32%	4.00%
Open CSU/TL	1.15%	75.28%	0.26%	0.51%	22.80%
Open Standard Stipulations	0.32%	19.82%	0.01%	9.87%	69.98%
Total	**38.65%**	**22.19%**	**4.81%**	**3.12%**	**31.23%**

Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 6					
Fluid Mineral (Oil & Gas) Decisions	**Alternative 6**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Closed	30.71%	24.29%	5.54%	0.93%	38.53%
Open NSO	83.28%	2.82%	9.57%	0.32%	4.00%
Open CSU/TL	1.13%	75.28%	0.26%	0.51%	22.80%
Open Standard Stipulations	0.32%	19.82%	0.01%	9.87%	69.98%
Total	**38.65%**	**22.19%**	**4.81%**	**3.12%**	**31.23%**
Fluid Mineral (Oil & Gas) Decisions	**Proposed RMP Amendment**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Closed	48.20%	19.06%	4.40%	0.37%	27.97%
Open Major Stipulations	80.89%	3.23%	10.95%	0.37%	4.57%
Open Moderate Stipulations	0.00%	82.89%	0.20%	0.00%	16.89%
Open Standard Stipulations	0.39%	1.59%	0.02%	12.28%	85.71%
Total	**39.15%**	**22.09%**	**4.86%**	**3.04%**	**30.86%**

14.4.7 HAF Group 7

I. Habitat Management

Table 14-19. Habitat Management Areas within HAF 7

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only.

Approximate Acres of HMA in HAF 7					
Alternative 1					
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
4,485,000	3,270,000	2,656,000	0	7,580,000	**17,991,000**
Alternative 2					
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
4,473,000	3,270,000	2,656,000	0	7,592,000	**17,991,000**
Alternative 3					
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
9,696,000	0	0	0	8,297,000	**17,994,000**
Alternative 4					
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
4,995,000	2,248,000	2,453,000	0	8,298,000	**17,994,000**
Alternative 5					
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
4,975,000	2,103,000	2,595,000	0	8,321,000	**17,994,000**
Alternative 6					
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
4,975,000	2,103,000	2,595,000	0	8,321,000	**17,994,000**
Proposed RMP Amendment					
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
4,975,000	2,075,000	2,623,000	0	8,321,000	**17,994,000**

Approximate Percent of HAF 1 that is HMA				
Alternative 1				
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
24.93%	18.18%	14.76%	0.00%	42.13%
Alternative 2				
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
24.86%	18.18%	14.76%	0.00%	42.20%
Alternative 3				
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
53.88%	0.00%	0.00%	0.00%	46.11%
Alternative 4				
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
27.76%	12.49%	13.63%	0.00%	46.12%
Alternative 5				
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
27.65%	11.69%	14.42%	0.00%	46.24%
Alternative 6				
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
27.65%	11.69%	14.42%	0.00%	46.25%
Proposed RMP Amendment				
PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
27.65%	11.54%	14.58%	0.00%	46.24%

II. Locatable Minerals

Table 14-20. Locatable Minerals Decisions within HAF 7

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. The acres for the locatable minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. For example, for locatable minerals, proposed mineral withdrawals are only proposed and considered for GRSG conservation under Alternative 1 and Alternative 3 in this RMP Amendment. All the other existing and proposed withdrawal acreage that is identified under other alternatives represent proposed or existing withdrawals that are either being proposed in other RMP efforts or existing withdrawals that are already in place. The information is provided for context and to facilitate the analysis of effects.

Approximate Acres of Locatable Minerals Decisions in HAF 7 by Habitat Management Area Type						
Locatable Minerals	**Alternative 1**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	550,000	203,000	4,000	0	412,000	**1,484,000**
Recommended Withdrawals	1,472,000	0	0	0	0	**1,473,000**
Open	1,183,000	1,674,000	1,499,000	0	2,825,000	**7,204,000**
Total	**3,205,000**	**1,876,000**	**1,814,000**	**0**	**3,238,000**	**10,161,000**
Locatable Minerals	**Alternative 2**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	550,000	203,000	315,000	0	412,000	**1,484,000**
Recommended Withdrawals	1,460,000	0	0	0	12,000	**1,473,000**
Open	2,643,000	1,674,000	1,499,000	0	2,838,000	**8,677,000**
Total	**4,653,000**	**1,876,000**	**1,814,000**	**0**	**3,262,000**	**11,634,000**

Approximate Acres of Locatable Minerals Decisions in HAF 7 by Habitat Management Area Type						
Locatable Minerals	**Alternative 3**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	1,601,000	0	0	0	441,000	**1,480,000**
Recommended Withdrawals	5,380,000	0	0	0	5,000	**5,387,000**
Open	912,000	0	0	0	3,327,000	**4,262,000**
Total	**7,893,000**	**0**	**0**	**0**	**3,774,000**	**11,695,000**
Locatable Minerals	**Alternative 4**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	554,000	157,000	328,000	0	441,000	**1,480,000**
Recommended Withdrawals	181,000	0	0	0	0	**181,000**
Open	2,575,000	1,242,000	1,321,000	0	3,325,000	**8,462,000**
Total	**3,310,000**	**1,399,000**	**1,648,000**	**0**	**3,766,000**	**10,123,000**
Locatable Minerals	**Alternative 5**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	601,000	134,000	301,000	0	444,000	**1,480,000**
Recommended Withdrawals	169,000	6,000	5,000	0	5,000	**186,000**
Open	2,728,000	1,012,000	1,402,000	0	3,347,000	**8,489,000**
Total	**3,498,000**	**1,152,000**	**1,708,000**	**0**	**3,797,000**	**10,155,000**
Locatable Minerals	**Alternative 6**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	601,000	134,000	301,000	0	444,000	**1,480,000**
Recommended Withdrawals	169,000	6,000	5,000	0	5,000	**186,000**
Open	2,728,000	1,012,000	1,402,000	0	3,347,000	**8,489,000**
Total	**3,498,000**	**1,152,000**	**1,708,000**	**0**	**3,797,000**	**10,155,000**
Locatable Minerals	**Proposed RMP Amendment**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	601,000	124,000	311,000	0	444,000	**1,480,000**
Recommended Withdrawals	169,000	6,000	5,000	0	5,000	**186,000**
Open	2,728,000	999,000	1,415,000	0	3,347,000	**8,489,000**
Total	**3,498,000**	**1,129,000**	**1,731,000**	**0**	**3,797,000**	**10,155,000**

Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 7					
Locatable Minerals	**Alternative 1**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	37.06%	13.68%	0.27%	0.00%	27.76%
Recommended Withdrawals	99.93%	0.00%	0.00%	0.00%	0.00%
Open	16.42%	23.24%	20.81%	0.00%	39.21%
Total	**31.54%**	**18.46%**	**17.85%**	**0.00%**	**31.87%**
Locatable Minerals	**Alternative 2**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	37.06%	13.68%	21.23%	0.00%	27.76%
Recommended Withdrawals	99.12%	0.00%	0.00%	0.00%	0.81%
Open	30.46%	19.29%	17.28%	0.00%	32.71%
Total	**39.99%**	**16.13%**	**15.59%**	**0.00%**	**28.04%**
Locatable Minerals	**Alternative 3**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	108.18%	0.00%	0.00%	0.00%	29.80%
Recommended Withdrawals	99.87%	0.00%	0.00%	0.00%	0.09%
Open	21.40%	0.00%	0.00%	0.00%	78.06%
Total	**67.49%**	**0.00%**	**0.00%**	**0.00%**	**32.27%**

Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 7					
Locatable Minerals	**Alternative 4**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	37.43%	10.61%	22.16%	0.00%	29.80%
Recommended Withdrawals	100.00%	0.00%	0.00%	0.00%	0.00%
Open	30.43%	14.68%	15.61%	0.00%	39.29%
Total	**32.70%**	**13.82%**	**16.28%**	**0.00%**	**37.20%**
Locatable Minerals	**Alternative 5**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	40.61%	9.05%	20.34%	0.00%	30.00%
Recommended Withdrawals	90.86%	3.23%	2.69%	0.00%	2.69%
Open	32.14%	11.92%	16.52%	0.00%	39.43%
Total	**34.45%**	**11.34%**	**16.82%**	**0.00%**	**37.28%**
Locatable Minerals	**Alternative 6**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	40.61%	9.05%	20.34%	0.00%	30.00%
Recommended Withdrawals	90.86%	3.23%	2.69%	0.00%	2.69%
Open	32.14%	11.92%	16.52%	0.00%	39.43%
Total	**34.44%**	**11.34%**	**16.82%**	**0.00%**	**37.39%**
Locatable Minerals	**Proposed RMP Amendment**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	40.61%	8.38%	21.01%	0.00%	30.00%
Recommended Withdrawals	90.86%	3.23%	2.69%	0.00%	2.69%
Open	32.14%	11.77%	16.67%	0.00%	39.43%
Total	**34.44%**	**11.12%**	**17.05%**	**0.00%**	**37.39%**

III. Fluid Minerals (Oil & Gas)

Table 14-21. Fluid Mineral (Oil & Gas) Decisions within HAF 7

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. These acres for fluid minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. The information is provided for context and to facilitate the analysis of effects. It is important to note that just because an area is open to leasing does not mean that it will be developed. Any development must be in conformance with the stipulations which may preclude development in some areas. The stipulation information has been considered in context with mineral potential, and drilling and economic trends to develop the Reasonably Foreseeable Development Scenario (see **Appendix 12**) which estimates the amount of development anticipated across all land ownership for each alternative.

Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 7 by Habitat Management Area Type						
Fluid Mineral (Oil & Gas) Decisions	**Alternative 1**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	872,000	459,000	671,000	0	2,162,000	**4,183,000**
Open Major Stipulations	2,437,000	242,000	1,447,000	0	251,000	**4,379,000**
Open Moderate Stipulations	17,000	1,300,000	0	0	208,000	**1,532,000**
Open Standard Stipulations	1,000	0	0	0	847,000	**848,000**
Total	**3,328,000**	**2,001,000**	**2,117,000**	**0**	**3,468,000**	**10,942,000**

Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 7 by Habitat Management Area Type						
Fluid Mineral (Oil & Gas) Decisions	**Alternative 2**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	872,000	459,000	671,000	0	2,162,000	**4,183,000**
Open Major Stipulations	2,425,000	242,000	1,447,000	0	263,000	**4,379,000**
Open Moderate Stipulations	17,000	1,300,000	0	0	208,000	**1,532,000**
Open Standard Stipulations	0	0	0	0	847,000	**848,000**
Total	**3,316,000**	**2,001,000**	**2,117,000**	**0**	**3,480,000**	**10,942,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 3**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	6,424,000	0	0	0	2,272,000	**8,717,000**
Open Major Stipulations	170,000	0	0	0	395,000	**565,000**
Open Moderate Stipulations	36,000	0	0	0	375,000	**414,000**
Open Standard Stipulations	306,000	0	0	0	776,000	**1,086,000**
Total	**6,936,000**	**0**	**0**	**0**	**3,818,000**	**10,782,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 4**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,066,000	212,000	609,000	0	2,261,000	**4,169,000**
Open Major Stipulations	2,491,000	150,000	1,135,000	0	397,000	**4,175,000**
Open Moderate Stipulations	3,000	1,366,000	5,000	0	375,000	**1,752,000**
Open Standard Stipulations	116,000	0	96,000	0	941,000	**1,154,000**
Total	**3,677,000**	**1,728,000**	**1,845,000**	**0**	**3,974,000**	**11,249,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 5**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,126,000	217,000	527,000	0	2,277,000	**4,148,000**
Open Major Stipulations	2,601,000	153,000	1,274,000	0	398,000	**4,427,000**
Open Moderate Stipulations	2,000	698,000	19,000	0	471,000	**1,190,000**
Open Standard Stipulations	3,000	575,000	3,000	0	829,000	**1,410,000**
Total	**3,732,000**	**1,643,000**	**1,823,000**	**0**	**3,976,000**	**11,175,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 6**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,126,000	217,000	527,000	0	2,277,000	**4,148,000**
Open Major Stipulations	2,602,000	153,000	1,274,000	0	398,000	**4,428,000**
Open Moderate Stipulations	2,000	698,000	19,000	0	471,000	**1,190,000**
Open Standard Stipulations	3,000	575,000	3,000	0	829,000	**1,410,000**
Total	**3,734,000**	**1,643,000**	**1,823,000**	**0**	**3,976,000**	**11,176,000**
Fluid Mineral (Oil & Gas) Decisions	**Proposed RMP Amendment**					
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,126,000	208,000	527,000	0	2,277,000	**4,140,000**
Open Major Stipulations	2,601,000	153,000	1,302,000	0	398,000	**4,454,000**
Open Moderate Stipulations	2,000	1,254,000	19,000	0	471,000	**1,746,000**
Open Standard Stipulations	3,000	0	3,000	0	829,000	**835,000**
Total	**3,732,000**	**1,615,000**	**1,851,000**	**0**	**3,976,000**	**11,175,000**

Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 7					
Fluid Mineral (Oil & Gas) Decisions	**Alternative 1**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Closed	20.85%	10.97%	16.04%	0.00%	51.69%
Open Major Stipulations	55.65%	5.53%	33.04%	0.00%	5.73%
Open Moderate Stipulations	1.11%	84.86%	0.00%	0.00%	13.58%
Open Standard Stipulations	0.12%	0.00%	0.00%	0.00%	99.88%
Total	**30.41%**	**18.29%**	**19.35%**	**0.00%**	**31.69%**

Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 7					
Fluid Mineral (Oil & Gas) Decisions	**Alternative 2**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Closed	20.85%	10.97%	16.04%	0.00%	51.69%
Open Major Stipulations	55.38%	5.53%	33.04%	0.00%	6.01%
Open Moderate Stipulations	1.11%	84.86%	0.00%	0.00%	13.58%
Open Standard Stipulations	0.00%	0.00%	0.00%	0.00%	99.88%
Total	**30.31%**	**18.29%**	**19.35%**	**0.00%**	**31.80%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 3**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Closed	73.70%	0.00%	0.00%	0.00%	26.06%
Open Major Stipulations	30.09%	0.00%	0.00%	0.00%	69.91%
Open Moderate Stipulations	8.70%	0.00%	0.00%	0.00%	90.58%
Open Standard Stipulations	28.18%	0.00%	0.00%	0.00%	71.45%
Total	**64.33%**	**0.00%**	**0.00%**	**0.00%**	**35.41%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 4**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Closed	25.57%	5.09%	14.61%	0.00%	54.23%
Open Major Stipulations	59.66%	3.59%	27.19%	0.00%	9.51%
Open Moderate Stipulations	0.17%	77.97%	0.29%	0.00%	21.40%
Open Standard Stipulations	10.05%	0.00%	8.32%	0.00%	81.54%
Total	**32.69%**	**15.36%**	**16.40%**	**0.00%**	**35.33%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 5**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Closed	27.15%	5.23%	12.70%	0.00%	54.89%
Open Major Stipulations	58.75%	3.46%	28.78%	0.00%	8.99%
Open Moderate Stipulations	0.17%	58.66%	1.60%	0.00%	39.58%
Open Standard Stipulations	0.21%	40.78%	0.21%	0.00%	58.79%
Total	**33.40%**	**14.70%**	**16.31%**	**0.00%**	**35.58%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 6**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Closed	27.15%	5.23%	12.70%	0.00%	54.89%
Open Major Stipulations	58.76%	3.46%	28.77%	0.00%	8.99%
Open Moderate Stipulations	0.17%	58.66%	1.60%	0.00%	39.58%
Open Standard Stipulations	0.21%	40.78%	0.21%	0.00%	58.79%
Total	**33.41%**	**14.70%**	**16.31%**	**0.00%**	**35.58%**
Fluid Mineral (Oil & Gas) Decisions	**Proposed RMP Amendment**				
	PHMA	**GHMA**	**IHMA**	**OHMA**	**Non-HMA**
Closed	27.07%	5.00%	12.67%	0.00%	54.74%
Open Major Stipulations	58.40%	3.44%	29.23%	0.00%	8.94%
Open Moderate Stipulations	0.11%	71.82%	1.09%	0.00%	26.98%
Open Standard Stipulations	0.36%	0.00%	0.36%	0.00%	99.28%
Total	**33.40%**	**14.45%**	**16.56%**	**0.00%**	**35.58%**

14.4.8 HAF Group 8

I. Habitat Management

Table 14-22. Habitat Management Areas within HAF 8

Acres and percentages reflect all lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only.

Approximate Acres of HMA in HAF 8				
Alternative 1				
PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
5,903,000	6,283,000	1,482,000	10,948,000	**24,616,000**
Alternative 2				
PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
5,798,000	5,867,000	1,048,000	11,902,000	**24,515,000**
Alternative 3				
PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
12,125,000	0	0	12,413,000	**24,539,000**
Alternative 4				
PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
6,631,000	4,384,000	1,110,000	12,413,000	**24,539,000**
Alternative 5				
PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
6,478,000	4,169,000	819,000	13,047,000	**24,514,000**
Alternative 6				
PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
6,478,000	4,169,000	819,000	13,047,000	**24,514,000**
Proposed RMP Amendment				
PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
5,554,000	4,129,000	810,000	13,047,000	**23,540,000**

Approximate Percent of HAF 1 that is HMA			
Alternative 1			
PHMA	**GHMA**	**OHMA**	**Non-HMA**
23.98%	25.52%	6.02%	44.48%
Alternative 2			
PHMA	**GHMA**	**OHMA**	**Non-HMA**
23.65%	23.93%	4.27%	48.55%
Alternative 3			
PHMA	**GHMA**	**OHMA**	**Non-HMA**
49.41%	0.00%	0.00%	50.58%
Alternative 4			
PHMA	**GHMA**	**OHMA**	**Non-HMA**
27.02%	17.87%	4.52%	50.58%
Alternative 5			
PHMA	**GHMA**	**OHMA**	**Non-HMA**
26.431%	17.12%	3.34%	53.22%
Alternative 6			
PHMA	**GHMA**	**OHMA**	**Non-HMA**
26.43%	17.12%	3.34%	53.22%
Proposed RMP Amendment			
PHMA	**GHMA**	**OHMA**	**Non-HMA**
23.59%	17.54%	3.44%	55.42%

II. Locatable Minerals

Table 14-23. Locatable Minerals Decisions within HAF 8

Acres and percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. The acres for the locatable minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. For example, for locatable minerals, proposed mineral withdrawals are only proposed and considered for GRSG conservation under Alternative 1 and Alternative 3 in this RMP Amendment. All the other existing and proposed withdrawal acreage that is identified under other alternatives represent proposed or existing withdrawals that are either being proposed in other RMP efforts or existing withdrawals that are already in place. The information is provided for context and to facilitate the analysis of effects.

Approximate Acres of Locatable Minerals Decisions in HAF 8 by Habitat Management Area Type					
Locatable Minerals	**Alternative 1**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	612,000	329,000	64,000	375,000	**1,380,000**
Recommended Withdrawals	127,000	4,000	0	0	**132,000**
Open	3,713,000	3,797,000	409,000	2,283,000	**10,210,000**
Total	**4,452,000**	**4,130,000**	**472,000**	**2,659,000**	**11,721,000**
Locatable Minerals	**Alternative 2**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	589,000	352,000	64,000	376,000	**1,380,000**
Recommended Withdrawals	12,000	4,000	0	0	**16,000**
Open	3,800,000	3,790,000	414,000	2,300,000	**10,304,000**
Total	**4,400,000**	**4,146,000**	**477,000**	**2,675,000**	**11,700,000**
Locatable Minerals	**Alternative 3**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	858,000	0	0	440,000	**1,298,000**
Recommended Withdrawals	7,726,000	0	0	28,000	**7,755,000**
Open	18,000	0	0	2,673,000	**2,691,000**
Total	**8,601,000**	**0**	**0**	**3,141,000**	**11,744,000**
Locatable Minerals	**Alternative 4**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	651,000	154,000	54,000	440,000	**1,298,000**
Recommended Withdrawals	12,000	4,000	0	0	**16,000**
Open	4,378,000	2,873,000	476,000	2,701,000	**10,428,000**
Total	**5,041,000**	**3,030,000**	**530,000**	**3,141,000**	**11,742,000**
Locatable Minerals	**Alternative 5**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	650,000	122,000	52,000	473,000	**1,297,000**
Recommended Withdrawals	12,000	3,000	0	2,000	**16,000**
Open	4,298,000	2,784,000	386,000	2,925,000	**10,394,000**
Total	**4,961,000**	**2,910,000**	**438,000**	**3,399,000**	**11,707,000**
Locatable Minerals	**Alternative 6**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	650,000	122,000	52,000	473,000	**1,297,000**
Recommended Withdrawals	12,000	3,000	0	2,000	**16,000**
Open	4,298,000	2,784,000	386,000	2,925,000	**10,394,000**
Total	**4,961,000**	**2,910,000**	**438,000**	**3,399,000**	**11,707,000**

Approximate Acres of Locatable Minerals Decisions in HAF 8 by Habitat Management Area Type					
Locatable Minerals	**Proposed RMP Amendment**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Existing Withdrawals	650,000	122,000	52,000	473,000	**1,297,000**
Recommended Withdrawals	12,000	3,000	0	2,000	**16,000**
Open	4,348,000	2,744,000	376,000	2,925,000	**10,394,000**
Total	**5,010,000**	**2,870,000**	**428,000**	**3,399,000**	**11,707,000**

Approximate % of Habitat Management Area by Locatable Minerals Decisions[2] within Habitat in HAF 8				
Locatable Minerals	**Alternative 1**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	44.35%	23.84%	4.64%	27.17%
Recommended Withdrawals	96.21%	3.03%	0.00%	0.00%
Open	36.37%	37.19%	4.01%	22.36%
Total	**37.98%**	**35.24%**	**4.03%**	**22.69%**
Locatable Minerals	**Alternative 2**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	42.68%	25.51%	4.64%	27.25%
Recommended Withdrawals	75.00%	25.00%	0.00%	0.00%
Open	36.88%	36.78%	4.02%	22.32%
Total	**37.61%**	**35.44%**	**4.08%**	**22.86%**
Locatable Minerals	**Alternative 3**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	66.10%	0.00%	0.00%	33.90%
Recommended Withdrawals	99.63%	0.00%	0.00%	0.36%
Open	0.67%	0.00%	0.00%	99.33%
Total	**73.24%**	**0.00%**	**0.00%**	**26.75%**
Locatable Minerals	**Alternative 4**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	50.15%	11.86%	4.16%	33.90%
Recommended Withdrawals	75.00%	25.00%	0.00%	0.00%
Open	41.98%	27.55%	4.56%	25.90%
Total	**42.93%**	**25.80%**	**4.51%**	**26.75%**
Locatable Minerals	**Alternative 5**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	50.12%	9.41%	4.01%	36.47%
Recommended Withdrawals	75.00%	18.75%	0.00%	12.50%
Open	41.35%	26.78%	3.71%	28.14%
Total	**42.38%**	**24.86%**	**3.74%**	**29.03%**
Locatable Minerals	**Alternative 6**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	50.12%	9.41%	4.01%	36.47%
Recommended Withdrawals	75.00%	18.75%	0.00%	12.50%
Open	41.35%	26.78%	3.71%	28.14%
Total	**42.38%**	**24.86%**	**3.74%**	**29.03%**
Locatable Minerals	**Proposed RMP Amendment**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Existing Withdrawals	50.12%	9.41%	4.01%	36.47%
Recommended Withdrawals	75.00%	18.75%	0.00%	12.50%
Open	41.83%	26.40%	3.62%	28.14%
Total	**42.79%**	**24.52%**	**3.66%**	**29.03%**

III. Fluid Minerals (Oil & Gas)

Table 14-24. Fluid Mineral (Oil & Gas) Decisions within HAF 8

Percentages reflect BLM managed lands. Percentages may not total to 100% due to rounding. All figures and tables are intended for Habitat Assessment Framework summary purposes only. These acres for fluid minerals represent a combination of existing allocations in existing Resource Management Plans (RMPs) and allocations identified under the alternatives in this RMP Amendment. The information is provided for context and to facilitate the analysis of effects. It is important to note that just because an area is open to leasing does not mean that it will be developed. Any development must be in conformance with the stipulations which may preclude development in some areas. The stipulation information has been considered in context with mineral potential, and drilling and economic trends to develop the Reasonably Foreseeable Development Scenario (see **Appendix 12**) which estimates the amount of development anticipated across all land ownerships for each alternative.

Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 8 by Habitat Management Area Type					
Fluid Mineral (Oil & Gas) Decisions	**Alternative 1**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,395,000	750,000	144,000	660,000	**2,951,000**
Open Major Stipulations	3,065,000	332,000	0	143,000	**3,540,000**
Open Moderate Stipulations	0	3,049,000	0	324,000	**3,375,000**
Open Standard Stipulations	0	0	330,000	1,723,000	**2,057,000**
Total	**4,460,000**	**4,131,000**	**474,000**	**2,850,000**	**11,924,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 2**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,370,000	774,000	139,000	663,000	**2,946,000**
Open NSO	3,056,000	360,000	0	143,000	**3,560,000**
Open CSU/TL	0	3,016,000	0	324,000	**3,341,000**
Open Standard Stipulations	0	0	340,000	1,737,000	**2,077,000**
Total	**4,427,000**	**4,150,000**	**479,000**	**2,867,000**	**11,923,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 3**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	9,481,000	0	0	709,000	**10,192,000**
Open Major Stipulations	0	0	0	98,000	**98,000**
Open Moderate Stipulations	0	0	0	357,000	**357,000**
Open Standard Stipulations	8,000	0	0	2,108,000	**2,117,000**
Total	9,489,000	**0**	**0**	**3,272,000**	**12,764,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 4**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,748,000	391,000	98,000	709,000	**2,946,000**
Open Major Stipulations	3,302,000	0	0	98,000	**3,401,000**
Open Moderate Stipulations	0	2,671,000	0	357,000	**3,028,000**
Open Standard Stipulations	5,000	3,000	433,000	2,128,000	**2,569,000**
Total	**5,055,000**	**3,065,000**	**531,000**	**3,292,000**	**11,944,000**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 5**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,738,000	397,000	92,000	720,000	**2,946,000**
Open Major Stipulations	3,238,000	0	0	98,000	**3,336,000**
Open Moderate Stipulations	0	2,567,000	0	493,000	**3,060,000**
Open Standard Stipulations	3,000	1,000	348,000	2,246,000	**2,598,000**
Total	**4,978,000**	**2,964,000**	**440,000**	**3,556,000**	**11,939,000**

Approximate Acres of Fluid Minerals (Oil & Gas) Decisions in HAF 8 by Habitat Management Area Type					
Fluid Mineral (Oil & Gas) Decisions	**Alternative 6**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,738,000	397,000	92,000	720,000	**2,946,000**
Open Major Stipulations	3,238,000	0	0	98,000	**3,336,000**
Open Moderate Stipulations	0	2,567,000	0	493,000	**3,060,000**
Open Standard Stipulations	3,000	1,000	348,000	2,246,000	**2,598,000**
Total	**4,978,000**	**2,964,000**	**440,000**	**3,556,000**	**11,939,000**
Fluid Mineral (Oil & Gas) Decisions	**Proposed RMP Amendment**				
	PHMA	**GHMA**	**OHMA**	**Non-HMA**	**Total**
Closed	1,953,000	331,000	0	250,000	**2,533,000**
Open Major Stipulations	3,066,000	0	0	98,000	**3,163,000**
Open Moderate Stipulations	0	2,592,000	0	493,000	**3,085,000**
Open Standard Stipulations	3,000	1,000	430,000	2,246,000	**2,680,000**
Total	**5,022,000**	**2,923,000**	**430,000**	**3,087,000**	**11,462,000**

Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 8				
Fluid Mineral (Oil & Gas) Decisions	**Alternative 1**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Closed	47.27%	25.42%	4.88%	22.37%
Open Major Stipulations	86.58%	9.38%	0.00%	4.04%
Open Moderate Stipulations	0.00%	90.34%	0.00%	9.60%
Open Standard Stipulations	0.00%	0.00%	16.04%	83.76%
Total	**37.40%**	**34.64%**	**3.98%**	**23.90%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 2**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Closed	46.50%	26.27%	4.72%	22.51%
Open Major Stipulations	85.84%	10.11%	0.00%	4.02%
Open Moderate Stipulations	0.00%	90.27%	0.00%	9.70%
Open Standard Stipulations	0.00%	0.00%	16.37%	83.63%
Total	**37.13%**	**34.81%**	**4.02%**	**24.05%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 3**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Closed	93.02%	0.00%	0.00%	6.96%
Open Major Stipulations	0.00%	0.00%	0.00%	100.00%
Open Moderate Stipulations	0.00%	0.00%	0.00%	100.00%
Open Standard Stipulations	0.38%	0.00%	0.00%	99.57%
Total	**74.34%**	**0.00%**	**0.00%**	**25.63%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 4**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Closed	59.33%	13.27%	3.33%	24.07%
Open Major Stipulations	97.09%	0.00%	0.00%	2.88%
Open Moderate Stipulations	0.00%	88.21%	0.00%	11.79%
Open Standard Stipulations	0.19%	0.12%	16.85%	82.83%
Total	**42.32%**	**25.66%**	**4.45%**	**27.56%**
Fluid Mineral (Oil & Gas) Decisions	**Alternative 5**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Closed	59.00%	13.48%	3.12%	24.44%
Open Major Stipulations	97.06%	0.00%	0.00%	2.94%
Open Moderate Stipulations	0.00%	83.89%	0.00%	16.11%
Open Standard Stipulations	0.12%	0.04%	13.39%	86.45%
Total	**41.70%**	**24.83%**	**3.69%**	**29.78%**

Approximate % of Habitat Management Area by Fluid Mineral (Oil & Gas) Decision in HAF 8				
Fluid Mineral (Oil & Gas) Decisions	**Alternative 6**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Closed	59.00%	13.48%	3.12%	24.44%
Open Major Stipulations	97.06%	0.00%	0.00%	2.94%
Open Moderate Stipulations	0.00%	83.89%	0.00%	16.11%
Open Standard Stipulations	0.12%	0.04%	13.39%	86.45%
Total	**41.70%**	**24.83%**	**3.69%**	**29.78%**
Fluid Mineral (Oil & Gas) Decisions	**Proposed RMP Amendment**			
	PHMA	**GHMA**	**OHMA**	**Non-HMA**
Closed	77.10%	13.07%	0.00%	9.87%
Open Major Stipulations	96.93%	0.00%	0.00%	3.10%
Open Moderate Stipulations	0.00%	84.02%	0.00%	15.98%
Open Standard Stipulations	0.11%	0.04%	16.04%	83.81%
Total	**43.81%**	**25.50%**	**3.75%**	**26.93%**

14.5 PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS

Beyond the state and local plans, there are other actions that have occurred in GRSG habitat in the past, are currently taking place or being considered, and activities which may be reasonably foreseeable. **Table 14-25** represents many of these actions across the entire range for GRSG, which are separated by state.

As noted in section 14.1, those actions that are at a similar level of decision-making to this RMPA are most likely to have a cumulative impact with the actions considered in the alternatives. Most prominently, this includes U.S. Forest Service GRSG plan amendments from 2015, as well as any other changes to those plans currently being considered. Other efforts with similar levels of decisions include other BLM planning efforts that affect similar geographic areas or land uses as what is being considered in this RMPA effort.

Additionally, BLM Colorado has developed the Fluid Mineral Specialist Report on Concurrent Land Use Planning Efforts in Colorado (BLM 2024b) to support the cumulative impacts analysis for several concurrent land use planning efforts in Colorado. The report provides an overview of how the land use planning decision areas overlap across the BLM administrative units (field offices) and where fluid mineral resources may be available as a result of all planning efforts. The report provides a geospatial analysis of fluid mineral topics and a discussion on potential impacts to air quality and greenhouse gas emissions, socioeconomic impacts, and communities that are most likely to be impacted by the concurrent and overlapping land use plans. That report is incorporated by reference here.

In addition to the various planning efforts, there are a variety of actions being considered within the planning area. There are also a wide variety of actions the BLM considered during implementation of the RMPs. The intent of **Table 14-25** and the related cumulative impacts analyses is not to analyze every potential future land use in GRSG habitat. Each action conducted on public lands must go through its own analysis, including consideration of the direct, indirect, and cumulative effects associated with that project. As the level of decision-making gets more specific, the level of analysis correspondingly gets more specific, as the level of uncertainty or speculation is reduced.

It is also critical to note that all actions authorized on public lands must document conformance with RMP goals, objectives, and decisions. Any project identified below that occurs on public lands – or any other action that may occur that is not noted in the table – must align with the direction in the current land use plans (if authorized before completion of this effort), or with the direction associated with whatever decision comes from this effort (if authorized after a decision is made in this effort). Additionally, any proposed action

that includes state or county permits must also be in conformance with those plans. As such, the intent of **Table 14-25** and the corresponding analyses is not to present or analyze every potential project that may occur, or even all those listed in the table, as some of those projects would not be in conformance with some of the alternatives being considered. The effect of the management of the alternatives and their impacts direct, indirect, and cumulative on GRSG and its habitat, the various land uses, and corresponding effects to socioeconomics are described in **Chapter 4**.

Table 14-25. Past, Present, and Reasonably Foreseeable Actions

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
Multi-State				
Lands and Realty	California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Wyoming	West-wide energy corridors (Section 368 energy corridors)	In accordance with Section 368(a) of the Energy Policy Act of 2005, the BLM designated 5,000 miles of energy corridors for potential placement of future oil, natural gas and hydrogen pipelines, and electricity transmission and distribution infrastructure. The BLM is currently conducting an amendment effort that is considering adjustments to some of the corridors.	Ongoing and Proposed changes to some corridors
Lands and Realty	California, Colorado, Idaho, Montana, Nevada, Oregon, Utah, Wyoming	Solar Programmatic EIS	The BLM is considering updates to its 2012 Western Solar Plan and is considering expanding its solar planning to include five additional states: Idaho, Montana, Oregon, Washington, and Wyoming	Ongoing
Multiple	All (except Dakotas and Washington)	21 Restoration Landscapes	Work in Restoration Landscapes will coordinate and sequence different types of investments and treatments from across the BLM – including fuels, rangelands, wildlife, forestry, aquatics and recreation.	Proposed
Locatable Minerals	California, Idaho, Montana, Nevada, Oregon, Utah, Wyoming	SFA Withdrawal Project	The BLM is considering withdrawal from location and entry under the Mining Act of 1872 for Sagebrush Focal Areas (SFAs) from the 2015 GRSG plans. This EIS is providing the additional and more specific analyses prior to a final decision of whether to withdraw some, none, or all of the SFAs.	Proposed
Lands and Realty	Idaho, Wyoming	Gateway West 230/500 Transmission Line Project	Rocky Mountain Power and Idaho Power to build and operate approximately 1,000 miles of new high-voltage transmission lines. Project has been authorized and is being implemented, with construction underway and ongoing, moving east to west	Ongoing
Vegetation	All	Vegetation Treatments Using Herbicides	The BLM approved an addition to its list of approved herbicides, 7 active ingredients including Indaziflam, Aminocyclopyrachlor, Clethodym, and Flumioxazin, among others.	Ongoing

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
Lands and Realty	Montana, North Dakota, Wyoming, Utah, Colorado, Nebraska, Arizona	Sentinel (Ground Based Strategic Deterrent (GBSD)) Program Deployment and Minuteman III Decommissioning and Disposal	The Department of the Air Force (DAF) issued a Record of Decision (ROD) in May 2023 to document its decision to implement actions to deploy the Sentinel (formerly known as the Ground Based Strategic Deterrent [GBSD]) intercontinental ballistic missile (ICBM) system and to decommission and dispose of the Minuteman III (MMIII) ICBM system. The ROD includes establishing approximately 3,126 miles of new utility corridors throughout the F.E. Warren AFB, Malmstrom AFB, and Minot AFB missile fields in Colorado, Nebraska, North Dakota, Montana, and Wyoming, for which the government would acquire the necessary property easements/ROWs. The new corridors would supplement the existing utility connections. Sentinel maintenance, training, storage, testing and support actions will occur also at Hill AFB, Utah; Utah Test and Training Range, Utah; Camp Guernsey, Wyoming; and Camp Navajo, Arizona.	Proposed
Lands and Realty	Wyoming, Colorado, Utah	Energy Gateway South Transmission Line	650-mile 500 kV transmission line. Begins in south central Wyoming, crosses Utah diagonally from northeast to southwest, and ends in Mona, Utah. Includes GRSG mitigation.	Ongoing
Lands and Realty	Wyoming, Colorado, Utah, Nevada	TransWest Express	725-mile 600 kV transmission line. Begins in south-central Wyoming, crosses Utah diagonally from northeast to southwest, and ends south of Las Vegas	Ongoing
Lands and Realty	Idaho, Oregon	Boardman to Hemingway Project	The Boardman to Hemingway Transmission Line Project is a 500 kilovolt (kV) transmission line, beginning at a substation near Boardman, Oregon, and extending south and east to the existing Hemingway Substation near Melba, Idaho, a distance of approximately 300 miles. The transmission line will provide additional electrical capacity between the Pacific Northwest region and the Intermountain region of southwestern Idaho.	Ongoing
Vegetation	Idaho, Oregon, Nevada, northeastern California, Utah, and eastern Washington	Programmatic EIS for Fuel Breaks in the Great Basin	This programmatic environmental impact statement (PEIS) evaluates creating and maintaining a system of fuel breaks in the Great Basin region. The project area, covering nearly 224 million acres, includes portions of California, Idaho, Nevada, Oregon, Utah, and Washington. The fuel breaks would be placed along a subset of available linear features, such as roads and rights-of-way (ROWs) on Bureau of Land Management (BLM)-administered lands within sagebrush communities; these potential treatment areas cover approximately 38 million acres within the project area boundary.	Ongoing

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
Vegetation	Idaho, Oregon, Nevada, northeastern California, Utah, and eastern Washington	Programmatic EIS for Fuels Reduction and Rangeland Restoration in the Great Basin	This landscape scale Programmatic Environmental Impact Statements (EIS) to analyzes potential effects of reducing fuel loading and restoring rangeland productivity within the Great Basin Region (Idaho, Oregon, Nevada, northern California, Utah, and eastern Washington) in order to protect and conserve the sagebrush-steppe ecosystem from loss as a result of wildfires.	Ongoing
Lands and Realty	Nevada, Utah	Cross-Tie kV Transmission Project	The Project proposed by TransCanyon, LLC (TransCanyon) includes a 214-mile, single-circuit, 1,500-megawatt, 500-kilovolt (kV), high voltage alternating current (HVAC) overhead transmission line that would be located on BLM-managed public land, USDA Forest Service National Forest System Land, state land, and private land in Beaver, Juab, and Millard Counties, Utah; and White Pine County, Nevada. The proposed route would cross a total of 137 miles in Utah and 77 miles in Nevada. Approximately 165 miles, or 77 percent, of the proposed route would be on BLM-managed public land, approximately 9 miles (4 percent) on National Forest System Land, approximately 11 miles (5 percent) on state land, and the remaining approximately 29 miles (14 percent) on privately owned land. TransCanyon would obtain these land rights through ROW grants from the BLM, a SUP from the USDA Forest Service, and easements or fee purchases for non-Federal lands.	Proposed
Lands and Realty	Idaho, Nevada, Utah	Southwest Intertie Project (SWIP)	LS Power Company proposes to construct and operate a 500kV transmission line from their Midpoint Substation near Shoshone, Idaho to a new proposed substation in the Dry Lake Valley northeast of Las Vegas, Nevada. A crosstie route would also be constructed from the Ely, Nevada area to a point near Delta, Utah. New substations would be required near Ely, Las Vegas, and Delta, and a series of compensation stations would be needed midway between the Midpoint Substation and Ely, Nevada, and between Ely and Dry Lake. New microwave facilities would be required on the route from Midpoint to Dry Lake.	Ongoing
Wildfires and Fuels Management	Idaho, Oregon	Tri-state Fuel Breaks Project	The Tri-state Fuel Breaks Project includes a system of roadside fuel breaks (987 miles; approx. 435 miles in Idaho and 550 miles in Oregon) that reduce fuel loading along established roads to improve suppression coordination and response across a 3.6-million-acre project area spanning the southeastern corner of Oregon and southwestern corner of Idaho and connect to existing fuel breaks within northern Nevada.	Ongoing

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
Northwest Colorado				
Federal Resource Management / Land Use Plans	Colorado	Big Game RMP Amendment	The BLM will consider whether to incorporate new or changed oil and gas management decisions in existing land use plans, such as limits on high-density development, including facility and route density limitations, and other lease stipulations that would incorporate conservation measures for important big game habitat areas in Colorado.	Ongoing
Federal Resource Management / Land Use Plans	Colorado	Gunnison Sage-Grouse RMP Amendment	The BLM is preparing an Environmental Impact Statement to determine whether to amend the land use plans of BLM field offices, national monuments, and national conservation areas containing occupied and unoccupied habitat for the threatened Gunnison sage-grouse (*Centrocercus minimus*) as identified by the U.S. Fish and Wildlife Service in the 2020 Final Recovery Plan.	Ongoing
Federal Resource Management / Land Use Plans	Colorado	Colorado River Valley Field Office and Grand Junction Field Office Supplemental EIS	The purpose of this supplemental EIS is to broaden the range of alternatives in the 2015 CRVFO and GJFO Approved RMPs with respect to the lands that are allocated as open or closed for oil and gas leasing. The purpose is also to provide additional air quality analysis for the fluid mineral management alternatives considered in the 2014 CRVFO Final EIS and the 2015 GJFO Final EIS and in this supplemental EIS.	Ongoing
Lands and Realty	Colorado	Blue Valley Land Exchange	Proposed exchange of 1,652 acres of federal lands in the Kremmling Field Office for 2,005 acres of nonfederal lands in Grand and Summit Counties, Colorado. A Notice of Decision approving the Blue Valley Land Exchange was issued in January 2023, followed by a 45-day protest period. KFO is in the process of protest response.	Ongoing
Lands and Realty	Colorado	Wolf Creek Reservoir EIS/ RMP Amendment	Rio Blanco Water Conservancy District (RBWCD) filed an application for a right-of-way (ROW) for "White River Regional Water Supply Project" and specifically for the Wolf Creek Reservoir. RBWCD obtained a conditional water right decree for 66,720 acre-feet for use in a proposed reservoir location. The majority of the project would occur on public land managed by the BLM. Other affected property includes the Middle Wolf Creek State Trust Land parcel and a private parcel owned by RBWCD.	Proposed
Lands and Realty	Colorado	Axial Basin Solar Development	Private land within LSFO. Axial Basin Solar LLC, a subsidiary of juwi, inc., is developing the Axial Basin Solar Project in Moffat County, Colorado. The utility-scale solar development is expected to be sited on 3,500 acres of private land.	Proposed

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
Lands and Realty	Colorado	Big Cat Solar Development	Big Cat Solar LLC a subsidiary of Apex Clean Energy Holdings LLC is proposing a 200MWac solar photovoltaic generation facility for up to 200 MW of battery energy storage and ancillary facilities on approximately 2,793 acres of public lands in the Grand Junction Field Office. The project would include a project substation and a line tap to the existing 230 kV generation interconnection transmission line running through the project area.	Proposed
Lands and Realty	Colorado	Book Cliffs Solar Development	Book Cliffs Solar Farm LLC a subsidiary of Scout Clean Energy LLC is proposing a 210 MW solar photovoltaic generation facility for up to 210 MW of photovoltaic module arrays, collection system, a control house and a collector substation on approximately 2,621 acres of public land in the Grand Junction Field Office. The project would utilize the existing 230 kV generation transmission line running through the project area.	Proposed
Lands and Realty	Colorado	Nannie Blaine Solar PV Park (State of Colorado land)	SolarGen is proposing the Nannie Blaine Solar PV Park which is a 48 MW photovoltaic array on 151 acres of State of Colorado lands located north of I-70 and just east of the Grand Junction Motor Speedway.	Proposed
Lands and Realty	Colorado	Xcel 6670 Rebuild	Xcel is proposing a rebuild of the 6670 Rifle-Ute to DeBeque 69 kilovolt (kV) Transmission Line (6670 transmission line) located in Mesa and Garfield Counties, Colorado. Transmission line 6670 is planned to continue to be operated at 69 kV but will be designed to accommodate 115 kV for future needs. The existing 30 to 50-foot-wide permanent right-of-way (ROW) would be widened to 75 feet to accommodate design upgrades.	Proposed
Wild Horse and Burro	Colorado	Piceance-East Douglas Herd Management Area Horse Gather (2024)	The White River Field Office plans to conduct a gather in the Piceance-East Douglas Herd Area in 2024. The Appropriate Management Level (AML) for the HMA is between 135-235 horses.	Proposed
Wild Horse and Burro	Colorado	Little Book Cliffs Herd Management Area Horse Gather (2024)	The Grand Junction Field Office plans to conduct a gather in the Little Book Cliffs Herd Management Area in 2024. The Appropriate Management Level (AML) for the HMA is between 90-150 wild horses. The last gather in the Little Book Cliffs occurred in 2018, during which 96 horses were gathered and 41 were returned to the range.	Proposed
Wildfires and Fuels Management	Colorado	GRSG habitat burned 2018-2022	A total of 66,647 acres of GRSG habitat in CO burned between 2018 and 2022. Of those, 26,412 acres were on BLM land.	Past
Wildfires and Fuels Management	Colorado	Northwest Colorado Programmatic Vegetation Treatment Environmental Assessment (2017)	The plan takes a programmatic approach to vegetation treatments and installation of erosion/stabilization structures to work towards the vegetation management goals of the GJFO, KFO, WRFO, CRVFO, and LSFO RMPs to promote healthy, productive, and diverse vegetation communities.	Past

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
Wildfires and Fuels Management	Colorado	Conducting Mechanical Vegetation Treatments During Drought Conditions (2020)	This plan analyzed the consequences of conducting mechanical vegetation treatments during drought conditions in GJFO, KFO, WRFO, CRVFO, and LSFO.	Past
Vegetation and GRSG Habitat Management	Colorado	Conducting Mechanical Vegetation Treatments During Drought Conditions (2021)	This plan analyzed the consequences of conducting mechanical vegetation treatments during drought conditions in GJFO, KFO, WRFO, CRVFO, and LSFO.	Past
Vegetation and GRSG Habitat Management	Colorado	Programmatic Environmental Assessment for Vegetation Treatments and Installation of Stabilization/Erosion Control Structures in Northwest Colorado (2017)	This programmatic EA evaluated vegetation treatments and erosion control structures in the WRFO, KFO, LSFO, CRVFO, and GJFO.	Past
Recreation	Colorado	South Sand Wash Open OHV Area Recreation Area Management Plan	The BLM is working with Craig Chamber of Commerce to develop a recreation management plan for the Sand Wash Basin Special Recreation Management Area. The plan will identify the types and locations of improvements needed to provide for OHV recreation opportunities within the SRMA.	Ongoing
Idaho				
Energy and Mining	Idaho	Husky 1 North Dry Ridge Phosphate Mine	The Husky 1 North Dry Ridge Phosphate Mine is an approximately 1,146-acre open pit phosphate mine in Caribou County, Idaho. The mine occurs on lands managed by the National Forest Service, Caribou-Targhee National Forest. Mining operations will occur over an estimated 13 years and total project duration with reclamation is 15 years.	Ongoing
Energy and Mining	Idaho	Caldwell Canyon Mine	The Caldwell Canyon Mine is an approximately 1,530-acre proposed open pit phosphate mine in Caribou County, Idaho. Mine facilities (ore stockpile, tipple, water management infrastructure, offices) would be located in the previously inactive Dry Valley Mine (East Caldwell Area) in Dry Valley. Mining operations would be conducted over an estimated 40-year period using a pit panel mining method.	Ongoing
Energy and Mining	Idaho	Rasmussen Valley Mine	The Rasmussen Valley Mine is an approximately 540-acre open pit phosphate mine in Caribou County, Idaho. The life of mining activities is 5 years and total project duration with reclamation is 7 years.	Ongoing
Energy and Mining	Idaho	East Smoky Panel Mine Project	The East Smoky Panel Mine is an approximately 850-acre open pit phosphate mine in Caribou County, Idaho. The life of mining activities is up to 12 years and total project duration with reclamation approximately 15 years.	Ongoing

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
Energy and Mining	Idaho	Dairy Syncline Mine Project	The Dairy Syncline Mine is an approximately 2,830-acres open pit phosphate mine in Caribou County, Idaho. The life of the mining activities is approximately 30 years.	Ongoing
Energy and Mining	Idaho	Smoky Canyon Mine Panels F and G Lease and Mine Modification Project	The existing Smoky Canyon Mine, located in Caribou County, Idaho, was authorized in 1982. Mining operations began in Panel A in 1984 and have continued ever since using standard open pit techniques in seven mine panels (Panels A-G). Mining operations are complete in Panels A, C, D, and E, and mining activities associated with Panel F and G were initiated in 2008 and are ongoing. Lease and mine modifications for Panels F and G mining and reclamation were approved in a 2015 Record of Decision.	Ongoing
Lands and Realty	Idaho	Lava Ridge Wind Project	The proposed Lava Ridge Wind Project could consist of up to 400 wind turbines and associated infrastructure, with an estimated generation capacity of 1,000 megawatts or more. The project area spans 197,474 acres and all project components would be sited within a series of approximately one-half mile wide corridors (approx. 84,385 acres). The project infrastructure proposed within the corridors is estimated to have a 2,374-acre footprint and a total disturbance area of 9,114 acres.	Proposed
Vegetation and GRSG Habitat Management	Idaho	Bruneau-Owyhee Sage-Grouse Habitat Project	The BLM is removing encroaching Western juniper to improve and maintain sagebrush-steppe habitat on about 726,000 acres within a 1.67 million-acre area of Owyhee County.	Ongoing
Lands and Realty	Idaho	Pending renewable energy development ROWs	There are 13 renewable energy development ROW applications (11 solar, 2 wind) and 2 renewable energy testing ROW applications (1 solar, 1 wind) pending review and analysis.	Proposed
Land Use Plan	Idaho	Four Rivers Field Office Resource Management Plan	The Four Rivers Field Office Resource Management Plan provides guidelines and objectives for renewable energy development, fish and wildlife habitat, outdoor recreation, livestock management, and other uses across approximately 783,000 acres of public lands and more than 1.17 million acres of Federal mineral estate in southwest Idaho.	Ongoing
Nevada and Northeast California				
Energy and Mining	Eureka County, Nevada	Gibellini Vanadium Project	The Project consists of construction and operation of an open pit mine, rock disposal area, crushing facilities and stockpile, heap leach pad, process facility, process and make-up water ponds, borrow areas, mine and access roads, water and power supply lines, ancillary facilities, and continued exploration activities on public lands within the Project area in Eureka County, Nevada. The mine life consists of 1.5 years of construction, 7 years of operation, 4 years of active reclamation and closure, and up to 30 years of post-closure monitoring.	Ongoing

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
Energy and Mining	Lander and Eureka Counties, Nevada	Goldrush Mine Project	The Goldrush Mine Plan of Operations boundary encompasses approximately 19,895 acres, of which 772 acres are on private land controlled by NGM and 19,123 acres of public lands administered by the BLM Mount Lewis Field Office and BLM Elko District, Tuscarora Field Office. The Goldrush Mine includes approximately 1,717.4 acres of new proposed disturbance and approximately 1,036.8 acres of existing/authorized and reclassified disturbance, for a total disturbance of approximately 2,754.2 acres. The underground mining and surface support activities for the Goldrush Mine include a materials handling system for transporting ore and waste rock from the underground workings to the surface and transporting aggregate and supplies to the underground workings and surface backfill plant; a dewatering system (including wells, pipelines, and pipeline corridors); a water treatment plant (WTP); rapid infiltration basins (RIBs); a multi-use shop; contact water pipeline; ventilation raises; a backfill aggregate paste plant and crusher; a shotcrete/cemented rock fill (CRF) plant; two new power lines (a 120-kilovolt (kV) power line with two switching stations, and a 13.8-kilovolt (kV) power line); new ancillary surface facilities (including bulk material storage, access roads, power supply, stormwater controls, laydown and parking areas, lighting, growth media stockpiles, dewatering and monitoring wells, gravel pit expansion, potable water and septic systems, dry facilities (i.e., change rooms), service boreholes for electrical and fuel delivery, fire suppression system, water truck refill stations, emergency helipads, fencing, and modular information technology (IT) and communications buildings); dual use of existing facilities within the nearby Cortez Mine Plan boundary; and continued surface and underground exploration activities. The Goldrush Mine would operate 24 hours per day, 365 days per year for approximately 24 years.	Ongoing
Energy and Mining	Washoe County, Nevada	Hog Ranch Mineral Exploration Project	The Hog Ranch Mineral Exploration Project is an expansion of current mineral exploration activities at the former Hog Ranch Mine in Northern Washoe County, Nevada. The approved mineral exploration on 200 acres of public land includes construction of drill pads, new access roads, and staging areas in support of exploratory drilling,	Ongoing

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
Energy and Mining	Elko County, Nevada	South Railroad Valley Gold Mine	The Project is an open-pit gold mine operation that will include the following major components: • Four open pits; • Three waste rock disposal facilities (WRDFs); • Ore crushing and conveying system; • Lime and cement silos and ore agglomeration facility; • Ore stockpiles; • Clay stockpile; • Growth media stockpiles; • On-Site Power Plant and Sub-Station; • A limestone quarry area; • A heap leach facility (HLF) with solution channels, associated process solution tanks, and ponds; • Water Supply and Dewatering System; • Stormwater diversion ditches and stormwater sediment basins; • Water Treatment Plant Processing facilities comprised of pumps and pipelines, adsorption desorption and recovery (ADR) plant, refinery, and an assay laboratory; • Access and haul roads; • Ancillary facilities that include the following: ready line; maintenance area; reagent and fuel storage; storage and laydown yards; explosive magazines; meteorological station; warehouse; truck maintenance shop; truck wash; offices, warehouse and workshop, change/lunch facilities; administration/security building; and solid and hazardous waste management facilities; • Exploration in the vicinity of the open pits to better define and expand the ore body; and • Reclamation and closure, including the development of evapotranspiration (ET) cells. GSV proposes to mine approximately 52.1 million tons of heap leach ore and 159 million tons of waste rock (for a maximum total of 211 million tons of material). The material (both ore and waste) will be extracted from the open pits using conventional open pit mining methods of drilling, blasting, loading, and hauling. In addition to the construction of operating facilities, proposed exploration activities within the Project Area are estimated to disturb up to 150 acres.	Proposed
Energy and Mining	White Pine County, Nevada	Bald Mountain Mine, Juniper Expansion Project	The Juniper Project would modify and expand operations on BLM-administered lands within the North Operations Area (NOA) of the existing Bald Mountain Mine, resulting in approximately 3,969 acres of new surface disturbance and extension of the NOA mine life by 11 years.	Proposed
Energy and Mining	Lander and Eureka, Counties, Nevada	Ormat Crescent Valley Geothermal Development Project	The proposed Crescent Valley Geothermal Project considers the construction, operation, maintenance and eventual reclamation of a geothermal energy production facility and associated transmission line totaling approximately 2,040 acres on public and privately leased lands. The transmission line would support an approximate 30-megawatt net rated geothermal power generating facility, operated by Ormat Nevada, Inc.	Proposed

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
Energy and Mining	Elko County, Nevada	Long Canyon Mine Project	The Project will be located in the Pequop Mountains and Goshute Valley, in Elko County, Nevada, approximately 75 miles east of Elko, Nevada. The Project will be an open-pit gold mine.	Proposed
Lands and Realty	Washoe, Lyon, Storey, Churchill, Mineral, Nye, Esmeralda, and Clark Counties, Nevada	Reno to Las Vegas Fiber Optic Project	The proposed buried fiber optic project would be located within existing highway rights-of-way that predominantly follow U.S. Highways 50 and 95; Nevada State Highways 160, 839, and 439; and County-maintained roads from Reno to Las Vegas.	Proposed
Energy and Mining	White Pine County, Nevada	White Pine Pumped Storage Hydroelectric Power Project	A 1,000 megawatt energy storage project under development in White Pine County, Nevada. The project facilities include two reservoirs, underground generation equipment, and a new transmission line. One of the reservoirs will be in the Duck Creek Range, and the other in the Steptoe Valley near Highway 93. Energy for pumping, and power generated by the project, will be delivered through a new 25-mile-long transmission line connecting the project with the Robinson Summit Substation. The remainder of the facilities will consist of access roads to the reservoirs, a transmission switch-station, and the entrance to the access tunnels.	Proposed
Lands and Realty	Eureka, White Pine, Lander, Churchill, and Lyon Counties, Nevada	Greenlink North Transmission Project	The Bureau of Land Management (BLM) Nevada Renewable Energy Coordination Office is evaluating two SF-299 applications [one application for a permanent right-of-way (ROW), one application for a short-term ROW] submitted by NV Energy for Transportation and Utility Systems and Facilities on Federal Lands. The proposed Greenlink North Project would span approximately 235 miles from Ely, Nevada to Yerington, Nevada through White Pine, Eureka, Lander, Churchill, and Lyon Counties and would involve construction of the following components: • Robinson Summit 525/345-kV Substation Expansion • New Lander 525/230-kV Collector Station. • New Fort Churchill-Robinson Summit 525-kV Transmission Line. • Fort Churchill 525/345-kV Substation Expansion.	Proposed
Lands and Realty	Clark, Nye, Esmeralda, Mineral, Lyon, Storey, and Washoe Counties, Nevada	Greenlink West Transmission Project	The Greenlink West Project would be a system of new 525-kilovolt (kV), 345-kV, 230-kV, and 120-kV electric transmission facilities on private, state, and federal lands. The project will run from North Las Vegas to Reno.	Ongoing

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
Energy and Mining	Humboldt County, Nevada	Thacker Pass Lithium	The proposed project consists of an open pit lithium mine, processing facilities, and continued exploration of adjacent lands located in northern Humboldt County, Nevada, approximately 17 miles northwest of Orovada, 53 miles north-northwest of Winnemucca, and 20 miles south of the Oregon state border. The proposed project will have a life expectancy of approximately 41 years.	Ongoing
Federal Resource Management Plans	Nevada, California	Greater Sage-Grouse Bi-State Distinct Population Segment	The approved Nevada California Greater Sage Grouse Distinct Population Segment Land Use Plan Amendment (LUPA) and Record of Decision (ROD) amends the Carson City Field Office Consolidated Resource Management Plan (RMP) and the Tonopah Field Office RMP. The BLM was a cooperating agency on the United States Forest Service (USFS) led planning effort and the LUPA was developed using a collaborative planning process that included input from the Nevada Department of Wildlife and the United States Fish and Wildlife Service. The LUPA/ ROD adds goals, objectives, action, and best management practices specifically designed to conserve, enhance, and/or restore habitats to provide for the long-term viability of the Greater Sage Grouse Bi-State Distinct Population Segment (BSSG). The LUPA provides direction at the land use plan level to include regulatory mechanisms for the management and conservation of BSSG habitats within the BLM Carson City and Battle Mountain Districts to support the BSSG population management objectives within the states of Nevada and California.	Ongoing
Mining and Energy	Washoe and Churchill Counties, Nevada	Juniper Geothermal Development Project	The Project proposes to include the construction and operation of up to two geothermal power production facilities, geothermal fluid production and injection wells and well pads, access roads, geothermal fluid pipelines, and ancillary support facilities. Electrical power generated at this facility would be sold on the commercial market.	Proposed
Mining and Energy	Pershing County, Nevada	Colado Geothermal	Drilling/exploration program to evaluate geologic structure, measure pressure – temperature gradients, and test the well to determine reservoir characteristics. Includes well pad construction, etc.	Proposed
Mining and Energy	Humboldt County, Nevada	Pinto Hot Springs Geothermal Exploration	—	Proposed
Mining and Energy	Pershing County, Nevada	Spring Valley Gold Mine	Proposed gold mine (baseline surveys currently underway)	Proposed
Lands and Realty	White Pine County, Nevada	Stagecoach Wind Development Project	Stagecoach Wind Development Wind Energy ROW is a 11,035-acre pending wind energy zone in White Pine County, Nevada.	Proposed
Lands and Realty	White Pine County, Nevada	Pantheon Solar	Pantheon Solar Project would be built on 8,086 acres of public lands, partially located in GRSG habitat.	Proposed

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
Mining and Energy	Eureka County	Ruby Hill Mine	Expanded drill program at existing Ruby Hill Mine	Ongoing
Mining and Energy	Lander County, Nevada	Robertson Gold Mine	Mining development and exploration operations by Nevada Gold Mines LLC (NGM) on 5,990 acres, consisting of approximately 5,822 acres of public lands administered by the Bureau of Land Management (BLM) and 168 acre of private land in Lander County, Nevada.	Proposed
Vegetation	Eureka County, Nevada	Three Bars Ecosystem and Landscape Restoration Project	The 3 Bars Ecosystem in central Eureka County, Nevada spans approximately 725,000 acres and includes portions of three major mountain ranges (Roberts Mountain, Simpson Park Range, and Sulphur Spring Range). Many factors are contributing to the overall decline in land condition of this area. The gradual loss of sagebrush, bitterbrush, and mountain shrub communities impact wildlife species such as sage grouse, pygmy rabbit, and mule deer. Compromised riparian habitats impact the threatened Lahontan cutthroat trout and other aquatic species. Factors contributing to the overall decline in land health include increasing incidence and severity of wildfire, increasing expansion of downy brome (cheatgrass), increasing expansion and densification of pinyon pine and Utah juniper woodlands, and increasing human impacts.	Ongoing
Mining and Energy	Lander County, Nevada	McGinness Hills Geothermal Complex	The McGinness Hills Geothermal Complex is a complex of 3 geothermal power stations located in a valley between the Toiyabe Range and Simpson Park Range in Lander County, Nevada. It is the largest geothermal complex in Nevada and the fourth largest in the United States. The complex consists of two 45 MW geothermal power stations that were commissioned in July 2012, as well as a third 48 MW geothermal power station that was commissioned on 20 December 2018. The entire complex is owned by Ormat.	Ongoing
Livestock Grazing	Battle Mountain, Carson City, Elko, Ely, and Winnemucca Districts	Targeted and Prescribed Grazing of Annual Grasses in Great Basin Ecosystems in Nevada	Targeted grazing treatments for reduction of annual invasive grasses in a variety of Disturbance Response Groups on BLM managed public lands throughout the Great Basin ecoregions in Nevada. The project purpose is to manage invasive annual grasses by using a variety of livestock grazing practices in the Great Basin ecoregions of Nevada	Ongoing
Energy and Mining	White Pine Co, Nevada	Sage City Solar	Proposes solar facility is 16 miles west of Ely, NV on 6,790 acres, with a projected output of 800 MW.	Proposed
Energy and Mining	White Pine Co, Nevada	Robinson Solar Project	Project proposes a 750MW Solar PV facility with Battery Storage. The Solar Project would consist of 2 years of construction, 30 years of operation, with an option to renew.	Ongoing
Energy and Mining	White Pine Co, Nevada	Tromso Solar	Proposed solar facility 17 miles west of Ely, NV with a10,000 acre project area.	Proposed
Energy and Mining	White Pine Co, Nevada	Spring Valley Wind	Spring Valley Wind Generation Project has 63 2.4 Mitsubishi wind turbines currently working.	Ongoing

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
Energy and Mining	White Pine Co, Nevada	Aquilo Wind	The proposed project is for wind development within an application area totaling 18,744 acres, with a projected output of 700 MW.	Proposed
Energy and Mining	White Pine Co, Nevada	CGI Wind Testing	This project is located 15 miles west of Ely, NV and has an application area of 46,205 acres.	Proposed
Energy and Mining	White Pine Co, Nevada	CGI Solar Testing	This project is located 15 miles west of Ely, NV and has an application area of 15,728 acres.	Proposed
Energy and Mining	White Pine Co, Nevada	Scout Wind	This project is located in Spring Valley and has an application area of 2,965 acres.	Proposed
Energy and Mining	Lander Co, Nevada	Wildcat Solar	This project is located 13 miles southeast of Austin, NV with an application area of 21,668 acres, and a projected output of 400 MW.	Proposed
Energy and Mining	Lander Co, Nevada	Lonely Solar	This project is located 15 miles southwest of Austin, NV with an application area of 4,686 acres, and a projected output of 500 MW.	Proposed
Energy and Mining	Washoe Co, Nevada	Dodge Flat II Solar	This project is located 4 miles northwest of Fernley, NV with an application area of 917 acres.	Proposed
Livestock Grazing	Battle Mountain, Carson City, Elko, and Winnemucca Districts	Flexibility in Grazing Authorizations to Improve Lahontan Cutthroat Trout in Nevada	This project would modify grazing permits to create flexibility in livestock management to improve Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*, LCT) habitat on BLM Nevada-administered grazing allotments. The project area includes 40 allotments administered through 43 permits, containing approximately 368 miles of occupied LCT stream habitat and approximately 875 acres of occupied LCT lake habitat in 4 Districts.	Proposed
Energy and Mining	Elko Co, Nevada	Tabor Flats Wind Test	This proposed project is 13 miles northwest of Wells, NV. No other information at this time.	Proposed
Lands and Realty	Lassen Co, California	Fourth Element 345 kV Transmission Line	Fourth Element is proposing to build a 345 kV transmission line to connect a wind energy generation facility to the power grid. The line would be 22 miles long, with 17.23 miles on BLM land.	Proposed
Vegetation	Washoe Co, Nevada	Dry Valley Rim Herbicide and Seeding	The BLM is treating 20,500 acres of the Dry Valley Rim with aerial herbicide with Imazapic and reseeding the area.	Ongoing
Montana, North Dakota, and South Dakota				
Land Use Plan	North Dakota	North Dakota Resource Management Plan (RMP) Revision	The North Dakota Bureau of Land Management (BLM) is revising its 32-year old Resource Management Plan (RMP) to provide goals, objectives, and direction for approximately 58,500 acres of BLM managed public lands and approximately 4.1 million acres of subsurface BLM managed federal mineral estate in North Dakota.	Proposed

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
Energy and Mining	Montana	Miles City FO Resource Management Plan Supplemental EIS/Plan Amendment	BLM Montana/Dakotas has prepared a Supplemental EIS and Proposed Resource Management Plan Amendment due to a court order issued by the United States District Court of Montana (Western Organization of Resource Councils, et al. v. BLM; CV 4:20-CV00076-GF-BMM; 8/3/2022). Pursuant to the Order, the BLM completed a new coal screening and remedial NEPA analysis that considers no-leasing and limited coal leasing alternatives and discloses the public health impacts (both climate and non-climate) of burning fossil fuels (coal, oil, and gas) from the planning area. The Supplemental EIS and potential Resource Management Plan Amendment alternatives vary the amount of BLM-administered federal coal authorized to be available for leasing within the planning area.	Proposed
Lands and Realty	Montana, North Dakota	North Plains Connector Transmission Line	The North Plains Connector is a proposed 525 kilovolt high voltage direct current (HVDC) transmission line connecting the U.S. eastern and western electric grids in Montana and North Dakota. The North Plains Connector would be approximately 385 miles long, extending from an existing substation in Colstrip, Montana, to an existing substation in Center, North Dakota, and a new substation in Morton County, North Dakota. The application package is currrently under review.	Proposed
Energy and Mining	Montana	Denbury Carbon Solutions, LLC, Deep Permanent CO2 Geologic Sequestration Project	The application involves approximately 100,190 acres of BLM-administered lands. The project includes access roads, well pads for 15 underground injection wells (12 on BLM, 3 on State), powerlines, substation, main bulk line, flowlines, temporary use areas, underground pore space, and two pump stations. It is estimated that over a 20-year injection time period the project area has a potential storage of approximately 409.5 million metric tons of CO2 on federal land that CO2 would be injected by the 15 proposed wells over a 20-year period. This project (if approved) when fully operational would offset greenhouse gas emissions. This would be responsive to the US 2050 net-zero goal outlined in EO 14008.	Proposed

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
Oregon				
Land Use Plan	Oregon	Southeast Oregon RMP Amendment	On June 16th, 2023, the BLM published in the Federal Register a Notice of Availability the Southeastern Oregon Proposed Resource Management Plan Amendment (PRMPA) and Final Environmental Impact Statement (FEIS) for the Southeastern Oregon planning area of the Vale District. This planning process proposes to amend the long-term management of the Southeastern Oregon planning area. The planning area encompasses approximately 4.6 million acres for the Malheur Field Office of the Vale District BLM. The Proposed RMP Amendment would prioritize protection of thirty-three areas (approx. 420,000 acres found by BLM to possess wilderness characteristics (outside of existing Wilderness Study Areas). Management of protected areas would emphasize maintenance and/or enhancement of the wilderness resource. In addition, the amendment would designate approximately 320,000 acres that are currently Open to cross-country off-highway vehicle (OHV) use as Limited to existing roads and primitive routes. Also addressed are rangeland health, grazing permit relinquishment and livestock grazing issues.	Ongoing
Land Use Plan	Oregon	Lakeview RMP Amendment	A Notice of Intent to prepare an EIS was published in the Federal Register. The Plan amendment will address the management of Lands with Wilderness Characteristics on about 1.65 million acres within the 3.2 million acre Lakeview planning area.	Ongoing
Vegetation and GRSG Habitat Management	Oregon	Northwest Malheur County Greater Sage-Grouse Habitat Restoration Project	Implementation started in 2017 and is ongoing. The BLM is using a combination of prescribed fire, silvicultural thinning, and herbicide and mechanical invasive species treatments that include western juniper removal, to maintain and restore habitat for GRSG and other sagebrush species in a 258,556-acre project area.	Ongoing
Energy and Mining	Oregon	Jindalee Hi-Tech Lithium Project	The Jindalee Hi-Tech Lithium Project is proposed lithium exploration using multiple bore holes. It encompasses 7,200-acres and would authorize 100 areas of disturbances from 267 exploration drill sites, the construction of 30.2 miles of a new access routes, and other temporary disturbances to store exploration activity equipment. Subsurface hydrological, geophysical, and geochemical data may be collected during the propose drilling activities.	Proposed
Utah				
Federal Resource Management / Land Use Plans	Utah	Grand Staircase-Escalante National Monument Resource Management Plan	Resource Management Plan revision for the Grand Staircase-Escalante National Monument in Kane and Garfield counties, Utah.	Ongoing

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
Habitat Management	Utah	Utah Watershed Restoration Initiative	A partnership based program in Utah to improve high priority watersheds throughout the state.	Ongoing
Lands and Realty	Utah	Pine Valley Water Supply Project	Central Iron County Water Conservancy District proposes to develop and transport water from Pine Valley, southwest of Milford, Utah, to their existing system in central Iron County, Utah.	Proposed
Lands and Realty	Utah	Dingell Act – Emery County Land Exchange	Implementing an exchange of federal and non-federal land as directed by the Dingell Act. An agreement to initiate (ATI) an exchange was prepared in November 2021. The land exchange would include public and state lands located across up to 18 counties in Utah: Beaver, Carbon, Emery, Grand, Iron, Juab, Kane, Millard, Rich, San Juan, Sevier, Summit, Tooele, Uintah, Utah, Wasatch, Washington, and Wayne Counties. Under the land exchange, the Secretary of the Interior, acting through the BLM, would convey to the State of Utah School and Institutional Trust Lands Administration (SITLA) approximately 89,700 acres of federal lands or interests in land. In exchange for the BLM lands, SITLA would convey to the BLM approximately 116,000 acres of non-federal lands or interests therein. The SITLA parcels are located within newly created wilderness areas, the San Rafael Swell Recreation Area, the Green River Wild and Scenic Rivers (WSR) Corridor in Emery County, and the John Wesley Powell National Conservation Area (NCA) in Uintah County. Additional SITLA lands located within wilderness areas or NCAs in Washington County could be included in the land exchange if needed to equalize values.	Proposed
Wyoming				
Wildland Fires 2018-2022	Wyoming	BLM: Past – Acres burned on BLM administered land	Approximately 150,954 acres of HMA burned between 2018 and 2022. Post fire restoration and habitat treatments are being implemented, as described below, to diminish impacts of habitat lost to wildland fire.	Past
Fire Restoration (Emergency Stabilization and Rehabilitation)	Wyoming	BLM: Past and Present – Habitat restoration following wildland fires	0 acres of BLM-administered habitat are either currently being treated or scheduled to be treated according to specific prescriptions outlined in Emergency Stabilization and Burned Area Rehabilitation plans following wildfire.	Past/ongoing
Habitat Treatments	Wyoming	BLM: Past – Habitat improvement projects	Approximately 434,704 acres of Greater Sage-Grouse habitat were treated between 2018 and 2022 to maintain or improve conditions for Greater Sage-Grouse. Treatments included conifer removal, fuel breaks, invasive species removal and habitat protection/ restoration.	Past

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
Land Use and Realty (issued and pending) 2018-2022	Wyoming	BLM: Past Non-Renewable Energy Development ROWs Issued on BLM-Administered Public Land	BLM Wyoming issued approximately 2,428 non-renewable energy ROWs in the planning area during calendar years 2018-2022. This includes amendments and reauthorizations, which may not have resulted in new disturbance. For ROWs occurring in sage grouse habitat, effects were offset by the management prescriptions in the RMPs and ARMPA, and through the application of mitigation to conserve Greater sage-grouse and their habitats on non-federal lands in coordination with State and federal partners.	Past
—	Wyoming	BLM: Past Renewable Energy Development ROWs Issued on BLM-Administered Public Land	BLM Wyoming issued two renewable energy development ROWs in the planning area during calendar years 2018-2022 (one solar, one wind) and six renewable energy testing/monitoring ROWs (all wind). ROW authorizations conformed to the approved RMPs, including applicable Greater Sage-Grouse conservation measures, and were coordinated with State and federal partners to address effects from appurtenant project facilities and operations on non-federal lands.	Past
—	Wyoming	BLM: Pending Non-Renewable Energy Development ROWs	From this same period, there are approximately 469 non-renewable energy ROW applications pending review and analysis. No additional cumulative impacts are anticipated beyond those described.	Proposed
—	Wyoming	BLM: Pending Renewable Energy Development ROWs	There are nine renewable energy development ROW applications (four solar, five wind) and two renewable energy testing/monitoring ROW applications (both wind) pending review and analysis. No additional cumulative impacts are anticipated beyond those described.	Proposed
Oil and Gas	Wyoming	BLM: Past	BLM Wyoming has offered for lease approximately 2,123,417 acres; 1,748,733 acres of that total was leased from February 2019 to July 2023. Leases followed management prescriptions in the RMPs and ARMPA and stipulations apply as described in the leases according to HMA category.	Past
—	Wyoming	BLM: Pending	BLM Wyoming has a scheduled lease sale in each quarter of the year, as described in the Minerals Leasing Act (MLA).	Proposed
Locatable Mineral Projects	Wyoming	BLM: Past and Present	Between 2018-2022, the BLM has approved 27 new mines and/or expansions within the planning area (including non-habitat).	Past/ongoing
—	Wyoming	BLM: Pending	The BLM is currently reviewing 15 plans of operation for new mines and/or mine expansions. This number also includes 10 pending mine patents, which are in the process of being patented into private ownership.	Proposed
Leasable Mineral Projects (Coal)	Wyoming	BLM: Past	One coal lease modification was issued in 2018, totaling 450 acres. For lease modifications occurring in sage grouse habitat, effects were offset by the management prescriptions in the RMPs and ARMPA.	Past

Project Type	Project Location - State(s)	Project, Plan or Action	Description	Project Status[1]
—	—	BLM: Pending	BLM Wyoming is currently reviewing two coal lease applications / modifications totaling 313 acres.	Proposed

[1] Project status definitions: Past: project is completed; Proposed: project is in the planning stages but has not yet been approved; Ongoing: project has been approved and is being implemented.

Appendix 15

Livestock Grazing Best Management Practices and Design Features and Supplemental Information

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Appendix 15. Livestock Grazing Best Management Practices and Design Features and Supplemental Information

15.1 Livestock Grazing Management Best Management Practices and Design Features

The following best management practices (BMP) provide a list of strategies, practices, or design features to be considered during implementation of the Proposed RMP Amendment. These measures are not required in every instance but are useful to aid in proper livestock grazing management in GRSG habitats. The applicability and overall effectiveness of each BMP cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some BMPs may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations. For example, variations could be required for the following reasons:

- A specific BMP is documented to not be applicable to the site-specific conditions of the project/activity. Economic considerations, such as increased costs, do not necessarily require that a BMP be varied or rendered inapplicable.
- An alternative BMP, a state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat.
- A specific BMP will not avoid or minimize impacts to GRSG or its habitat.

15.1.1 Coordination

- 43 CFR 4100 regulations direct BLM to consult, cooperate and coordinate with affected grazing permittees, the state having lands or responsible for managing resources within the area, and the interested public when engaging in program work such as changes in permitted use, Allotment Management Plans, Range Improvements, issuance and/or modification of a grazing authorization. The BLM coordinates with Federal, State, county, Indian tribal and local governmental entities, institutions, organizations, corporations, associations, and individuals when authorizing grazing on BLM lands. In GRSG habitat management areas, these communication efforts should include coordination on how livestock grazing practices could be managed across both BLM-administered lands and non-BLM-administered lands, in partnership with interested permittees and lessees, to improve GRSG habitat conditions.

15.1.2 Best Management Practices for Livestock Grazing Management

- Set priorities for grazing management activities (e.g., monitoring, authorization renewals, field checks, etc.) following direction in agency policy, including IM 2018-024 as amended or superseded. When considering competing priorities in GRSG habitat, considerations should include level of management priority (priority vs general habitat management areas) and focusing on areas where current livestock grazing management is a significant causal factor to not meeting or making significant progress towards meeting the special status species (SSS) land health standard, and those containing riparian areas, including wet meadows. Other criteria for prioritization can include the need to respond to urgent natural resource concerns (e.g., fire) and legal obligations.

- When current livestock management practices are determined to not be meeting or making progress towards meeting the SSS land health standard (following appropriate consultation, cooperation and coordination, consistent with BLM Handbook H-4180-1), implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications, either within the existing terms and conditions or considered as additional alternatives in grazing authorization NEPA analysis as a threshold/response, (not presented in any priority order) could include, but are not limited to, changes in:
  - Season or timing of use;
  - Numbers of livestock;
  - Distribution of livestock use;
  - Duration and/or level of use;
  - Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); and
  - Range improvements.
- Locate supplements (salt, mineral, protein, etc.) away from water sources, meadows, riparian areas, swales, and GRSG leks in locations that increase livestock distribution unless effective control of livestock to avoid detrimental impairment of any riparian area or GRSG habitats can be ensured.
- When using salt or mineral supplements, place them outside intact sagebrush stands to reduce impacts to GRSG breeding habitat. For example, place supplements in existing disturbed sites, areas with reduced sagebrush cover, to reduce impacts on GRSG breeding habitat; where feasible use salts or mineral supplements to improve management of livestock for the benefit of GRSG habitat.
- During the lekking season, encourage minimal vehicle use and maintenance activities associated with livestock management during lekking hours (before 9 am and after 6 pm) within 0.6 miles of a lek.
- To decrease attracting predators or decreasing water quality, whenever found and wherever possible, remove dead livestock from public land and dispose of in ways that do not shift the impact to non-public land. If it is not possible to entirely remove livestock carcasses, they should, at a minimum, be removed from riparian areas and water sources.
- In PHMA, IHMA (in Idaho), and GHMA, areas that have received vegetation treatments should be rested from livestock grazing until resource monitoring data verifies the treatment objectives specific to the purposes of the treatment are being met and an appropriate grazing regime has been developed. Examples of vegetation treatments include seedings, hazardous fuels reduction treatments, emergency stabilization and rehabilitation efforts.
- Avoid disturbing lekking and roosting GRSG from human, guard animal, and sheep activities by trailing, overnighting, watering, and bedding sheep on public lands at least 0.6 miles from occupied leks (dates of lek activity determined locally, approximately March 15–May 1 in lower elevations and March 25–May 15 in higher elevations).
- When trailing livestock during the lekking or nesting season, use roads or existing trails, to the extent possible.
- When available, use GRSG habitat use-pattern mapping or habitat monitoring to strategically adjust livestock distribution to benefit occupied GRSG breeding habitat, include herding, salting, and water-source management (e.g., turning troughs/pipelines on/off and extending pipelines/moving troughs) in grazing programs.
- Ensure that permittees are informed of management and movement requirements related to avoiding recent burns, habitat rehabilitation, or other restoration sites.
- Identify and, when feasible, establish strategically located forage reserves, focusing on areas where restoration to GRSG habitat is unlikely or lower priority habitat restoration areas.

15.1.3 Design Features for Range Developments

- When installing new range improvement projects in PHMA/IHMA, avoid construction during the applicable seasonal use periods associated with lekking, nesting, or brood rearing seasonal habitats (March 1 – July 15, or as identified for local variability in coordination with the state wildlife agency or other appropriate agency with management expertise and authority).
- Use temporary range infrastructure, such as troughs, fences, and supplements, where feasible and appropriate, to meet management objectives.
- Install shutoff valves at spring sources and troughs. Unless needed for wildlife habitat or water, ensure shutoff valves are closed and troughs are drained when livestock are not utilizing the pasture, as consistent with the water laws of the State within which the land is located.
- Install lids on spring collection boxes.
- Limit structures taller than adjacent vegetation and existing structures that could provide perching opportunities for avian predators. Where they are necessary, place them near taller natural features or partially/entirely bury them if possible.
- Install floats in troughs to prevent overflow and keep water at spring sources, as consistent with the water laws of the State within which the land is located.
- Ensure that new and existing livestock troughs and open water storage tanks are fitted with ramps to facilitate the use of and escape from troughs by GRSG and other wildlife; do not use unsecured, unstable, or ineffective items such as floating boards or similar objects.
- Locate troughs outside meadows, swales, and riparian areas.
- Design new water developments to maintain hydrologic function of spring sources, water courses and associated riparian habitat, as consistent with the water laws of the State within which the land is located.
- Consider virtual fencing opportunities, as appropriate.
- To minimize risk of noxious or invasive plant spread, require all heavy equipment used in construction of range improvements to be thoroughly cleaned of all soil and plant material prior to entering public lands.
- To minimize livestock concentration impacts on nesting and early brood rearing sage-grouse, locate new livestock handling facilities (such as corrals) away from active leks and outside of nesting habitat at least by 1.2 miles (Manier et al. 2014).
- Identify and close roads and trails that are not needed for range development maintenance.
- Where livestock handling and/or watering facilities result in lowering the downstream water table and dewatering of wet meadows or mesic habitat, relocate or remove these facilities when doing so will halt or reverse the dewatering, consistent with applicable laws.
- Design new and maintain existing water projects to avoid standing pools of shallow water that could spread West Nile Virus.

15.1.4 Drought Response

- When completing a fully processed grazing authorization in GRSG habitat, incorporate strategies for livestock management during drought conditions.
- During drought conditions use a recognized drought indicator, such as the Drought Monitor, Vegetation Drought Response Index, or Palmer Drought Severity Index, to determine when

abnormally dry or drought conditions are developing, present, or easing. When such conditions are developing or present:
  - Conduct pre-season assessments prior to livestock turn out.
  - Monitor vegetation conditions during authorized livestock use periods to determine need for early removal and/or other changes to meet seasonal RMP objectives.
- During drought periods, prioritize evaluating effects of drought in PHMA relative to GRSG needs for food and cover (including riparian areas); ensure that post-drought management allows for vegetation recovery, based on ecological potential, that meets GRSG needs in priority GRSG habitat areas. Where ESDs or STMs are lacking for an area, the best available information to achieve the GRSG needs should be used.
- If livestock grazing is deferred due to drought, reevaluate vegetation and GRSG habitat indicators that measure GRSG habitat prior to reauthorization of grazing.

15.1.5 From the BLM National Sage-Grouse Habitat Conservation Strategy of 2004

- Use prescriptive livestock grazing, where appropriate, to reduce annual grass production and the spread of wildfire into sagebrush communities. Timing of grazing and effects on residual native plants need to be carefully evaluated.
- Use grazing practices that promote the growth and persistence of native shrubs, grasses and forbs needed by sage-grouse for seasonal food and concealment. Grazing practices include changing season of use, numbers of livestock, grazing intensity, distribution of livestock use, and type of livestock (sheep, cattle or horses). Altering season of grazing may help to favor perennial plants in areas where native perennials and cheatgrass occur together in the plant community. Vegetation structure (height) should be managed so as to provide adequate cover for sage-grouse during the nesting period.
- Coordinate with state wildlife agencies where concentrations of grazing wildlife detrimentally affects sage-grouse habitat quality.
- Maintain seeps, springs, wet meadows, and riparian vegetation in a functional and diverse condition for young sage-grouse and other species that depend on forbs and insects associated with these areas. Consider fencing if vegetation associated with these wet areas cannot be maintained with current livestock, wildlife or wild horse and burro use and the impacts of the fence are outweighed by the improved habitat quality.
- Where other grazing management options are not achieving, or cannot achieve, the desired objectives, a short-term option may be livestock exclusion. Temporary exclusion can provide the plant community the opportunity to progress toward a point where grazing can again be reintroduced once desired conditions are reached. Removing livestock may not reverse the condition of severely altered habitats and often must be combined with reseeding and other rehabilitation methods to restore appropriate sagebrush habitat.

15.1.6 Nevada Specific BMPs

If results from the GRSG Habitat Assessment Framework indicate that GRSG habitat benchmarks are found to be un-suitable, and the land health evaluation results in a finding that Standards are not met or progress made towards meeting, and the determination concludes that current livestock grazing is a causal factor, and until appropriate modifications are incorporated through the grazing authorization renewal process, the

following management strategies could be considered that may include, but are not limited to, the following, with considerations to site specific seasonal date restrictions:

- Provide periods of rest or deferment during critical growth periods of key vegetation species
- Manage grazing duration and intensity to allow plant growth sufficient to meet or make progress towards meeting GRSG habitat objectives (Table 2-2)
- Employ herd management techniques to minimize impacts of livestock on breeding, nesting, and brood-rearing habitat during the breeding season (March 1 to June 30; Lek—March 1 to May 15, and Nesting—April 1 to June 30)
- Consider any temporary projects that can avoid, minimize, or mitigate livestock impacts (e.g., temporary fencing or temporary water hauling locations;
- To prevent impacts to nesting GRSG, work with permittees to avoid concentrated turn-out locations for livestock within 4 miles of active and pending leks from March 1 to June 30 with consideration of quality of site-specific habitat, current bird activity, probability of sage-grouse nesting within the radius area, and duration intensity of the use.
- Avoid domestic sheep use and bedding areas and herder camps within 2 miles of active and pending leks from March 1 to June 30
- Utilizing land features and roads on maps provided to the permittee to help delineate livestock use avoidance areas

15.2 SUPPLEMENTAL INFORMATION: ACTION ALTERNATIVES ADDRESSING LIVESTOCK GRAZING

The USFWS 2013 Greater Sage-grouse (Centrocercus urophasianus) Conservation Objectives: Final Report (COT Report) notes that "livestock grazing is the most widespread type of land use across the sagebrush biome and almost all sagebrush areas are managed for livestock grazing" (USFWS 2013). The COT Report also includes tables that characterize threats to GRSG by population throughout its range (see COT Report, Table 2, pages 16 through 29). One of the threats assessed included grazing, with the report noting the threats from improper livestock grazing varied by population from "present and widespread," to "present but localized," and "not known to be present."

To address the threat of improper livestock grazing, the COT Report recommended a conservation objective to "conduct grazing management…in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for sage-grouse (e.g. shrub cover, nesting cover)" (COT Report, page 45). It goes on to note that "areas which do not currently meet this standard should be managed to restore these components." It concludes that "livestock…numbers must be managed at levels that allow native sagebrush vegetative communities to minimally achieve Proper Functioning Conditions (PFC; for riparian areas) or Rangeland Health Standards (RHS; uplands). The specific management (e.g., type of livestock, numbers, seasons, rotation, etc.) will depend on the local ecological factors and current condition of land health. The COT Report also recommends a conservation objective for range management structures ("avoid or reduce the impact of range management structures on sage-grouse"), and fences ("minimize the impact of fences on sage-grouse populations").

As part of this planning effort livestock/range management actions were reviewed to determine which specifically address COT objectives. The prior GRSG plan amendment efforts included several management actions in the livestock grazing section that are addressed in existing agency regulations, policies, or that are duplicative of management actions in other sections of the ARMPA or the original RMPs. Since these actions

would continue to be implemented whether they appear in the RMP, they are being considered for removal in Alternatives 4, 5, 6, and the Proposed RMP Amendment. Further, most of these actions address management on livestock grazing in general, rather than focusing on conducting livestock grazing in a manner that reduces the potential for improper livestock grazing. Finally, some of the management actions did not contain specific direction, but provided a series of suggestions of what kind of activities or adjustments may be considered during future grazing management decisions, with specific decisions deferred to the implementation level. Alternatives 4, 5, 6, and the Proposed RMP Amendment consolidate the livestock grazing decisions to focus on conducting livestock grazing in a manner that would reduce the potential for improper livestock grazing in GRSG habitat and relocate or remove actions that are not required to be in the RMP to implement.

The following table compares livestock grazing management actions from each of the BLM amendment efforts from 2015, with changes made in 2019 (if applicable) displayed in strike-out (for deletions) or underlines (for additions). The right-hand column identifies a summary statement for the row, with similar concepts between the states grouped. The column also identifies whether the concepts in the row are addressed by management in Alternatives 4, 5, 6, and the Proposed RMP Amendment in the EIS Chapter 2 and Appendix 21, whether the concept was retained as a livestock grazing best management practices, or if it is proposed to not be carried forward in this planning effort.

2015 RMP Amendment Livestock Grazing Management Direction with Updates from 2019 Amendment Identified							
Colorado	**Idaho**	**Montana/Dakotas**	**Nevada/California**	**Oregon**	**Utah**	**Wyoming**	**NOTES**
Objective RM-1: GRSG objectives and well-managed livestock operations are compatible because forage availability for livestock and hiding cover for GRSG are both dependent on healthy plant communities. Agreements with partners that promote sustainable GRSG populations concurrent with sustainable ranch operations offer long-term stability. In the context of sustainable range operations, manage the range program to: 1) maintain or enhance vigorous and productive plant communities; 2) maintain residual herbaceous cover to reduce predation during GRSG nesting and early brood-rearing; 3) avoid direct adverse impacts to GRSG-associated range project infrastructure; and 4) employ grazing management strategies that avoid concentrating animals on key GRSG habitats during key seasons.	—	**North Dakota Management Direction LG-1.3:** Within PHMA, incorporate GRSG habitat objectives and management considerations into all BLM grazing allotments through AMP or permit renewals. Develop standards with State of North Dakota and USFWS.	**Objective LG 1:** Manage permitted livestock grazing to maintain and/or enhance PHMAs and GHMAs to meet or make progress towards meeting all GRSG life-cycle requirements and habitat objectives (Table 2-2), based on site potential.	**Objective LG 1:** Manage livestock grazing to maintain or improve Greater Sage-grouse habitat by achieving Standards for Rangeland Health (SRH).	—	—	Summary statement: • Manage grazing to achieve GRSG habitat/objectives and/or land health standard • Avoid direct adverse GRSG impacts from range infrastructure Applicability for RMPs? There is a regulatory requirement to achieve land health standards (4180), and it is a common objective/desired condition for public lands. In this effort, we want to focus on an objective specific to maintaining/improving GRSG habitat. This concept is included in chapter 2 (see also Appendix 21, Section 21.1.10) in Objective RM-1.

2015 RMP Amendment Livestock Grazing Management Direction with Updates from 2019 Amendment Identified							
Colorado	**Idaho**	**Montana/Dakotas**	**Nevada/California**	**Oregon**	**Utah**	**Wyoming**	**NOTES**
—	**MD LG 1**: Maintain existing areas designated as available or unavailable for livestock grazing. Existing active AUMs for livestock grazing within the planning area will not be changed at the broad scale, though the number of AUMs available on an allotment may be adjusted based on site-specific conditions to meet management objectives during term permit renewals, AMP development, or other appropriate implementation planning. Additionally, temporary adjustments can be made annually to livestock numbers, the number of AUMs, and season of use in accordance with applicable regulations.	**Dillon MD LG 1**: Maintain existing areas designated as available or unavailable for livestock grazing. Existing active AUMs for livestock grazing within the planning area will not be changed at the broad scale, though the number of AUMs available on an allotment may be adjusted based on site-specific conditions to meet management objectives during term permit renewals, AMP development, or other appropriate implementation planning. Additionally, temporary adjustments can be made annually to livestock numbers, the number of AUMs, and season of use in accordance with applicable regulations. **Lewistown Action LG-1.2:** The area will remain available for livestock grazing.	—	**Objective LG 2:** On BLM-managed lands, 12,~~083~~105,~~622~~581 acres will continue to be available for livestock grazing in Greater Sage-grouse habitat. Table 2-6 is no longer applicable and is therefore deleted ~~In key RNAs, 22,765 acres will be unavailable to livestock grazing. See Table 2-6, Key ACECs and RNAs for ARMPA~~. MD LG 1 is deleted. Livestock grazing management in the 13 key RNAs returns to being governed by applicable district RMPs as amended by the 2015 Oregon Greater Sage-Grouse ROD/ARMPA goals, objectives, and management decisions. ~~**MD LG 1:** All or portions of key RNAs will be unavailable to grazing (Table 2-6). Determine whether to remove fences, corrals, or water storage facilities (e.g. reservoirs, catchments, ponds).~~	~~**MA LG 1:** PHMA and GHMA will be available for livestock grazing (Figure 2-3, Livestock Grazing [Appendix A]). Active animal unit months (AUMs) for livestock grazing will be 329,521 on BLM lands. Make adjustments to permitted AUMs consistent with regulation and the remaining grazing direction. In addition, on an annual basis livestock numbers and the season of use can be adjusted within the terms and conditions of the permit.~~ ~~Make adjustments to permitted use and annual adjustments to levels of livestock use consistent with regulation and the direction identified below where livestock grazing is identified as a causal factor to not meeting standards or habitat objectives.~~	—	Summary statement: • Available/unavailable allocation decision. Applicability for RMPs? One of the primary decisions an RMP is supposed to make is whether a given area is available for livestock grazing. Included in chapter 2 (see also Appendix 21, Section 21.1.10) as Allocation RM-1.
MD RM-1: (ADH) Within ADH, incorporate GRSG habitat objectives and management considerations into all BLM grazing allotments through Allotment Management Plans.	—	—	—	—	—	—	Summary statement: • Manage grazing to achieve GRSG habitat/objectives and/or land health standards Applicability for RMPs? Duplicative with other decisions. Consolidate decisions that incorporate habitat objectives into one. See chapter 2 (see also Appendix 21, Section 21.1.10) grazing decision RM-1 or Application of Habitat Objectives – Objective SSS Y and actions SSS Y1 and SSS Y2.

2015 RMP Amendment Livestock Grazing Management Direction with Updates from 2019 Amendment Identified							
Colorado	**Idaho**	**Montana/Dakotas**	**Nevada/California**	**Oregon**	**Utah**	**Wyoming**	**NOTES**
MD RM-2: (ADH) Work cooperatively on integrated ranch planning within GRSG habitat. Develop management strategies that are seamless with respect to actions on public and private lands within BLM grazing allotments.	**MD LG 3**: Where opportunities exist, coordinate with other land managers to encourage livestock operations that utilize mixed federal, private and/or state land to be managed at the landscape scale to benefit GRSG and their habitat across land ownerships.	**Dillon MD LG 3**: Where opportunities exist, coordinate with other land managers to encourage livestock operations that utilize mixed federal, private and/or state land to be managed at the landscape scale to benefit GRSG and their habitat across land ownerships. **Billings Management Direction LG-1.4:** In PHMA, work cooperatively on integrated ranch planning within GRSG habitat so operations with deeded/BLM allotments can be planned as single units. **Lewistown Action LG-1.4:** In PHMA, cooperate with ranchers and other agencies on integrated ranch planning so operations with intermingled land ownerships within BLM allotments can be planned as single units.	—	—	~~**MA LG 3**: In PHMA, consult, cooperate, and collaborate with other land owners and management agencies (e.g., private and SITLA) to develop plans which provide for landscape level approaches to habitat improvement. Manage unfenced private and SITLA lands within a grazing allotment that are under exchange of use agreements or percent public land use as a single unit that will have the same management as the public lands.~~	**MD LG 2:** Within PHMA the BLM will work cooperatively with permittees, lessees, and other landowners to develop voluntary grazing management strategies that integrate both public and private lands into single management units to improve Greater Sage-Grouse habitat.	Summary statement: • Coordinate with partners/neighbors Applicability for RMPs? 43 CFR 4100 regulations direct BLM to consult, cooperate and coordinate with affected grazing permittees, the state having lands or responsible for managing resources within and the interested publics when engaging in program work such as changes in permitted use, Allotment Management Plans, Range Improvements, issuance and/or modification of a grazing permit. Because regulations already require coordination, and conducting such coordination does not require an RMP decision to implement, it would be removed from the RMP-decision section for Alternatives 4, 5, 6 and the Proposed RMP Amendment. However, coordination language has been added specific to managing GRSG habitat across multiple ownership as a BMP in the appendix.

2015 RMP Amendment Livestock Grazing Management Direction with Updates from 2019 Amendment Identified							
Colorado	**Idaho**	**Montana/Dakotas**	**Nevada/California**	**Oregon**	**Utah**	**Wyoming**	**NOTES**
MD RM-3: (PHMA) The BLM will prioritize: 1. the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and 2. the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.	**MD LG 15**: Generally, t~~T~~he BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases based on land health conditions or concerns related to rangeland health standards. If similar issues are found in both PHMA and IHMA, then those in PHMA should be addressed first. ~~in Sagebrush Focal Areas (SFA) followed by PHMA outside of the SFA.~~ In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards and that have declining Greater Sage-Grouse populations, defined by a soft or hard population adaptive management trigger being engaged. Greater Sage-Grouse populations that are stable or trending upward will be a lower priority for permit renewal and the assessment process~~, with focus on those containing riparian areas, including wet meadows. Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFA followed by areas of PHMA outside SFA~~. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. **MD LG 2**: Prioritize BLM land health assessments and processing of BLM grazing	**Dillon MD LG 15**: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in Sagebrush Focal Areas (SFA) followed by PHMA outside of the SFA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFA followed by areas of PHMA outside SFA. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. **MD LG 2:** Prioritize BLM land health assessments and processing of BLM grazing permits consistent with management area prioritization (MD SSS 4), unless other higher priority considerations exist (MD LG 15) or other factors such as threatened, endangered and proposed species habitat that livestock grazing can affect. Where possible, conduct land health assessments at the watershed, or other meaningful landscape-scale. **Billings MD LG-14**: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if	**MD LG 2:** The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in ~~SFA followed by~~ PHMAs ~~outside of the SFA~~. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting land health standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.	**MD LG 11:** Sagebrush Focal Areas will be prioritized for management and conservation actions, including, but not limited to review of livestock grazing permits/leases. **MD LG 12:** The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in Sagebrush Focal Areas (SFA) followed by PHMA outside of the SFA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g. fire) and legal obligations.	~~**MA LG 2**: The BLM will prioritize~~ ~~(1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and~~ ~~(2) the processing of grazing permits/leases in SFA first followed by PHMA outside SFA.~~ ~~In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (ex., fire) and legal obligations.~~	**MD LG 5 (cont.):** The BLM would prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in ~~SFAs followed by~~ PHMA ~~outside of the SFAs~~. In setting workload priorities, precedence would be given to existing permits/leases in these areas not meeting LHSs, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations.	Summary statement: • Prioritize review/processing of grazing permits Applicability for RMPs? Prioritization is not an RMP decision. It depends on staffing, budget, and the consideration of other resource issues that include, but are not limited to GRSG, other listed species, LHS, wildfire, or other resource concerns. Previous national level guidance for prioritization of renewals has always been to look at high resource value areas first. IM's such as WO 2009-018 and WO 2018-024 gave guidance on prioritization. The 2015 FWS listing determination cited the prioritization for reviewing grazing permits and conducting monitoring to determine if changes may be needed to meet GRSG habitat conditions – though it also noted that other criteria could be considered. Retained language related to prioritization in the livestock grazing BMP appendix. It can help inform and guide during implementation, though it is not needed as an RMP-level decision.

2015 RMP Amendment Livestock Grazing Management Direction with Updates from 2019 Amendment Identified							
Colorado	**Idaho**	**Montana/Dakotas**	**Nevada/California**	**Oregon**	**Utah**	**Wyoming**	**NOTES**
(See above.)	permits consistent with management area prioritization (MD SSS 4), unless other higher priority considerations exist (MD LG 15) or other factors such as threatened, endangered and proposed species habitat that livestock grazing can affect. Where possible, conduct land health assessments at the watershed, or other meaningful landscape-scale.	modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (ex., fire) and legal obligations. **Lewistown (Same as Livestock Grazing MD-12**): The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in SFA followed by PHMA outside of the SFA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. **Lewistown Action LG 1.5**: The BLM will prioritize (1) the review of grazing permits/leases in particular to determine if modification is necessary prior to renewal): and (2) the processing of grazing permits/leases in in SFA, followed by PHMA. In setting will prioritize (1) the review of grazing permits/leases in particular to determine if modification is necessary prior	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

2015 RMP Amendment Livestock Grazing Management Direction with Updates from 2019 Amendment Identified							
Colorado	**Idaho**	**Montana/Dakotas**	**Nevada/California**	**Oregon**	**Utah**	**Wyoming**	**NOTES**
(See above.)	*(See above.)*	to renewal): and (2) the processing of grazing permits/leases in in SFA, followed by PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (e.g., fire) and legal obligations. **Miles City MD LG-3:** The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (ex., fire) and legal obligations. **North Dakota Management Direction LG-1.5**: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas,	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

2015 RMP Amendment Livestock Grazing Management Direction with Updates from 2019 Amendment Identified							
Colorado	**Idaho**	**Montana/Dakotas**	**Nevada/California**	**Oregon**	**Utah**	**Wyoming**	**NOTES**
(See above.)	*(See above.)*	including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (such as fire) and legal obligations. **South Dakota MD-32** Land Health Standards: BLM will prioritize grazing leases in PHMA to determine if modifications are necessary prior to renewals or if the allotment does not meet Land Health Standards. **Management Direction 36**: The BLM will prioritize (1) the review of grazing permits/leases, in particular to determine if modification is necessary prior to renewal, and (2) the processing of grazing permits/leases in PHMA. In setting workload priorities, precedence will be given to existing permits/leases in these areas not meeting Land Health Standards, with focus on those containing riparian areas, including wet meadows. The BLM may use other criteria for prioritization to respond to urgent natural resource concerns (such as fire) and legal obligations.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

2015 RMP Amendment Livestock Grazing Management Direction with Updates from 2019 Amendment Identified							
Colorado	**Idaho**	**Montana/Dakotas**	**Nevada/California**	**Oregon**	**Utah**	**Wyoming**	**NOTES**
MD RM-4: (ADH) Conduct land health assessments that include (at a minimum) indicators and measurements of vegetation structure/condition/composition specific to achieving GRSG habitat objectives (Doherty et al. 2011). If local/state seasonal habitat objectives are not available, use GRSG habitat recommendations from Connelly et al. 2000 and Hagen et al. 2007.	**MD LG 4**: PHMA & IHMA: During the land health assessment process, identify the type(s) of seasonal habitat the assessed areas are capable of supporting. Utilize the habitat assessment framework, (Stiver et al. 2015) or other BLM approved methodology, in accordance with current policy and guidance to determine whether vegetation structure, condition and composition are meeting GRSG habitat objectives including riparian and lentic areas (Objective SSS 2; Table 2-2). Use appropriate Ecological Site Descriptions, reference sheets and state and transition models to inform desired habitat conditions and expected responses to management changes for the land unit being assessed.	**Dillon MD LG 4**: PHMA & IHMA: During the land health assessment process, identify the type(s) of seasonal habitat the assessed areas are capable of supporting. Utilize the habitat assessment framework, (Stiver et al. 2015) or other BLM approved methodology, in accordance with current policy and guidance to determine whether vegetation structure, condition and composition are meeting GRSG habitat objectives including riparian and lentic areas (Objective SSS 2; Table 2-2). Use appropriate Ecological Site Descriptions, reference sheets and state and transition models to inform desired habitat conditions and expected responses to management changes for the land unit being assessed. **Lewistown Action LG-1.2**: In PHMA and GHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/ composition of vegetation specific to achieving GRSG habitat objectives. Management actions will be developed and implemented within one year if land health determinations indicate that an allotment is not meeting standards due to current livestock grazing. Appendix D addresses mid-scale monitoring. **Lewistown Action LG-1.6**: Allotments that have the best opportunities for conserving, enhancing, or restoring habitat for GRSG will receive high priority for monitoring, evaluation, and management.	**MD LG 4:** Complete land health assessments in PHMAs and GHMAs to identify whether or not GRSG habitat objectives (Table 2-2) are being met. The priority order for completing land health assessments in GRSG habitat is: • ~~Allotments containing SFA that have never been evaluated;~~ • ~~Allotments containing SFA that have not been re-evaluated in 10 or more years;~~ • Allotments containing PHMAs that have never been evaluated; • Allotments containing PHMAs that have not been re-evaluated in 10 or more years; • Allotments containing GHMAs that have never been evaluated; • Allotments containing GHMAs that have not been re-evaluated in 10 or more years.	**Objective LG 3:** Complete rangeland health assessments for grazing permits/leases that have not been renewed and prioritized by Allotment Categories I, M, and C. The priority order for completing rangeland health assessments in Greater Sage-grouse habitat is: 1. Allotments containing SFA that have never been evaluated. 2. Allotments containing SFA that have not been re-evaluated in 10 or more years. 3. Allotments containing PHMA that have never been evaluated. 4. Allotments containing PHMA that have not been re-evaluated in 10 or more years. 5. Allotments containing GHMA that have never been evaluated. 6. Allotments containing GHMA that have not been re-evaluated in 10 or more years.	~~**MA LG-5:** In PHMA and GHMA, conduct land health assessments that include indicators and measurements of structure, condition, composition, etc., of vegetation specific to achieving GRSG habitat objectives (Objective SSS-3), including within wetlands and riparian areas. Prioritize land health assessments in SFA, followed by PHMA outside of the SFA. Conduct land health assessments at the watershed scale and use the GRSG habitat objectives when assessing the applicable standard in GRSG habitats.~~	**MD LG 1**: The BLM policy in WO-IM-2009-007 and BLM Handbook H-4180-1 will be used to evaluate land health standards achievement in PHMA (core only) and, where not achieved, to determine if existing grazing management practices or levels of grazing use on public lands are significant factors in failing to achieve the standards and conform with the guidelines, which through this process will identify appropriate actions to address nonachievement and nonconformance.	Summary statement: • Land health assessments: include habitat indicators, ecological site descriptions, state and transition, priorities Applicability for RMPs? Prioritization is not an RMP decision. It depends on staffing, budget, and the consideration of other resource issues that include, but are not limited to GRSG, other listed species, LHS, wildfire, or other resource concerns. Previous national level guidance for prioritization of renewals has always been to look at high resource value areas first. IM's such as WO 2009-018 and WO 2018-024 gave guidance on prioritization. The 2015 FWS listing determination cited the prioritization for reviewing grazing permits and conducting monitoring to determine if changes may be needed to meet GRSG habitat conditions – though it also noted that other criteria could be considered. Retained language related to prioritization in the livestock grazing BMP appendix. It can help inform and guide during implementation, though it is not needed as an RMP-level decision.

2015 RMP Amendment Livestock Grazing Management Direction with Updates from 2019 Amendment Identified							
Colorado	**Idaho**	**Montana/Dakotas**	**Nevada/California**	**Oregon**	**Utah**	**Wyoming**	**NOTES**
(See above.)	*(See above.)*	**Lewistown Action LG-1.7**: In PHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions will be developed if land health determinations indicate that an allotment is not meeting standards due to current livestock grazing. Appendix D addresses mid-scale monitoring. **Lewistown Action LG-1.8:** The BLM will monitor grazing permits/leases renewed or modified in accordance with the direction contained in this guidance as follows: Allotments within SFA, followed by those in other PHMA, and focusing on those with riparian areas, will be prioritized for monitoring to ensure compliance with the terms and conditions in the permits. The BLM will collect, at a minimum, the following monitoring data: · Vegetation Condition · Actual Use · Utilization · Use Supervision **Lewistown Action LG-1.9**: In PHMA and GHMA, conduct land health evaluations and determinations that include (at a minimum) indicators and/or measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Management actions will be developed if land health determinations indicate that an allotment is not meeting standards due to livestock grazing in accordance with BLM	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

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(See above.)	*(See above.)*	grazing regulations 43 CFR, Part 4100. Appendix D addresses mid-scale monitoring. **Lewistown Action LG-1.11**: In PHMA, manage for vegetation composition and structure consistent with ecological site potential within the reference state to achieve GRSG seasonal habitat objectives. Natural ecological processes that impede localized site potential and that create a mosaic of habitat successional patterns will continue to occur. **North Dakota Management Direction LG-1.6**: In PHMA, conduct land health assessments that include (at a minimum) indicators and measurements of structure/condition/composition of vegetation specific to achieving GRSG habitat objectives. Local objectives will be developed at the field office level in partnership with North Dakota Game and Fish Department and USFWS, and incorporated into AMPs or livestock grazing permits as appropriate incorporating best available science. **North Dakota Management Direction LG-1.9**: In PHMA, manage for vegetation composition and structure consistent with GRSG seasonal habitat objectives. ESDs can help determine whether or not the GRSG seasonal habitat objectives are consistent with the ecological site potential within the reference state. GRSG seasonal habitat objectives and ecological site potential within reference	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

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(See above.)	*(See above.)*	states are not always going to be the same. **HiLine (Same as Vegetation MD-11):** Rangeland health monitoring and assessments will be conducted within current staffing capabilities. The allotments within the Greater Sage-Grouse PHMA and the Grassland Bird/Greater Sage-Grouse PHMA will be high priority for reassessment of land health standards and processing grazing permits as detailed in Appendix I. Rangeland health monitoring plans will be developed and implemented at the field office level.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*
MD RM-6: (ADH) Manage for vegetation composition and structure consistent with ecological site potential and within the reference state subject to habitat objectives, including successional stages.	—	—	—	—	—	—	Summary statement: • Manage for vegetation composition consistent with ecological site potential Applicability for RMPs? Duplicative with habitat objective reference action. Consolidate decisions that incorporate habitat objectives into one. See chapter 2 (see also Appendix 21, Section 21.1.10) grazing decision RM-1 or Application of Habitat Objectives – Objective SSS Y and actions SSS Y1 and SSS Y2.

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MD RM-5: (ADH) Develop specific objectives—through NEPA analysis conducted in accordance with the permit/lease renewal process—to conserve, enhance, or restore GRSG habitat. Base benchmarks on Ecological Site/Range Site Descriptions. When existing on Ecological Site/Range Site Descriptions have not been developed, or are too general to serve adequately as benchmarks, identify and document local reference sites for areas of similar potential that exemplify achievement of GRSG habitat objectives and use these sites as the benchmark reference. Establish measurable objectives related to GRSG habitat from baseline monitoring data, ecological site descriptions, or land health assessments/evaluations, or other habitat and successional stage objectives.	—	**Billings: MD LG-12**: Site specific Greater Sage-Grouse habitat and management objectives will be developed for BLM land within Greater Sage-Grouse PHMA. These objectives will be incorporated into the respective allotment management plans (AMPs) or livestock grazing permits as appropriate. **Lewistown Action LG-1.2:** Site-specific Greater Sage-Grouse habitat and management objectives will be developed for BLM land and incorporated into the respective AMPs or livestock grazing permits as appropriate. Third order (fine-scale) and fourth order (site-scale) habitat indicators and characteristics for sage-grouse habitat seasonal use areas as described in the Sage-Grouse Habitat Assessment Framework (Stiver, et al. 2015) will be used to quantify habitat objectives. **HiLine MD-36**: Consideration will be given to incorporating fine-scale and site-specific Greater Sage-Grouse habitat and management objectives as appropriate to the area into AMPs or livestock grazing permits.	**MD LG 8:** Within PHMAs and GHMAs, incorporate terms and conditions into grazing permits to meet GRSG habitat objectives (Table 2-2), specific terms and conditions will be based on rangeland health assessments (and subsequent monitoring data).	**MD LG 4:** When fine and site-scale Greater Sage-grouse habitat assessment and monitoring is needed or required, (e.g., as a component of a rangeland health assessment), measure the Greater Sage-grouse habitat suitability indicators for seasonal habitats identified in Table 2-2. Site suitability values may be adjusted regionally where there is scientific justification for doing so. When using the indicators to guide management actions or during land health assessments, consider that the indicators are sensitive to the ecological processes operating at the scale of interest and that a single habitat indicator does not necessarily define habitat suitability for an area or particular scale.	~~**MA-LG-4:** Evaluate Utah's Rangeland Health Standards and process grazing permits. Focus monitoring and management activities on allotments found not to be achieving Utah's Rangeland Health Standards where livestock grazing is identified as a causal factor and that have the best opportunities for conserving, enhancing or restoring habitat for GRSG.~~ ~~Use ecological site descriptions and/or other appropriate information to determine the desired plant community within proper functioning ecological processes for conducting land health assessments to evaluate the achievement or non-achievement of rangeland health standards.~~	**MD LG 4:** Within PHMA, ~~all BLM use authorizations will contain terms and conditions regarding the actions needed to meet or progress toward meeting the habitat objectives. I~~if monitoring data show the wildlife/special status species standard ~~habitat objectives have~~ has not been met nor progress being made toward meeting ~~them~~ that standard, there will be an evaluation and a determination made as to the cause. If it is determined that the current authorized livestock use is a significant causal factor in failing to achieve the wildlife/special status species standards, the BLM would address the achievement or progress toward achieving the LHSs (43 CFR 4180.2) and, if needed, Greater Sage-Grouse habitat maintenance or improvement ~~for healthy rangelands, the use will be adjusted by the response specified in the instrument that authorized the use~~.	Summary statement: • Manage grazing to achieve GRSG habitat/objectives and/or land health standards Applicability for RMPs? Developed a consolidated action (Management Action RM-1 in chapter 2 and Appendix 10) to consider GRSG habitat benchmarks via HAF to inform LHS. The action connects GRSG habitat benchmarks for suitable habitat via HAF to inform land health special status species standard, and then the regulatory requirement to meet LHS (see Management Action RM-1 in chapter 2 and Section 21.1.10 in Appendix 10).
MD RM-7: (ADH) Include terms and conditions on grazing permits and leases that address disruptive activities that affect GRSG and assure plant growth requirements are met and residual forage remains available for GRSG hiding cover. Specify as necessary: 1. Season or timing of use 2. Numbers of livestock (include temporary non-use or livestock removal)	**MD LG 6:** When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperation and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential	**Dillon MD LG 6:** When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperation and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential	**MD LG 1:** When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperation and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation and consistent with 43 CFR 4160.1 and IM-	**MD LG 2:** When livestock management practices are determined to not be compatible with meeting or making progress towards achievable habitat objectives following appropriate consultation, cooperating and coordination, implement changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications include, but are not limited to, changes in: 1. Season or timing of use;	**MA-LG-6:** In PHMA, when an area is not ~~livestock management practices are determined to not be compatible with~~ meeting or making progress towards achievable habitat objectives and Land Health Standards, and the causal factor is livestock grazing (i.e., improper livestock grazing) ~~following appropriate consultation, cooperating and coordination~~, implement	**MD LG 1**: When determining appropriate actions to address nonachievement of land health standards and nonconformance with the guidelines due to existing grazing management practices or levels of grazing use, management actions including but not limited to the following will be considered singly or in combination: 1. Season or timing of use	Summary statement: • Include/Adjust terms and conditions to meet land health standards/GRSG objectives/needs Applicability for RMPs? The text in this row does not contain any decision but is a list of what the agency could consider if an area isn't meeting the habitat needs for GRSG. This is evident by language such as "…potential modifications include" or

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3. Distributions of livestock use 4. Intensity of use (utilization or stubble height objectives) 5. Kind of livestock (e.g., cattle, sheep, horse, llama, alpaca, and goat) 6. Class of livestock (e.g., yearlings versus cow/calf pairs) 7. Locations of bed grounds, sheep camps, trail routes, and the like	modifications include, but are not limited to, changes in: • Season or timing of use; • Numbers of livestock; • Distribution of livestock use; • Duration and/or level of use; • Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); and • Grazing schedules (including rest or deferment). *Not in Priority Order **MD LG 8:** PHMA & IHMA - Where practical, design pasture rotations to utilize non-native perennial grass seedings and/or annual grasslands, during GRSG nesting season annually or periodically.	modifications include, but are not limited to, changes in: • Season or timing of use; • Numbers of livestock; • Distribution of livestock use; • Duration and/or level of use; • Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); and • Grazing schedules (including rest or deferment). *Not in Priority Order **Dillon MD LG 8:** PHMA & IHMA - Where practical, design pasture rotations to utilize non-native perennial grass seedings and/or annual grasslands, during GRSG nesting season annually or periodically. **Lewistown Action LG-1.1:** GRSG habitat objectives will be considered when evaluating an allotment's conformance with land health standards (see Appendix F in the Lewistown Field Office Proposed RMPA/Final EIS) prior to renewing a grazing authorization. **Lewistown Action LG-1.12**: In PHMA, implement management actions within or outside of the watershed planning/permit renewal process to modify grazing management and to meet seasonal GRSG habitat objectives. Consider singly, or in combination, for changes in: · Season or timing of use · Numbers of livestock (includes temporary non-use or livestock removal) · Distribution of livestock use · Intensity of use · Type of livestock	2018-023. Potential modifications include, but are not limited to, changes in: • Season or timing of use; • Numbers of livestock; • Distribution of livestock use; • Duration and/or level of use; • Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); • Grazing schedules (including rest or deferment); • Class of livestock; • Grazing schedules (including rest or deferment) • Making allotment unavailable to grazing *Not in priority order **MD LG 5:** If results from a land health assessment indicate that GRSG habitat objectives (Table 2-2) are not met in ~~SFA,~~ PHMAs or GHMAs and grazing is a causal factor, and until appropriate modifications (MD LG 1) are incorporated through the permit renewal process, then consistent with applicable laws and regulations, implement management strategies that may include, but are not limited to, the following: • Provide periods of rest or deferment during critical growth periods of key vegetation species • Limit grazing duration and intensity to allow plant growth sufficient to meet GRSG habitat objectives (Table 2-2) • Employ herd management techniques to minimize impacts of livestock on breeding, nesting, and brood-rearing habitat during the breeding season (March 1 to June 30; Lek—March 1 to	2. Numbers of livestock; 3. Distribution of livestock use; 4. Duration and/or level of use; 5. Locations of bed grounds, sheep camps, trail routes, and the like; 6. Extended rest or temporary closure from grazing through BLM administrative actions; 7. Make allotment unavailable to grazing; 8. Kind of livestock (e.g., cattle, sheep, horses, or goats) (Briske et al. 2011); and 9. Grazing schedules (including rest or deferment). *Not in Priority Order When SRH are being met no changes in current management or activity plans or permits/leases are required, but could occur to meet other resource management objectives.	changes in grazing management through grazing authorization modifications, or allotment management plan implementation. Potential modifications include, but are not limited to, changes in: • Season or timing of use; • Numbers of livestock; • Distribution of livestock use; • Duration and/or level of use; • Kind of livestock (e.g., cattle, sheep, horses, or goats); and • Grazing schedules (including rest or deferment). *Not in priority order	2. Numbers of livestock (includes temporary nonuse or livestock removal) 3. Distribution of livestock use 4. Intensity of use 5. Kind of livestock (e.g., cattle, sheep, horses, llamas, alpacas and goats) 6. Class of livestock (e.g., yearlings versus cow calf pairs) 7. Range improvements. Refer to the document, "Grazing Influence, Management, and Objective Development in Wyoming's Greater Sage-Grouse Habitat" (Cagney et al. 2010) for guidance when considering appropriate management actions to achieve conformance.	"implement management strategies that may include" and both instances note that the list is inclusive of but not limited to a series of potential actions. It's just a list – like a toolbox of things the BLM could apply. 43 CFR 4180 directs BLM to take appropriate action if livestock are the causal factor for failing to achieve the land health standards. Handbook 4180 outlines the process and suggests available tools such as Ecological Site Descriptions to be used as a reference when assessing/evaluating the achievement of land health standards. Moved a consolidated version of this to the BMP appendix, as it's just a list of potential actions the BLM could consider during implementation.

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(See above.)	*(See above.)*	**HiLine MD-1**: If monitoring data demonstrate that livestock use on an allotment in a priority Greater Sage-Grouse area is adversely affecting Greater Sage-Grouse or their habitat, the terms and conditions of grazing permits may be modified, or changes in active use could be considered in order to meet the standards for rangeland health as described in 43 CFR, Part 4180 and the Standards for Rangeland Health and Guidelines for Livestock Grazing Management (Appendix L) or to otherwise manage, maintain, or improve sage-grouse habitat. **HiLine MD-2:** Appropriate indicators and measurements specific to habitat for Greater Sage-Grouse, or any other wildlife species of concern, will be evaluated as part of standards and guidelines assessment and any necessary and appropriate habitat objectives specific to meeting the wildlife health standard for the site will be identified and incorporated into allotment management plans (AMPs) or the terms and conditions of livestock grazing permits. **North Dakota Management Direction LG-1.10**: In PHMA, implement management directions (grazing decisions, AMP/Conservation Plan development, or other agreements) to modify grazing management to meet State of North Dakota seasonal GRSG habitat requirements, where allotment evaluations indicate land health assessments are not being met due to livestock. Consider singly, or in combination, changes in:	May 15, and Nesting—April 1 to June 30) • Consider any temporary projects that can mitigate livestock impacts (e.g., temporary fencing or temporary water hauling locations; • Work with permittees to avoid concentrated turn-out locations for livestock within 4 miles of active and pending leks from March 1 to June 30 • Avoid domestic sheep use and bedding areas and herder camps within 2 miles of active and pending leks from March 1 to June 30 • Utilizing land features and roads on maps provided to the permittee to help delineate livestock use avoidance areas • Considering no grazing from May 15 – Sept. 15 in riparian areas and wet meadows. • Removing livestock within 3-7 days for the remainder of the grazing year once the allowable use levels are reached (BLM 1996, Burton et. al 2011, Cagney et. al, 2010, Connelly et. al 2000, France et. al 2008, Hagen et. al 2007, Holechek 1988, Platts 1990, and Tanaka et. al 2014): ▪ In riparian areas and wet meadows the allowable percent utilization is 35% woody species, and a minimum stubble height of 4-6 inches (10-15 cm) for herbaceous riparian vegetation based on site. ▪ In mountain big sage habitat, the allowable percent utilization is 40 % herbaceous key species and/or 35 % shrub key species.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

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(See above.)	*(See above.)*	1. Season or timing of use; 2. Numbers of livestock (includes temporary non-use or livestock removal); 3. Distribution of livestock use; 4. Intensity of use; and 5. Type of livestock (e.g., cattle, sheep, horses, llamas, alpacas, and goats).	▪ In Wyoming Basin big sage habitat, the allowable percent utilization is 35% herbaceous key species and/or 35 % shrub key species. ▪ In black sage habitat, the allowable percent utilization is 35% herbaceous key species and/or 35 % shrub key species. To the extent that the implementation of these strategies would be in conflict with the terms and conditions of any applicable livestock grazing permit or lease, then the BLM would complete a new decision-making process before implementing the strategies.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*
—	—	—	**MD LG 6:** Appropriate allowable utilization levels will be defined through the grazing permit renewal process. At least one alternative in the NEPA process will consider the utilization levels identified in MD LG 5.	—	—	—	Summary statement: • Include/Adjust terms and conditions to meet land health standards/GRSG objectives/needs Applicability for RMPs? Only from NV/CA. It's not an RMP decision, but "plan to plan" type of language along with direction for what future NEPA should consider in a range of alternatives, none of which are RMP decisions or BMPs.
—	—	—	**MD LG 7:** In pastures where post livestock removal use monitoring results in utilization levels that exceed allowable use levels and livestock are identified as a causal factor, reduce animal unit months (AUMs) grazed the following year ~~accordingly~~in accordance with 43 CFR 4160.1 and IM 2018-023. AUMs cannot be applied to another pasture that is already being used by livestock or is being purposefully rested.	—	—	—	Summary statement: • Include/Adjust terms and conditions to meet land health standards/GRSG objectives/needs Applicability for RMPs? Only from NV/CA. Not an RMP decision, but direction for implementation that is not directly linked to habitat conditions. Included as a BMP specific to NV/CA.

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—	—	—	**MD LG 10**: In any allotment where land health standards were not met and livestock grazing was found to be a significant causal factor, compliance monitoring will be conducted annually until GRSG habitat objectives (Table 2-2) are met. If compliance monitoring finds that the implemented management strategies identified in MD LG 5 are not achieving the desired results, a change in action will be required in compliance with 43 CFR 4160.1 and IM 2018-023.	—	—	—	Summary statement: • Monitoring commitment if not meeting LHS Applicability for RMPs? Monitoring is not an RMP decision but is based on available staff and budget. This is more appropriately addressed as a mix of 1) compliance with the grazing regulations and 2) implementation prioritization. Not carried forward as it's related to implementation prioritization, which is not an RMP action.
MD RM-8: (ADH) Develop drought contingency plans at the appropriate landscape unit that provide for a consistent/appropriate BLM response. Plans shall establish policy for addressing ongoing drought and post-drought recovery for GRSG habitat objectives.	**MD LG 14**: In response to weather conditions (i.e. drought) adjust grazing management (i.e., delay turnout, adjust pasture rotations, adjust the amount and/or duration of grazing) as appropriate to provide for adequate food and cover for GRSG.	**Dillon MD LG 14**: In response to weather conditions (i.e. drought) adjust grazing management (i.e., delay turnout, adjust pasture rotations, adjust the amount and/or duration of grazing) as appropriate to provide for adequate food and cover for GRSG. **Lewistown Action LG-1.13**: During drought periods, prioritize evaluating effects of the drought in PHMA, relative to their needs for food and cover. Drought management will continue to be in accordance with the Montana/Dakotas drought policy (see Appendix I, Drought Policy, in the Lewistown Field Office Proposed RMPA/Final EIS). Since there is a lag in vegetation recovery following drought, post-drought management will be implemented to allow for vegetation recovery that meets GRSG needs in PHMA. In accordance with BLM grazing regulation 43 CFR, Part 4130.3-3, consultation, cooperation, and coordination with owners or lessees having lands or	—	**MD LG 5:** During drought conditions use a recognized drought indicator, such as the Drought Monitor or Palmer Drought Severity Index, to determine when abnormally dry or drought conditions are developing, present, or easing. When such conditions are developing or present: 1. Conduct pre-season assessments prior to livestock turn out. 2. Monitor vegetation conditions during authorized livestock use periods to determine need for early removal or other changes to meet seasonal PHMA and GHMA objectives. If livestock grazing is deferred due to drought, reevaluate vegetation and Greater Sage-grouse habitat indicators that measure Greater Sage-grouse habitat prior to reauthorization of grazing.	~~**MA-LG-7:** In PHMA, during drought periods, prioritize evaluating effects of the drought relative to GRSG needs for food and cover.~~ ~~Initiate emergency management measures (e.g. delaying turnout, adjusting the amount and/or duration of livestock grazing, implement other terms of the permit) during times of drought to protect GRSG habitat, in accordance with Instruction Memorandum 2013-094 (Resource Management During Drought), or other agency policies.~~ ~~Implement post-drought management to allow for vegetation recovery that meets GRSG needs.~~	**MD LG 7:** When periods of drought occur, where appropriate, the AO will evaluate strategies to address drought through coordination with grazing permittee/lessee and annual billings processes. In cooperation with livestock grazing permittees/lessees, drought contingency plans will be developed at the appropriate landscape unit that provide for a consistent/appropriate BLM response. Contingency plans shall establish strategies for addressing ongoing drought and post-drought recovery.	Summary statement: • Drought response Applicability for RMPs? • Drought is not solely a livestock grazing issue. However, as drought directly effects vegetation that is used by both livestock grazing and GRSG, there is a connection. Consolidated grazing related management associated with drought to the BMP appendix, as the existing management to the left is more related to best practices than it is RMP-level decision-making or allocation changes. • Additionally, 43 CFR 4110.3-3(b) provides the ability of the authorized officer to determine that when resources on public lands require protection because of drought … that actions can be taken.

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(See above.)	*(See above.)*	managing resources within the area, the affected cooperative state grazing district, and interested public will be completed prior to adjusting post-drought livestock management if the grazing permit is being modified to make these adjustments. Implementation of adjustments will be initiated through documented agreement or by decision of the authorized officer in accordance with BLM grazing regulation 43 CFR, Part 4160. **North Dakota Management Direction LG-1.11**: During drought periods, prioritize evaluating effects of the drought in PHMA relative to their needs for food and cover. Management will continue to be in accordance with the Montana-Dakotas Drought Policy (see Appendix H, Drought Policy, of the 2015 Greater Sage-Grouse Approved RMPA/ROD [BLM 2015a]).	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*
MD RM-9: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA would include specific management thresholds based on Table 2.3 in the Proposed Plan, Land Health Standards (43 CFR, Part 4180.2), ecological site potential, and one or more defined responses that would allow the authorizing officer to make adjustments to livestock grazing that have already been subject to NEPA analysis.	**MD LG 16**: Grazing in the PHMA and IHMA will be managed according to the process outlined in the text below, and the grazing permit renewal process will be managed according to 43 CFR 4100, Subpart 4180, and as outlined in the process below. a. Incorporate the Greater Sage-Grouse desired conditions in Table 2.2 [of the 2015 Final EIS] and management considerations as desired conditions, and manage livestock grazing, recognizing that these conditions may not be achievable: (1) due to the existing ecological	**Dillon MD LG 16**: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMA will include specific management thresholds, based on GRSG Habitat Objectives Table, Land Health Standards (43 CFR 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. **Billings MD LG-13**: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will	**MD LG 3:** The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within ~~SFA and~~ PHMAs will include specific management thresholds based on GRSG Habitat Objectives Table (Table 2-2), Land Health Standards (43 CFR, Part 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.	**MD LG 13:** The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMA will include specific management thresholds based on GRSG Habitat Objectives Table 2-2, Land Health Standards (43 CFR, Part 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.	**MA-LG-6 (cont.):** When improper livestock grazing is the causal factor for not meeting or making progress towards achievable habitat objectives and Land Health Standards, ~~T~~the NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within ~~SFA and~~ PHMA will analyze multiple potential modifications (e.g., alternatives from the list above) that address the reasons for not meeting, allowing the ~~include specific management thresholds based on **Table 2-2**, Land Health Standards (43 CFR, Part 4180.2), and ecological~~	**MD LG 4 (cont.)**: When NEPA analysis is required for a specific implementation action, one alternative would include mechanisms to make adjustments to meet or make progress toward meeting the wildlife/special status species standard. The analysis should also identify the BLM-approved data collection methodologies used for monitoring conditions and determining when adjustments are necessary. If current grazing management meets land health standards and provides for Greater Sage-Grouse habitat, there would be no need to analyze an alternative for Greater Sage-Grouse. Authorized uses in PHMA that incorporate habitat objectives	Summary statement: • Thresholds and Responses in permit renewals Applicability for RMPs? Alternatives 4, 5, 6 and the Proposed RMP Amendment include the concept of a proactive approach associated with thresholds and responses in the alternatives above under Management Action RM-2.

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(See above.)	condition, ecological potential, or existing vegetation; or (2) due to causal events unrelated to existing livestock grazing; and 3) that they are not intended to be prescriptive at the allotment level. b. Conduct habitat assessments using appropriate monitoring methods. Where appropriate, make a determination of factors causing any failure to achieve the desired conditions in Table 2.2 [of the 2015 Final EIS]. The assessment will be conducted at a resolution and scale sufficient to document the habitat condition and will include local, spatial, and interannual variability. Any determination relative to the habitat characteristics (Table 2.2 [of the 2015 Final EIS]) will be based on existing ecological condition, ecological potential, and existing vegetation information. This is to ensure the assessment recognizes whether these habitat characteristics are achievable. c. The assessment will rely on published characteristics of Greater Sage-Grouse habitat and the ecological site descriptions, on Table 2.2 [of the 2015 Final EIS as amended], and where available and applicable, rangeland health determinations made in accordance with 43 CFR 4180.2(c). d. After conducting the assessment in (b), above, if	include specific management thresholds based on GRSG Habitat Objectives Table (Table 2-6) and Land Health Standards (43 CFR, Part4180.2) and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. **MD LG-15**: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds based on GRSG Habitat Objectives Table (Table 2-6) and Land Health Standards (43 CFR, Part4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. **Miles City MD LG-4:** The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds based on GRSG Habitat Objectives Table and Land Health Standards (43 CFR, Part4180.2) and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. **South Dakota MD 34**: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management	*(See above.)*	*(See above.)*	~~site potential, and one or more defined responses that will allow the~~ authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. Adjustments to meet seasonal GRSG habitat requirements could include those items identified in the list above.	for Greater Sage-Grouse must develop desired conditions based on Greater Sage-Grouse habitats present in the allotment and the ecological potential of sites that supports these habitats. Metrics used to monitor for objectives must be developed and inform the wildlife/SSS portion of the Standards for Healthy Rangelands. Within PHMA, seasonal habitat objectives for Greater Sage-Grouse apply only to those habitats delineated within an allotment during the specific season (e.g., breeding season objectives during breeding season). Data needed to inform the relationship between the authorized use and habitat condition would come from sample locations that appropriately reflect the impact of the authorized use on habitat conditions. Data points should fall within Greater Sage-Grouse seasonal habitat areas and be collected on ecological sites that have the potential to produce Greater Sage-Grouse habitat~~The NEPA analysis for renewals and modifications of livestock grazing permits/leases that includes lands within SFAs and PHMA will include specific management thresholds based on GRSG habitat objectives (Tables 2-2 and 2-3) and Land Health Standards (43 CFR 4180.2), and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis~~.	*(See above.)*

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(See above.)	the current grazing system achieves applicable Idaho rangeland health standards, absent substantial and compelling information, no further grazing management changes are necessary to achieve desired conditions for Greater Sage-Grouse habitat. e. If the process and conditions outlined in (b), above demonstrate that livestock grazing is limiting achievement of the desired conditions (Table 2.2 [of the 2015 Final EIS]), renewed permits will include measures, including but not limited to the actions outlined in **Appendix C** to achieve desired habitat conditions. These measures must be tailored to address the specific management issues. f. Adaptive management changes related to existing grazing permits should be undertaken only where improper grazing is determined to be the causal factor in not meeting habitat characteristics, specific to site capability, based on monitoring, with appropriate spatial variability. See **Appendix C**. g. Where management changes are needed and necessary pursuant to (f), above, implement management actions that are narrowly tailored to address the specific habitat objective applied at the allotment or activity plan level, including the actions outlined in **Appendix C**,	thresholds based on GRSG Habitat Objectives Table and Land Health Standards (43 CFR, Part4180.2) and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. **South Dakota MD 36:** The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds, based on GRSG Habitat Objectives (Table 2-3), Habitat Objectives for GRSG and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. **North Dakota Management Direction LG-1.8:** Develop specific objectives to conserve, enhance or restore PHMA based on ecological site descriptions and assessments (including within wetlands and riparian areas). If an effective grazing system that meets GRSG habitat requirements is not already in place, analyze at least one alternative that conserves, restores or enhances GRSG habitat in the NEPA document prepared for the permit renewal. **North Dakota Management Direction LG-1.5**: The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

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(See above.)	Grazing Section of BMPs. (The Governor's plan is attached as **Appendix I** for references to this section.)~~The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within SFA and PHMA will include specific management thresholds, based on GRSG Habitat Objectives Table, Land Health Standards (43 CFR 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis.~~	management thresholds, based on GRSG Habitat Objectives (Table 2-3), Habitat Objectives for GRSG and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. **Lewistown Action LG 1.5** The NEPA analysis for renewals and modifications of livestock grazing permits/leases that include lands within PHMA will include specific management thresholds, based on GRSG Habitat Objectives (Table 2-2), Land Health Standards (43 CFR, Part 4180.2) and ecological site potential, and one or more defined responses that will allow the authorizing officer to make adjustments to livestock grazing that have already been subjected to NEPA analysis. **Lewistown Action LG-1.10**: Conserve, enhance, or restore PHMA based on ecological site descriptions (including wetlands and riparian areas). If an effective grazing system that meets GRSG habitat objectives is not already in place, analyze at least one allotment-specific alternative within the planning unit/permit renewal process that conserves, restores, or enhances PHMA.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

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MD RM-10: Allotments within PHMA, focusing on those containing riparian areas, including wet meadows, would be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.	**MD LG 17**: Allotments within ~~SFA, followed by those within~~ PHMA with declining Greater Sage-Grouse populations, defined by a soft or hard adaptive management trigger being engaged and/or with land health concerns, ~~and focusing on those containing riparian areas, including wet meadows,~~ will be prioritized for field checks ~~to help ensure compliance with the terms and conditions of the grazing permits. Field checks can include monitoring for actual use, utilization, and use supervision. Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFA followed by areas of PHMA outside SFA~~.	**Dillon MD LG 17**: Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks can include monitoring for actual use, utilization, and use supervision. Management and conservation action prioritization will occur at the Conservation Area (CA) scale and be based on GRSG population and habitat trends: Focusing management and conservation actions first in SFA followed by areas of PHMA outside SFA. **Billings LG-16, Lewistown LG 1.5, HiLine Grazing MD-17, Miles City MD-5, North Dakota Part of Management Direction LG 1.5, and South Dakota MD-35:** Allotments within PHMA, focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks can include monitoring for actual use, utilization, and use supervision	**MD LG 11**: Allotments within ~~SFA, followed by those within~~ PHMAs, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.	**MD LG 14:** Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.	~~**MA LG 9:** In PHMA, assess livestock grazing in riparian and meadow complexes and ensure recovery or maintenance of appropriate vegetation and water quality. Where recovery or maintenance is not occurring and the causal factor is livestock grazing, reduce pressure on riparian or wet meadow vegetation used by GRSG in the summer by adjusting grazing management practices (e.g., use fencing/herding techniques, or changes in seasonal use or livestock distribution).~~ ~~Allotments within SFA, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks could include monitoring for actual use, utilization, and use supervision.~~	**MD LG 5**: BLM monitoring would be used to evaluate progress toward achieving land health standards within PHMA and, where not achieved, to determine if existing grazing management practices or levels of grazing use on public lands are significant factors in failing to meet, maintain or make progress toward achieving the standards and conform with the guidelines, which through this process will identify appropriate actions to address nonachievement and nonconformance. ~~Allotments within SFAs, followed by those within PHMA, and focusing on those containing riparian areas, including wet meadows, will be prioritized for field checks to help ensure compliance with the terms and conditions of the grazing permits. Field checks include monitoring for actual use, utilization, and use supervision.~~	Summary statement: • Monitoring to LHS/habitat objectives, including riparian monitoring and prioritizing "field checks" Applicability for RMPs? Prioritization of monitoring and "field checks" is not an RMP decision. It depends on staffing, budget, and the consideration of other resource issues that include, but are not limited to GRSG, other listed species, LHS, wildfire, or other resource concerns. The 2015 FWS listing determination cited the prioritization for reviewing grazing permits and conducting monitoring to determine if changes may be needed to meet GRSG habitat conditions – though it also noted that other criteria could be considered. 43 CFR 4180 directs BLM to take appropriate action if livestock are the causal factor for failing to achieve the land health standards. Handbook 4180 also provided guidance on assessing/evaluating Standard 2 which is the Riparian standard.

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MD RM-11: (ADH) Manage riparian areas and wet meadows for proper functioning condition within ADH. **MD RM-12:** (ADH) Within ADH, manage wet meadows to maintain diverse species richness, including a component of perennial forbs, relative to site potential (i.e., reference state). **MD RM-13:** (ADH) Establish permit/lease terms and conditions in conjunction with grazing strategies to ensure that the timing and level of utilization results in wet meadows with diverse species richness, including a component of perennial forbs, relative to site potential (i.e., reference state).	—	**Lewistown Action LG-1.18**: Within PHMA, reduce hot season grazing on riparian and meadow complexes to promote recovery or maintenance of appropriate vegetation and water quality. Use fencing/herding techniques or seasonal use or livestock distribution changes to reduce pressure on riparian or wet meadow vegetation used by GRSG in summer. Hot season use of riparian and wet meadow complexes may be authorized where consistent with overall GRSG habitat objectives and where use is currently resulting in vegetative conditions that are in conformance with land health standards. **HiLine (Same as Riparian MD-10):** Grazing techniques and practices detailed in Appendix I will be implemented to reduce hot season (summer) grazing on riparian and meadow complexes within the PHMA. Alternative water facilities will be installed to relieve grazing impacts on riparian areas inside of priority sage-grouse habitat.	**MD LG 12**: Grazing management strategies for riparian areas and wet meadows will, at a minimum, maintain or achieve proper functioning condition (PFC) and promote GRSG brood-rearing habitat objectives (Table 2-2) within PHMAs and GHMAs.	—	~~**MA-LG-8:** In PHMA, manage riparian areas and wet meadows for proper functioning condition.~~	**MD LG 10**: ~~Grazing between~~ In PHMA, for riparian habitats and/or wet meadow communities utilized by Greater Sage-Grouse, livestock grazing would be managed ~~and upland habitats will be balanced~~ to promote the production and availability of beneficial forbs ~~to GRSG~~ for use during ~~nesting and~~ brood-rearing~~, while maintaining upland conditions and functions. Grazing in meadows, mesic habitats, and riparian pastures also will be balanced to promote the production and availability of beneficial grasses and forbs for use during late brood-rearing within PHMA, while maintaining upland conditions and functions.~~	Summary statement: • Management of riparian areas/wet meadows Applicability for RMPs? Riparian management is not a solely livestock grazing issue. Managing for PFC is related to land health standards and vegetation management in an RMP. Including it in the livestock grazing section implies that grazing is the only affected or responsible resource use, which it is not. Desired conditions and associated management for riparian areas are a component of the "suitable habitat" action when it comes to GRSG, and/or are addressed in vegetation sections of the original RMP decisions. As this is a duplicative concept with language and concepts in the GRSG habitat objectives and land health standards it is being considered for removal from specific reference in the livestock grazing section under Alternatives 4, 5, 6 and the Proposed RMP Amendment.
MD RM-14: (ADH) Authorize new water development only after determining that the project will not adversely impact GRSG from habitat loss. Ensure that adequate long-term grazing management is in effect before authorizing water developments that may increase levels of use or change season of use. Give specific consideration to adjacent or downstream wetland habitat when a project entails a diversion from a spring or seep.	—	—	**MD LG 16:** Authorize new water developments for diversion from spring or seep source, in accordance with state water law and subject to valid existing rights when PHMAs and GHMAs will benefit from or not be negatively impacted by the new development. This includes developing new water sources for livestock as part of a grazing management plan to improve GRSG habitat.	—	**MA-LG-10:** In PHMA, manage existing and ~~limit authorization of~~ new water developments to ~~projects that~~ have a neutral ~~effect~~ or ~~are~~ beneficial effect to GRSG habitat~~ (such as by shifting livestock use away from critical areas). New developments that divert surface water must be designed to maintain riparian or wet meadow vegetation and hydrology to meet GRSG needs.~~	—	Summary statement: • Guidance/Management for new water developments Applicability for RMPs? Developed consolidated management in the alternative table above that combines management for any new grazing improvement project. See chapter 2 (and also Appendix 21, Section 21.1.10) Livestock Grazing decisions RM-3 and RM-4.

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MD RM-15: (ADH) Analyze springs, seeps and associated pipelines to determine if modifications are necessary to maintain the continuity of the predevelopment riparian area. If necessary to maintain GRSG populations or reverse a downward population trend caused by habitat loss, modify the project as necessary to restore the applicable wetland habitat.	—	—	**MD LG 15:** In accordance with state water law and subject to valid existing rights, remove or modify water developments that are negatively impacting GRSG habitats. **MD LG 17:** Modify water development projects to ensure riparian habitats in PHMAs and GHMAs are being maintained or improved in compliance with valid existing rights and in accordance with state water law. **MD LG 19:** In PHMAs and GHMAs, remove livestock ponds built in perennial channels that are negatively impacting riparian habitats, either directly or indirectly, unless riparian access is able to be controlled and negative impacts effectively mitigated (e.g.; water gap fence to pond), and do not permit new ones to be built in these areas subject to valid existing rights. Prior to pond removal, offsite watering options will be examined and considered.	**MD LG 6:** Authorize new, relocate, or modify existing range improvements that use seeps or springs as a water source to enhance their year round functionality. Install or retrofit wildlife escape ramps in all livestock water troughs or water storage facilities (e.g., catchments, storage tanks). Maintain, enhance, or reestablish riparian areas in PHMA and GHMA **MD LG 7:** Identify playas, wetlands, and springs that have been modified for livestock watering within PHMA and GHMA. Identify those water improvements that have Greater Sage-grouse population limiting implications, and develop projects for rehabilitation. Further actions should be instigated for development of water off site; new water should be available before existing water is eliminated.	~~**MA-LG-11:** In PHMA, evaluate existing water developments (springs, seeps, etc., and their associated pipelines) to determine if modifications are necessary to maintain or improve riparian areas and GRSG habitat. Make modifications where necessary, considering impacts on other water uses when such considerations are neutral or beneficial to GRSG.~~	**MD LG 12**: Existing water developments associated with springs and seeps will be evaluated and associated pipelines/structures to those developments having a negative effect on PHMA will be modified.	Summary statement: • Guidance/Management of existing water developments (monitor, evaluate, maintain, adjust, and/or remove) Applicability for RMPs? Developed consolidated management in the alternative table above that combines management for any existing grazing improvement project. See chapter 2 (and also Appendix 21, Section 21.1.10) Livestock Grazing decisions RM-3 and RM-4.

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MD RM-16: (ADH) Manage for a habitat objective that is primarily sagebrush with a mosaic of seral stages and sagebrush in all age classes. On a site-by-site basis, do not allow treatments that would adversely affect GRSG populations. See Appendix H, Guidelines for Implementation and Adaptive Management.	—	**North Dakota Management Direction LG-1.16**: In PHMA, allow treatments that conserve, enhance or restore GRSG habitat as well as other priority species habitat (this includes treatments that benefit livestock as part of an AMP/Conservation Plan to improve GRSG habitat).	—	—	~~**MA-LG-12:** In PHMA, ensure that vegetation treatments conserve, enhance or restore GRSG habitat (this includes treatments that benefit livestock).~~	—	Summary statement: • Direction for "treatments" that help GRSG Applicability for RMPs? Not a grazing specific action. Management actions for vegetation treatments are addressed in management actions in the vegetation section, which are not being changed by this amendment effort. As this is a duplicative concept with language and concepts in the GRSG habitat objectives and land health standards it is being considered for removal from specific reference in the livestock grazing section under Alternatives 4, 5, 6 and the Proposed RMP Amendment.
—	**MD LG 5**: When modifying grazing management, analyze indirect impacts on habitat, including changes in fuel loading and wildfire behavior.	**Dillon MD LG 5**: When modifying grazing management, analyze indirect impacts on habitat, including changes in fuel loading and wildfire behavior.	—	—	—	—	Summary statement: • Future NEPA guidance Applicability for RMPs? Identification of what to analyze in future NEPA actions is not an RMP decision. That's a NEPA policy implementation issue.

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MD RM-17: (PHMA) Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to GRSG PHMA to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings are part of an Allotment Management Plan/Conservation Plan or if they provide value in conserving or enhancing the rest of PHMA, then no restoration would be necessary. Assess the compatibility of these seedings for GRSG habitat or as a component of a grazing system during the land health assessments (Davies et al. 2011). For example: Some introduced grass seedings are an integral part of a livestock management plan and reduce grazing pressure in important sagebrush habitats or serve as a strategic fuels management area.	—	**Lewistown Action LG-1.21**: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to PHMA to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings are part of a grazing management plan that is providing value in conserving or enhancing native rangelands in PHMA and other priority wildlife habitats, then no restoration will be necessary. Assess the compatibility of these seedings for GRSG habitat or as a component of a grazing system during the land health evaluation and determination process. **North Dakota Management Direction LG-1.17**: Evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses in and adjacent to PHMA to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If these seedings are part of an AMP/Conservation Plan or if they provide value in conserving or enhancing the rest of the PHMA, then no restoration will be necessary. Assess the compatibility of these seedings for GRSG habitat or as a component of a grazing system during the land health assessments.	—	—	~~**MA LG-13**: In PHMA, evaluate the role of existing seedings that are currently composed of primarily introduced perennial grasses to determine if they should be restored to sagebrush or habitat of higher quality for GRSG. If existing seedings provide value in conserving or enhancing GRSG habitats, then no restoration will be necessary. Assess the compatibility of these seedings for GRSG habitat during the land health assessments.~~	—	Summary statement: • Seedings (evaluate, restore, management) Applicability for RMPs? Not a grazing specific action. Management objectives for vegetation treatments are encapsulated by the GRSG habitat objective and are captured in management by the connection between LHS and habitat objectives. As this is a duplicative concept with language and concepts in the GRSG habitat objectives and land health standards it is being considered for removal from specific reference in the livestock grazing section under Alternatives 4, 5, 6 and the Proposed RMP Amendment.

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MD RM-18: (ADH) Design new range improvement projects to enhance livestock distribution and to control the timing and intensity of utilization. Examples of structural range improvement projects are cattle guards, fences, corrals, pipelines, troughs, storage tanks, windmills, ponds/reservoirs, solar panels, and spring developments. Include a plan to monitor and control invasive plant species following any related ground disturbance. Place mineral or salt supplements away from water sources and leks in locations that enhance livestock distribution.	**MD LG 11:** Design any new structural range improvements, following appropriate cooperation, consultation and coordination, to minimize and/or mitigate impacts on GRSG habitat. Any new structural range improvements should be placed along existing disturbance corridors or in unsuitable habitat, to the extent practical, and are subject to RDFs (**Appendix C**). Structural range improvement in this context, include, but are not limited to: fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments.	**Dillon MD LG 11:** Design any new structural range improvements, following appropriate cooperation, consultation and coordination, to minimize and/or mitigate impacts on GRSG habitat. Any new structural range improvements should be placed along existing disturbance corridors or in unsuitable habitat, to the extent practical, and are subject to RDFs (**Appendix C**). Structural range improvement in this context, include, but are not limited to: fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. **Lewistown Action LG-1.24**: In PHMA, site and design new structural range improvements and location of supplements (salt or protein blocks) to conserve, enhance, or restore said habitat through an improved grazing management system relative to GRSG habitat objectives. Structural range improvements, in this context, include cattle guards, fences, exclosures, corrals, or other livestock handling structures; pipelines, troughs, storage tanks (including movable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels, and spring developments). **North Dakota Management Direction LG-1.18**: In PHMA, design any new structural range improvements and location of supplements (salt or protein blocks) to	**MD LG 13:** For range improvement projects, review Objective SSS 4 and apply MDs SSS 1 through SSS 4 when reviewing and analyzing projects and activities proposed in GRSG habitat.	—	~~**MA-LG-14:** In PHMA, design new structural range improvements to have a neutral effect or conserve, enhance, or restore GRSG habitat through an improved grazing management system relative to GRSG objectives. Structural range improvements, in this context, include but are not limited to: cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. Potential for invasive species establishment or increase following construction must be considered in the project planning process and monitored and treated post-construction.~~	**MD LG 11**: Range improvement projects will be planned and authorized in a way that contributes to rangeland health and maintains and/or improves Greater Sage-Grouse and its habitat.	Summary statement: • Guidance/Management for new range improvement projects Applicability for RMPs? Developed consolidated management in the alternative table above that combines management for any new grazing improvement projects. See chapter 2 (and also Appendix 21, Section 21.1.10) Livestock Grazing decisions RM-3 and RM-4.

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(See above.)	*(See above.)*	conserve, enhance, or restore GRSG habitat through an improved grazing management system relative to GRSG objectives. Structural range improvements, in this context, include but are not limited to: cattle guards, fences, exclosures, corrals or other livestock handling structures; pipelines, troughs, storage tanks (including moveable tanks used in livestock water hauling), windmills, ponds/reservoirs, solar panels and spring developments. Potential for invasive species establishment or increase following construction must be considered in the project planning process and monitored and treated post-construction. **South Dakota MD-37: Range Improvements:** Range improvements in PHMA would be allowed if the improvements would not impact GRSG, improvements would provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats, or if improvements would meet the lek buffer requirement. Refer to Appendix B for a discussion about GRSG lek buffers.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

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MD RM-19: (PHMA) Where conditions create the potential for impacts from West Nile virus from developments or modification of water developments, use preferred design features (PDFs)/RDFs to mitigate the potential impacts. See **Appendix C** (Required Design Features, Preferred Design Features, and Suggested Design Features).	—	**Lewistown Action LG-1.26**: When developing or modifying water developments in PHMA and GHMA, use applicable RDFs (Appendix C) to reduce potential impacts from West Nile virus. **HiLine (Same as Vegetation MD-9):** Water developments will be installed and/or maintained to facilitate control of livestock use of vegetation, support other uses, and protect resource values. In order to minimize surface disturbance, have reliable water of better quality and not alter normal surface flow of water, alternative water developments will be emphasized before constructing new pits and reservoirs. The BLM will manage water developments within Greater Sage-Grouse habitat to reduce the spread of West Nile virus (Appendix I). **Miles City MD 1:** Where deemed effective, water developments will be managed to reduce the spread of West Nile virus (see Appendix C, GRSG Required Design Features). **North Dakota Management Direction LG-1.19**: When developing or modifying water developments in PHMA, use applicable RDFs (Appendix C of the 2015 Greater Sage-Grouse Approved RMPA/ROD2 [BLM 2015a]) to mitigate potential impacts from West Nile virus.	—	**MD LG 8:** Design new and maintain existing water projects to avoid standing pools of shallow water that would spread West Nile Virus.	—	—	Summary statement: • West Nile virus guidance Applicability for RMPs? These are worded like a BMP and were added to the livestock grazing BMP appendix.

2015 RMP Amendment Livestock Grazing Management Direction with Updates from 2019 Amendment Identified							
Colorado	**Idaho**	**Montana/Dakotas**	**Nevada/California**	**Oregon**	**Utah**	**Wyoming**	**NOTES**
MD RM-20: (PHMA) Evaluate existing structural range improvements to determine if modifications are necessary to maintain GRSG populations or reverse a downward population trend caused by habitat loss. Modify, relocate, or remove projects as necessary.	**MD LG 12:** During the land health assessment and grazing permit renewal process, evaluate existing livestock management range improvements with respect to their effect on GRSG habitat. Consider removal of projects that are not needed for effective livestock management, are no longer in working condition, and/or negatively affect GRSG habitat, with the exception of functional projects needed for management of habitat for other threatened, endangered or proposed species or other sensitive resources.	**Dillon MD LG 12:** During the land health assessment and grazing permit renewal process, evaluate existing livestock management range improvements with respect to their effect on GRSG habitat. Consider removal of projects that are not needed for effective livestock management, are no longer in working condition, and/or negatively affect GRSG habitat, with the exception of functional projects needed for management of habitat for other threatened, endangered or proposed species or other sensitive resources.		**MD LG 10:** Avoid construction of livestock facilities and supplemental feeding of livestock within 1.2 mile of occupied or pending leks in Greater Sage-grouse habitat unless it is part of an approved habitat improvement project or approved by the authorized officer to improve ecological health or to create mosaics in dense sagebrush stands that are needed for optimum Greater Sage-grouse habitat.	~~**MA LG-15:** In PHMA, evaluate existing structural range improvements to make sure they have a neutral effect or conserve, enhance or restore GRSG habitat.~~	**MD LG 8**: In ~~GHMA and~~ PHMA, existing range improvements (e.g., fences, livestock/wildlife watering facilities) would continue to be evaluated and modified when necessary. ~~The potential risk to Greater Sage-Grouse and its habitats from existing structural range improvements will be evaluated. The potential for modification of those structural range improvements identified as posing a risk will be addressed.~~	Summary statement: • Guidance/Management of existing structural range improvements (evaluate, maintain, adjust, and/or remove), as well as mineral/salt supplements Applicability for RMPs? Developed a consolidated management action specific to management of existing grazing projects in GRSG HMAs. See chapter 2 (and also Appendix 21, Section 21.1.10) Livestock Grazing decisions RM-3 and RM-4.
Place mineral and salt supplements away from water sources and leks in locations that enhance livestock distribution.	**MD LG 9:** Evaluate the locations where salt/supplements are placed, coordinate salt/supplements placement to reduce impacts on GRSG habitat (e.g., existing disturbed areas).	**Dillon MD LG 9:** Evaluate the locations where salt/supplements are placed, coordinate salt/supplements placement to reduce impacts on GRSG habitat (e.g., existing disturbed areas). **Lewistown Action LG-1.27**: During the land health evaluation and determination and grazing authorization renewal process (typically every 10 years), examine existing structural range improvements and location of supplements (salt or protein blocks) to ensure they conserve, enhance or restore PHMA. During the allotment evaluation and determination and grazing authorization renewal process, examine existing structural range improvements to ensure they conserve, enhance, or restore PHMA. **HiLine Same as Wildlife MD-43g):** Existing range improvements, including the location of supplements, will be	**MD LG 18:** Locate salting and supplemental feeding locations, temporary or mobile watering, and new handling facilities (e.g., corrals and chutes) at least 1 mile from riparian areas, springs, and meadows. The distance can be greater based on site-specific conditions.	Supplemental feeding in Greater Sage-grouse habitat must be part of an approved habitat improvement plan or approved by the authorized officer.		Supplements and supplemental feeding would continue to be authorized where appropriate.	As for the supplement guidance, supplemental feeding has to be approved by the AO, whether it is in this RMP or not. And terms and conditions can include (and usually do include) specifications on where/where not to place supplements. As such, it is not an RMP decision, but fits better as grazing BMPs, where these concepts are considered to be moved under Alternatives 4, 5, 6 and the Proposed RMP Amendment.

2015 RMP Amendment Livestock Grazing Management Direction with Updates from 2019 Amendment Identified							
Colorado	**Idaho**	**Montana/Dakotas**	**Nevada/California**	**Oregon**	**Utah**	**Wyoming**	**NOTES**
(See above.)	*(See above.)*	evaluated and if necessary modified to conserve, enhance or restore sage-grouse habitat. **North Dakota Management Direction LG-1.20**: In PHMA, evaluate existing structural range improvements and location of supplements (salt or protein blocks) during grazing lease renewal process to make sure they conserve, enhance or restore GRSG habitat.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*
MD RM-21: (ADH) Mark fences in high risk areas (Christiansen 2009; Stevens 2011). (PHMA) Where marking fences does not reduce fence-related GRSG mortality, modify fences. Where modification does not reduce GRSG mortality and the fence-related mortality is sufficient to adversely affect GRSG populations, remove fences.	**MD LG 13**: Prioritize removal, modification or marking of fences or other structures in areas of high collision risk following appropriate cooperation, consultation and coordination to reduce the incidence of GRSG mortality due to fence strikes (Stevens et al. 2012).	**Dillon MD LG 13**: Prioritize removal, modification or marking of fences or other structures in areas of high collision risk following appropriate cooperation, consultation and coordination to reduce the incidence of GRSG mortality due to fence strikes (Stevens et al. 2012). **Lewistown Action LG-1.27** Identify and mark fences in high and moderate risk areas, as identified by the use of "The Fence Collision Risk Tool" (http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/) within PHMA, based on proximity to lek, lek size, and topography (Stevens 2011, Stevens et al. 2013). **North Dakota Management Direction LG-1.20:** To reduce outright GRSG strikes and mortality, remove, modify or mark fences in high risk areas within PHMA based on proximity to lek, lek size, and topography.	**MD LG 14:** Build or modify livestock exclosures so that they are large enough to provide hiding cover to GRSG and other wildlife and to reduce the possibility of wildlife collisions with fences (Christiansen 2009; Stevens 2011; NRCS 2012). **MD LG 23:** Fences shall not be constructed or reconstructed within 1.2 miles from the perimeter of occupied leks, unless the collision risk can be mitigated through design features or markings (e.g., mark, laydown fences, and design).	**MD LG 9:** Remove, modify, or mark fences identified as high risk for collisions, generally within 1.2 miles of occupied or pending leks.	**MA-LG-16:** To reduce outright GRSG strikes and mortality, remove, modify or mark fences in high risk areas (Stevens et al. 2012) based on proximity to lek (e.g., within 1.2 miles of a lek), lek size, and topography, or as latest science indicates. ~~Prioritize actions in SFA first, then PHMA.~~ Employ NRCS fence collision risk tool (NRCS/CEAP Conservation Insight Publication "Applying the Sage Grouse Fence Collision Risk Tool to Reduce Bird Strikes").	—	Summary statement: • Fences – construction, reconstructions, marking, removal, modification, etc. Applicability for RMPs? Developed a consolidated management action specific to management of fences in GRSG HMAs. See chapter 2 (and also Appendix 21, Section 21.1.10) Livestock Grazing decision RM-5.

2015 RMP Amendment Livestock Grazing Management Direction with Updates from 2019 Amendment Identified							
Colorado	**Idaho**	**Montana/Dakotas**	**Nevada/California**	**Oregon**	**Utah**	**Wyoming**	**NOTES**
MD RM-22: (ADH) Monitor for and treat invasive species associated with existing range improvements (Gelbard and Belnap 2003; Bergquist et al. 2007).	—	**Lewistown Action LG-1.27:** In PHMA and GHMA, monitor for and treat invasive and noxious weed species associated with existing range improvement projects. **North Dakota Management Direction LG-1.20:** Monitor for, and treat invasive species associated with existing range improvements.	—	—	~~**MA-LG-17:** In PHMA, monitor for and treat noxious weeds and treat invasive species where needed, associated with existing range improvements.~~	—	Summary statement: • Invasive species associated with range improvements Applicability for RMPs? Don't need a specific management action related to weeds in livestock grazing. The GRSG habitat objectives encapsulates the weed issue. The language in the management actions are not required to be an RMP decision to implement given language that is already captured in the habitat objective to manage for suitable GRSG habitat.
MD RM-23: (ADH) At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized shall remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3. When a permittee or lessee voluntarily relinquishes grazing preference, consider conversion of the allotment to a reserve common allotment that will remain available for use on a temporary, nonrenewable basis for the benefit of GRSG habitat. Authorize temporary nonrenewal permits in Reserve Common Allotments to meet resource objectives elsewhere such as rest or deferment due to fire or vegetation treatments. Temporary use of reserve common allotments would not be allowed due to drought or overuse of customary allotments.	**MD LG 18**: At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3.	**Dillon MD LG 18, Billings Management Direction LG-17, Lewistown Action LG 1.5, HiLine LG-16, Miles City Management Decision 6, North Dakota Management Decision LG-1.7, South Dakota MD-23:** At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3. **Billings MD-LG-11:** All allotments wholly located in Greater Sage-Grouse PHMA will be considered for retirement, where the base property owner relinquishes their preference.	**MD LG 21:** At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized shall remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments and fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3.	**MD LG 15:** At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3.	~~**MA-LG-18:** At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR, Part 4110.2-3.~~	**MD LG 6:** At the time a permittee or lessee voluntarily relinquishes a permit or lease, the BLM will consider whether the public lands where that permitted use was authorized should remain available for livestock grazing or be used for other resource management objectives, such as reserve common allotments or fire breaks. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR 4110.2-3.	Summary statement: • Relinquishment Applicability for RMPs? Retained this specific grazing management action in chapter 2 (see also Appendix 21, Section 21.1.10) as Management Action RM-6.

2015 RMP Amendment Livestock Grazing Management Direction with Updates from 2019 Amendment Identified							
Colorado	**Idaho**	**Montana/Dakotas**	**Nevada/California**	**Oregon**	**Utah**	**Wyoming**	**NOTES**
—	**MD LG 10**: Incorporate RDFs into Terms and Conditions for crossing permits to limit disturbance of occupied leks when trailing livestock across BLM administered lands in the spring. Work with permittees in locating over-nighting, watering and bedding locations to minimize impacts on seasonal habitats.	**Dillon MD LG 10**: Incorporate RDFs into Terms and Conditions for crossing permits to limit disturbance of occupied leks when trailing livestock across BLM administered lands in the spring. Work with permittees in locating over-nighting, watering and bedding locations to minimize impacts on seasonal habitats.	—	**MD LG 3:** The timing and location of livestock turnout and trailing shall not contribute to livestock congregation on occupied or pending leks during the Greater Sage-grouse breeding season of March 1 through June 30.	—	**MD LG 9:** Livestock trailing that is authorized will include a trailing plan to utilize non-habitat to the extent possible, include specific routes and timeframes for trailing, utilize existing trails, and avoid stopovers on occupied leks, as appropriate.	Summary statement: • Management of trailing activities Applicability for RMPs? The existing language fits better as BMPs, not as RMP decisions. Included in the BMP appendix under Alternatives 4, 5, 6, and the Proposed RMP Amendment.
—	**MD LG 7**: Where opportunities exist, establish forage reserves to facilitate restoration and rehabilitation efforts in GRSG habitat areas. A forage reserve is an area that is set aside for use as needed by various permittees who might be displaced by wildfire, ESR, restoration efforts, etc. rather than having a term permit issued for grazing like a regular allotment.	**Dillon MD LG 7**: Where opportunities exist, establish forage reserves to facilitate restoration and rehabilitation efforts in GRSG habitat areas. A forage reserve is an area that is set aside for use as needed by various permittees who might be displaced by wildfire, ESR, restoration efforts, etc. rather than having a term permit issued for grazing like a regular allotment.	—	—	—	—	Summary statement: • Forage reserves Applicability for RMPs? Reserve Common Allotments are already included in Management Action RM-6. As such, a separate action is not needed as an RMP action. The area would still be available for livestock grazing, but authorizations would be applied to fill in for areas where authorized uses could not occur due to fire or vegetation treatments. Additional language is included in the BMP appendix for Alternatives 4, 5, 6 and the Proposed RMP Amendment.

2015 RMP Amendment Livestock Grazing Management Direction with Updates from 2019 Amendment Identified							
Colorado	**Idaho**	**Montana/Dakotas**	**Nevada/California**	**Oregon**	**Utah**	**Wyoming**	**NOTES**
—	—	—	**MD LG 9:** When a transfer application is received for preference on an allotment within GRSG habitat: • Transfer of Preference: A transfer of preference will be approved unless the applicant does not meet qualifications (43 CFR, Part 4110.1 and 4110.2). A transfer will be approved to an unqualified applicant if 4110.2-3(e) applies. • Issuing the permit: In accordance with Section 402(c)(2) of FLPMA, a new permit will be issued to the new preference holder with the same terms and conditions as the terminated permit unless: – A NEPA analysis of alternative terms and conditions has been completed. If changes in terms and conditions are needed to meet sage-grouse habitat needs or otherwise make progress toward meeting land health standards, issue a decision offering a permit with the new terms and conditions – If a new permit is issued as required by Section 402(c)(2) of FLPMA, then determine priority for completing land health evaluations, habitat assessments and NEPA analysis as described in MD LG 1.	—	—	—	Summary statement: • Transfers Applicability for RMPs? Not needed as an RMP action; can consider this type of action without an RMP. Most of this action just cites to regulations or refers to policy. Considered for removal under Alternatives 4, 5, 6, and the Proposed RMP Amendment.

2015 RMP Amendment Livestock Grazing Management Direction with Updates from 2019 Amendment Identified							
Colorado	**Idaho**	**Montana/Dakotas**	**Nevada/California**	**Oregon**	**Utah**	**Wyoming**	**NOTES**
—	—	—	**MD LG 20:** In PHMA and GHMA, rest areas that have received vegetative treatments from livestock grazing until resource monitoring data verifies the treatment objectives are being met and an appropriate grazing regime has been developed. Any livestock grazing temporary suspended use or other management changes per 43 CFR, Part 4110.3-2a for the purpose of a vegetation treatment will be done through the grazing decision, prior to treatment. **MD LG 22:** After grazing rest associated with vegetation treatments in PHMAs and GHMAs, monitor annually for a minimum of 5 years to ensure project objectives are being maintained.	—	—	—	Summary statement: • Resting after vegetation treatments Applicability for RMPs? Don't need a specific RMP management action related to resting treated areas from livestock grazing. The GRSG habitat objectives encapsulates the need to adjust any of the land uses to meet GRSG habitat objectives. The action itself refers to regulations under which such changes would be considered. Beyond that, monitoring is not an RMP decision but is based on available staff and budget. Considered for removal under Alternatives 4, 5, 6 and the Proposed RMP Amendment.

Appendix 16

Montana/Dakotas Oil and Gas Lease Stipulations

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Appendix 16. Montana/Dakotas Oil and Gas Lease Stipulations

16.1 SUMMARY OF ALTERNATIVES

Alternatives 1 and 2	Alternative 3	Alternatives 4,5,6	Proposed RMP Amendment
Refer to Appendix 2, Section 2.10 for current Stipulations	Lease stipulations, waivers, exceptions and modifications are not applicable. Closed to leasing in PHMA. (CHMA would be NSO with No WEMS).	Refer to text below for Stipulations applicable to Alternatives 4, 5 and 6.	Refer to text below for Stipulations applicable to the Proposed RMP Amendment

16.2 OIL AND GAS LEASE STIPULATIONS ALTERNATIVES 4,5 AND 6: SUMMARY

No.	Area	Stip Type	Language
1.	PHMA/RHMA	NSO	GREATER SAGE-GROUSE PHMA/WEST DECKER RHMA To protect Greater Sage-grouse breeding activities, surface occupancy and use is prohibited within 0.6 mile of the perimeter of active leks and lek complexes in Priority Habitat Management Areas (PHMA) and West Decker RHMA.
2.	PHMA/RHMA	NSO	GREATER SAGE-GROUSE PHMA/WEST DECKER RHMA To protect high density Greater-Sage Grouse habitat, including all seasonal habitats, surface occupancy and use is prohibited within Priority Habitat Management Areas (PHMA) and West Decker RHMA.
3.	PHMA/RHMA	CSU	GREATER SAGE-GROUSE PHMA/WEST DECKER RHMA <u>Disturbance/Density Cap</u> Projects that exceed disturbance or density thresholds will need to be redesigned, relocated, or modified to avoid or minimize disturbance to sage grouse habitat or density of facilities near sage-grouse leks.
4.	GHMA/RHMA	NSO	GREATER SAGE-GROUSE LEKS IN GHMA/MUSSELSHELL RHMA To protect Greater Sage-grouse breeding activities, surface occupancy and use is prohibited within 0.6 mile of the perimeter of active leks and lek complexes in General Habitat Management Areas (GHMA) and Musselshell RHMA.
5.	GHMA/RHMA	NSO	GREATER SAGE-GROUSE CRUCIAL WINTER RANGE IN GHMA/MUSSELSHELL RHMA To protect Greater Sage-grouse winter concentration area, surface occupancy and use is prohibited for oil and gas exploration and development in crucial winter range in General Habitat Management Areas (GHMA) and Musselshell RHMA.

No.	Area	Stip Type	Language
6.	GHMA/RHMA	CSU	GREATER SAGE-GROUSE SEASONAL HABITATS IN GHMA/MUSSELSHELL RHMA Surface occupancy and use will be avoided unless the project proponent can clearly demonstrate that the impacts can be adequately addressed application of the mitigation hierarchy, including conservation actions, needed design features, and offsets. Prior to surface-disturbing or disruptive activities a plan to maintain functionality of breeding, nesting sage-grouse, brood rearing and/or winter habitats for Greater Sage-Grouse will be prepared by the proponent and implemented upon approval by the authorized officer. The plan shall address how short-term and long-term direct and indirect effects to seasonal habitats will be mitigated based on current science and research.
7.	RHMA Cedar Creek	CSU	GREATER SAGE-GROUSE CEDAR CREEK RHMA Surface occupancy and use would be allowed with design features to minimize disturbance to sage-grouse habitat within the Cedar Creek Greater Sage-Grouse Restoration Habitat Management Area.
8.	CHMA	CSU	GREATER SAGE-GROUSE CHMA Surface occupancy and use will be avoided unless the project proponent can clearly demonstrate that the impacts to potential stopover sites can be adequately mitigated. Prior to such activities a plan to mitigate impacts will be prepared by the proponent and implemented upon approval by the AO.
9.	ALL HMAs	TL	GREATER SAGE GROUSE HMAs To protect Greater Sage-grouse populations utilizing important seasonal habitats, no surface use is allowed from December 1 through March 15 in winter range, March 15 - July 15 in breeding and nesting habitats and during migratory periods for stopover sites. This stipulation does not apply to operation and maintenance of production facilities.

16.3 OIL AND GAS LEASE STIPULATIONS ALTERNATIVES 4, 5 AND 6: COMPLETE TEXT

16.3.1 No Surface Occupancy: Greater Sage-Grouse PHMA/West Decker RHMA

Stipulation: To protect Greater Sage-grouse breeding activities, surface occupancy and use is prohibited within 0.6 mile of the perimeter of active leks and lek complexes in Priority Habitat Management Areas (PHMA) and West Decker RHMA.

Objective: To maintain the integrity of Greater Sage-Grouse breeding activities in PHMA/West Decker RHMA and support sustainable Greater-Sage Grouse populations.

Waivers, Exceptions & Modifications: (See Range-wide Issues)

16.3.2 No Surface Occupancy: Greater Sage-Grouse PHMA/West Decker RHMA

Stipulation: To protect high density Greater-Sage Grouse habitat, including all seasonal habitats, surface occupancy and use is prohibited within Priority Habitat Management Areas (PHMA) and West Decker RHMA.

Objective: To maintain areas with the most important of habitats and highest densities of sage-grouse (e.g., core areas) by facilitating long-term sustainability by minimizing impacts to habitat through disturbance and disruption. Since GRSG utilize different seasonal habitats and require connectivity between these areas, oil and gas operations should avoid new surface disturbing and disruptive activities across GRSG breading areas (leks), nesting habitat, brood rearing areas, and winter concentration areas used in mild to severe winters (i.e., all winter range).

Waivers, Exceptions & Modifications: (See Range-wide Issues)

16.3.3 Controlled Surface Use for Disturbance Cap: Greater Sage-Grouse PHMA/West Decker RHMA

Stipulation: Projects that exceed disturbance or density thresholds will need to be redesigned, relocated or modified to avoid or minimize disturbance to sage grouse habitat or density of facilities near sage-grouse leks.

Objective: To reduce anthropogenic disturbance and habitat degradation within PHMA and West Decker RHMA.

Waivers, Exceptions and Modifications: (See Range-wide Issues)

16.3.4 No Surface Occupancy: Greater Sage-Grouse Leks in GHMA/Musselshell RHMA

Stipulation: To protect Greater Sage-grouse breeding activities, surface occupancy and use is prohibited within 0.6 mile of the perimeter of active leks and lek complexes in General Habitat Management Areas (GHMA) and Musselshell RHMA.

Objective: To maintain the integrity of Greater Sage-Grouse GHMA/Musselshell RHMA and support sustainable Greater-Sage Grouse populations.

Waivers, Exceptions & Modifications: (See Range-wide Issues)

16.3.5 No Surface Occupancy: Greater Sage-Grouse Crucial Winter Range GHMA/Musselshell RHMA

Stipulation: To protect Greater Sage-grouse winter concentration area, surface occupancy and use is prohibited for oil and gas exploration and development in crucial winter range in General Habitat Management Areas (GHMA) and Musselshell RHMA.

Objective: Maintain the integrity of crucial winter habitat to support sage-grouse populations during severe winters. Crucial winter range is where a high proportion of the species population is located during severe winter conditions (e.g., maximum snow depths in the deepest 2 of 20 years).

Waiver: The Authorized Officer may consider and grant a waiver to if the area mapped as possessing the attributes protected by the stipulation is determined during coordination with the state wildlife agency to lack those attributes and if the area associated with the site proposed for the waiver is no longer in PHMA through the appropriate planning process (i.e., plan maintenance or amendment).

Prior to waiving the NSO stipulation for a given area, the potential waiver shall be subject to public review for at least a 30-day period.

Exception: The Authorized Officer may consider and grant an **exception** to the NSO stipulation associated within GHMA Crucial Winter Range if one of the following criteria apply – after documenting the review of available information associated with the site proposed for the exception – both internally compiled and as provided by state, local, or tribal governments, project proponents, other federal agencies, or interested stakeholders:

If it can be demonstrated that the proposed development and surface occupancy would not impair the function or utility of the site for current for subsequent use as seasonal habitat based on at least one of the following:

- The location of the proposed authorization is determined to be non-habitat/unsuitable (as determined by a biologist with GRSG experience using methods such as the Habitat Assessment Framework), and lacks the ecological potential to become marginal or suitable habitat, and does not provide important connectivity between habitat areas, and the project includes design features to prevent indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function.
- Topography/areas of non-habitat create an effective barrier to impacts.
- By co-locating the proposed authorization with existing disturbance, no additional impacts would be realized above those already associated with the existing major infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function.
- The proposed location would be undertaken as an alternative to a similar action occurring on a nearby parcel (for example, due to landownership patterns), and development on the parcel in question would have less of an impact on GRSG or its habitat than on the nearby parcel; this exception must also include measures sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts.

To approve this exception, the Authorized Officer must document, in coordination with the state wildlife agency, that the proposed action satisfies at least one of the criteria listed above.

Prior to granting an exception to an NSO stipulation the potential exception shall be subject to public review for at least a 30-day period.

If the area associated with the proposed exception has met one of the adaptive management triggers (hard or soft), no exceptions would be considered until the causal factor analysis is completed.

16.3.6 Controlled Surface Use: Greater Sage-Grouse Seasonal Habitats in GHMA/Musselshell RHMA

Stipulation: Surface occupancy and use will be avoided unless the project proponent can clearly demonstrate that the impacts can be adequately addressed through application of the mitigation hierarchy, including conservation actions, needed design features, and offsets. Prior to surface-disturbing or disruptive activities a plan to maintain functionality of breeding, nesting sage-grouse, brood rearing and/or winter habitats for Greater Sage-Grouse will be prepared by the proponent and implemented upon approval by the authorized officer. The plan shall address how short-term and long-term direct and indirect effects to seasonal habitats will be mitigated based on current science and research.

Objective: To protect the integrity of Greater Sage-grouse General Habitat Management Areas and Musselshell RHMA, promote movement and genetic diversity to, and maintain seasonal habitats to support sustainable populations. Plans to address impacts will in general:

- Utilize the Conservation Buffer distances (Appendix X, and other approved resources) and incorporate Required Design Features (Appendix Y, or other as applicable), such as:
  - The timing of construction (i.e., no surface use is allowed from December 1 through March 15 in winter range and March 15 - July 15 in breeding and nesting habitats)
  - The timing of operations and maintenance (e.g., limit early morning and evening visits to wells near leks during the breeding season)
  - Locate surface disturbing and disruptive activities, such as linear features, infrastructure related to energy development, tall structures (e.g., communication or transmission towers, transmission lines), and low structures (e.g., fences, rangeland structures), to avoid and minimize impacts to seasonal habitats and movement corridors
  - Mitigate noise and related disruptive activities including those that do not result in habitat loss near leks and winter concentration areas

Waiver: The AO may waive this stipulation if no portion of the leasehold is within a General Habitat Management Area.

Exception: The BLM determines that impacts to GRSG and its habitat are minimized such that the proposal will maintain the functionality of SG habitat, while meeting the General Habitat goals and objectives.

Modification: The AO may modify the area subject to the stipulation if an environmental analysis finds a portion of the GHMA is nonessential or no longer Greater Sage-Grouse habitat.

16.3.7 Controlled Surface Use: Greater Sage-Grouse Cedar Creek RHMA

Stipulation: Surface occupancy and use would be allowed with design features to minimize disturbance to sage-grouse habitat within the Cedar Creek Greater Sage-Grouse Restoration Habitat Management Area.

Objective: To minimize disturbance to sage-grouse habitat and maximize restoration efforts while allowing for the permitted uses, the project proponent will prepare a plan to maintain functionality of habitats for

Greater Sage-Grouse. The plan will be prepared prior to surface-disturbing or disruptive activities and implemented upon approval by the authorized officer. Plans to address impacts will in general:

- Utilize the buffer distances and analysis provided in Appendix X
- Incorporate Required Design Features (Appendix Y, or other as applicable)
- Timing of construction to avoid disruption to seasonal habitats
- Timing of operations and maintenance to minimize disruption to seasonal habitats
- Placing of linear features, related infrastructure, and surface disturbance in relation to leks.
- Noise and related disruptive activities including those that do not result in habitat loss

Exception: The AO may grant an **Exception** if the proposed action will meet the goals and objectives for sage-grouse habitat.

Modification: The AO, in coordination with MFWP, may modify the boundaries of the stipulated area if portions of the leasehold are no longer sage-grouse habitat and future use by sage-grouse is unlikely.

Waiver: This stipulation may be waived if:

- sage-grouse are no longer a BLM special status species,
- no reasonable alternative development scenario exists, or
- the habitat has been altered to the point sage-grouse no longer occupy the site and there is no reasonable likelihood of sage-grouse reoccupying the site.

Exception: The BLM may approve actions in RHMA that are within the applicable lek buffer distance identified above only if:

- The BLM determines that impacts to GRSG and its habitat are minimized such that the project will cause minor or no new disturbance (ex. co-location with existing authorizations);
- Any residual impacts within the lek buffer-distances are addressed through compensatory mitigation measures sufficient to ensure a net conservation gain as outlined in the Mitigation Strategy (Appendix X).

Modification: The AO may modify the area subject to the stipulation if an environmental analysis finds a portion of the RHMA is nonessential or no longer Greater Sage-Grouse habitat after coordination with the state fish and wildlife entity.

Waiver: The AO may waive this stipulation if no portion of the leasehold is within a Restoration Habitat Management Area.

16.3.8 Controlled Surface Use: Greater Sage-Grouse CHMA

Stipulation: Surface occupancy and use will be avoided unless the project proponent can clearly demonstrate that the impacts to potential stopover sites can be adequately mitigated. Prior to such activities a plan to mitigate impacts will be prepared by the proponent and implemented upon approval by the AO.

Objective: To maintain the integrity of sage-grouse habitat and provide habitat for the movement and genetic diversity to support connected sage-grouse populations. Plans to address impacts will in general:

- Incorporate Required Design Features (Appendix Y, or other as applicable)
- Timing of construction to avoid disruption to movements between seasonal habitats

- Avoidance of placing of linear features, related infrastructure, and surface disturbance in existing or potential sagebrush ecosystems.
- Noise and related disruptive activities during spring and fall movement periods

Exception: The BLM may approve actions in CHMA if the BLM determines the proposed action will meet the objectives for sage-grouse stopover sites, through findings such as:

- The BLM determines that impacts to potential GRSG stopover sites are minimized such that the project will cause minor or no new disturbance (ex. co-location with existing disturbance);
- Any residual impacts are addressed through compensatory mitigation measures as outlined in the Mitigation Strategy (Appendix X).

Modification: The AO, in coordination with the state Fish and Wildlife entity, may modify the boundaries of the stipulated area if portions of the leasehold are no longer sage-grouse habitat and future use by sage-grouse is unlikely.

Waiver: The AO, in coordination with the state Fish and Wildlife entity, may waive this stipulation if no portion of the leasehold is within a Connectivity Habitat Management Area.

16.3.9 Timing Limitation: Greater Sage-Grouse HMAs

Stipulation: To protect Greater Sage-grouse populations utilizing important seasonal habitats, no surface use is allowed from December 1 through March 15 in winter range, March 15 - July 15 in breeding and nesting habitats and during migratory periods for stopover sites. This stipulation does not apply to operation and maintenance of production facilities.

Objective: The protection of sage-grouse leks, breeding and nesting habitat (e.g., 3.1 miles from leks), winter range, and stopover sites necessary for the long term maintenance of sage-grouse populations.

Waivers, Exceptions & Modifications: (See Range-wide Issues)

16.4 MONTANA/DAKOTAS OIL & GAS LEASE STIPULATION SUMMARY: PROPOSED RMP AMENDMENT

No.	Area	Stip Type	Language
1.	PHMA/PHMA with limited exceptions/ LMHMA/SCHMA	NSO	GREATER SAGE-GROUSE PHMA, PHMA with limited exceptions, LMHMA, and SCHMA To protect high density Greater-Sage Grouse habitat, including all seasonal habitats, surface occupancy and use is prohibited within Priority Habitat Management Areas (PHMA and PHMA with limited exceptions), the Little Missouri HMA, and the South Carter HMA. This NSO only applies to the North Dakota portion of the Little Missouri HMA.
2.	PHMA/LMHMA	CSU	GREATER SAGE-GROUSE PHMA and LMHMA Projects that exceed disturbance or density thresholds will need to be redesigned, relocated, or modified to avoid or minimize disturbance to sage grouse habitat or density of facilities in PHMA and the Little Missouri HMA. This CSU only applies to the North Dakota portion of the Little Missouri HMA.

No.	Area	Stip Type	Language
3.	GHMA	NSO	GREATER SAGE-GROUSE LEKS IN GHMA To protect Greater Sage-grouse breeding activities, surface occupancy and use is prohibited within 0.6 mile of the perimeter of active leks and lek complexes in General Habitat Management Areas (GHMA).
4.	GHMA	NSO	GREATER SAGE-GROUSE CRUCIAL WINTER RANGE IN GHMA To protect Greater Sage-grouse winter concentration area, surface occupancy and use is prohibited for fluid mineral exploration and development in crucial winter range in General Habitat Management Areas (GHMA).
5.	GHMA	CSU	GREATER SAGE-GROUSE SEASONAL HABITATS IN GHMA Surface occupancy and use will be avoided unless the project proponent can clearly demonstrate that the impacts can be adequately addressed through application of the mitigation hierarchy, including conservation actions, needed design features, and offsets. Prior to surface-disturbing or disruptive activities a plan to maintain functionality of breeding, nesting sage-grouse, brood rearing and/or winter habitats for Greater Sage-Grouse will be prepared by the proponent and implemented upon approval by the authorized officer. The plan shall address how short-term and long-term direct and indirect effects to seasonal habitats will be mitigated based on current science and research.
6.	LMHMA	CSU	GREATER SAGE-GROUSE SEASONAL HABITATS IN LMHMA Surface occupancy and use would be allowed with design features to minimize disturbance to sage-grouse habitat in the Little Missouri Habitat Management Area. This CSU only applies within the Montana portion of the Little Missouri HMA (i.e., the Cedar Creek Anticline).
7.	CHMA	CSU	GREATER SAGE-GROUSE CHMA Surface occupancy and use will be avoided unless the project proponent can clearly demonstrate that the impacts to potential stopover sites can be adequately mitigated. Prior to such activities a plan to mitigate impacts will be prepared by the proponent and implemented upon approval by the AO.
8.	ALL HMAs	TL	GREATER SAGE GROUSE ALL HMA TYPES To protect Greater Sage-grouse populations utilizing important seasonal habitats, no surface use is allowed from December 1 through March 15 in winter range, March 15 - July 15 in breeding and nesting habitats and during migratory periods for stopover sites. This stipulation does not apply to operation and maintenance of production facilities.

16.5 MONTANA/DAKOTAS OIL & GAS LEASE STIPULATION COMPLETE TEXT: PROPOSED RMP AMENDMENT

16.5.1 No Surface Occupancy: Greater Sage-Grouse PHMA, PHMA with limited exceptions, LMHMA and SCHMA

Stipulation: To protect high density Greater-Sage Grouse habitat, including all seasonal habitats, surface occupancy and use is prohibited within Priority Habitat Management Areas (PHMA and PHMA with limited exceptions), the Little Missouri HMA and the South Carter HMA This NSO only applies to the North Dakota portion of the Little Missouri HMA.

Objective: To maintain areas with the most important habitats and highest densities of sage-grouse (e.g., core areas) by facilitating long-term sustainability by minimizing impacts to habitat through disturbance and disruption. Since GRSG utilize different seasonal habitats and require connectivity between these areas, oil and gas operations should avoid new surface disturbing and disruptive activities across GRSG breading areas (leks), nesting habitat, brood rearing areas, and winter concentration areas used in mild to severe winters (i.e., all winter range).

Waiver: No Waivers would be granted in PHMA with limited exceptions areas. See Range-wide Issues for waivers outside these areas.

Modification: No Modifications would be granted in PHMA with limited exceptions areas. See Range-wide Issues for modifications outside these areas.

Exceptions: The Authorized Officer may consider and grant an exception to the NSO stipulation for PHMA (and Little Missouri HMA in North Dakota, South Carter HMA) only for activities farther than 0.6m from a lek. No Exceptions would be granted within .6 miles of a lek or in PHMA with limited exceptions areas. Outside this boundary an exception may be considered if one of the following criteria apply:

- The project is proposed to be undertaken as an alternative to an off-BLM location in PHMA/LMHMA/SCHMA and will provide a clear conservation gain to GRSG.
- By co-locating the proposed authorization, and associated infrastructure, with existing disturbance, no additional impacts would be realized above those already associated with the existing infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function.

Granting the exception must be in conformance with the RMP GRSG goal and habitat objectives, and not result in direct, indirect, or cumulative effects on GRSG or its habitats after application of the Mitigation hierarchy (See Mitigation Section 2.6.3).

To approve this exception, the Authorized Officer must document the review of available information associated with the site proposed for the exception – both internally compiled and as provided by State, County and other local agencies, tribal governments, project proponents, other federal agencies, or interested stakeholders as appropriate - and determine that the proposed action satisfies at least one of the criteria listed above. If the appropriate State agency does not concur with granting the exception, the Authorized Officer must provide rationale for how the criteria are met considering the information the State provides.

Prior to granting an exception to an NSO stipulation the potential exception shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process).

If the area associated with the proposed development seeking the exception (e.g., well pad, compressor station, etc.) is in an area (neighborhood cluster) that has met one of the adaptive management thresholds (hard or soft) (refer to Section 2.5.13), no exceptions would be considered until the causal factor analysis is completed and the BLM has determined that allowing exceptions is still warranted.

16.5.2 Controlled Surface Use for Disturbance Cap: Greater Sage-Grouse PHMA/Little Missouri hMA in North Dakota and South Carter HMA

Stipulation: Projects that exceed disturbance or density thresholds will need to be redesigned, relocated, or modified to avoid or minimize disturbance to sage grouse habitat or density of facilities in PHMA and the Little Missouri HMA. This CSU only applies to the North Dakota portion of the Little Missouri HMA.

Objective: To limit anthropogenic disturbance and habitat degradation within PHMA, the Little Missouri HMA, and the South Carter HMA

Waivers, Exceptions and Modifications: (See Range-wide Issues)

16.5.3 No Surface Occupancy: Greater Sage-Grouse Leks in GHMA

Stipulation: To protect Greater Sage-grouse breeding activities, surface occupancy and use is prohibited within 0.6 mile of the perimeter of active leks and lek complexes in General Habitat Management Areas (GHMA).

Objective: To maintain the integrity of Greater Sage-Grouse GHMA and support sustainable Greater-Sage Grouse populations.

Waiver: The Authorized Officer may consider and grant a waiver to if the area mapped as possessing the attributes protected by the stipulation is determined during coordination with the appropriate state agency to lack those attributes and if the area associated with the site proposed for the waiver is no longer in a GRSG HMA through the appropriate planning process (i.e., plan maintenance or amendment).

Prior to waiving the NSO stipulation for a given area, the potential waiver shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process).

Exception: The AO may grant an **Exception** only where the proposed action:

(i) Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or
(ii) By co-locating the proposed authorization with existing disturbance, no additional impacts would be realized above those already associated with the existing infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function; or
(iii) The project is proposed to be undertaken as an alternative to an off-BLM location in PHMA and will provide a clear conservation gain to GRSG.

To approve this exception, the Authorized Officer must document the review of available information associated with the site proposed for the exception – both internally compiled and as provided by State, County and other local agencies, tribal governments, project proponents, other federal agencies, or interested stakeholders as appropriate - and determine that the proposed action satisfies at least one of the criteria listed above. The exception should be consistent with guidance and recommendations from the appropriate State agency. If the state does not concur with granting the exception, the Authorized Officer must provide rationale for how the criteria are met considering the information the State provides.

Prior to granting an exception to an NSO stipulation the potential exception shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process).

Modification: After documenting the review of available information the Authorized Officer documents, in coordination with the appropriate state authority, that a portion of the NSO area is nonessential, or it is identified through scientific research or monitoring that the existing area is inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the GRSG, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting.

The Authorized Officer may consider and grant a **modification** to the fluid mineral lease NSO stipulation where an exception is granted, as described under **Exception**, for the primary disturbance (e.g., well pad, compressor station), then a modification providing for surface occupancy of potential associated infrastructure related to the development that are not individually precluded by other GRSG actions (e.g., roads, pipelines, power lines). While the NSO stipulation could be modified for these additional developments, they must still comply with other GRSG management actions (e.g., mitigation, disturbance cap, minerals/energy density, seasonal restrictions, RDFs, etc.) if an exception to the NSO is granted.

Prior to modifying the area subject to the NSO stipulation, the potential modification shall be subject to public review for at least a 30-day period. If the area associated with the proposed exception has met one of the adaptive management triggers (hard or soft), no modifications would be considered until the causal factor analysis is completed.

16.5.4 No Surface Occupancy: Greater Sage-Grouse Crucial Winter Range GHMA

Stipulation: To protect Greater Sage-grouse winter concentration area, surface occupancy and use is prohibited for oil and gas exploration and development in crucial winter range in General Habitat Management Areas (GHMA)

Objective: Maintain the integrity of crucial winter habitat to support sage-grouse populations during severe winters. Crucial winter range is where a high proportion of the species population is located during severe winter conditions (e.g., maximum snow depths in the deepest 2 of 20 years).

Waiver: The Authorized Officer may consider and grant a waiver to if the area mapped as possessing the attributes protected by the stipulation is determined during coordination with the appropriate state agency to lack those attributes and if the area associated with the site proposed for the waiver is no longer in a GRSG HMA through the appropriate planning process (i.e., plan maintenance or amendment).

Prior to waiving the NSO stipulation for a given area, the potential waiver shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process).

Exception: The AO may grant an **Exception** in Crucial Winter Range only where the proposed action:

(i) Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or
(ii) By co-locating the proposed authorization with existing disturbance, no additional impacts would be realized above those already associated with the existing infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function; or
(iii) The project is proposed to be undertaken as an alternative to an off-BLM location in PHMA and will provide a clear conservation gain to GRSG.

To approve this exception, the Authorized Officer must document the review of available information associated with the site proposed for the exception – both internally compiled and as provided by State, County and other local agencies, tribal governments, project proponents, other federal agencies, or interested stakeholders as appropriate - and determine that the proposed action satisfies at least one of the criteria listed above. The exception should be consistent with guidance and recommendations from the appropriate State agency. If the state does not concur with granting the exception, the Authorized Officer must provide rationale for how the criteria are met considering the information the State provides.

Prior to granting an exception to an NSO stipulation the potential exception shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process).

If the area associated with the proposed exception has met one of the adaptive management triggers (hard or soft), no exceptions would be considered until the causal factor analysis is completed.

16.5.5 Controlled Surface Use: Greater Sage-Grouse Seasonal Habitats in GHMA

Stipulation: Surface occupancy and use will be avoided unless the project proponent can clearly demonstrate that the impacts can be adequately addressed through application of the mitigation hierarchy, including conservation actions, needed design features, and offsets. Prior to surface-disturbing or disruptive activities a plan to maintain functionality of breeding, nesting sage-grouse, brood rearing and/or winter habitats for Greater Sage-Grouse will be prepared by the proponent and implemented upon approval by the authorized officer. The plan shall address how short-term and long-term direct and indirect effects to seasonal habitats will be mitigated based on current science and research.

Objective: To protect the integrity of Greater Sage-grouse General Habitat Management Areas, promote movement and genetic diversity to, and maintain seasonal habitats to support sustainable populations. Plans to address impacts will in general:

- Consider conservation buffer distances (e.g Conservation buffer distance estimates for Greater Sage-Grouse—A review: U.S. Geological Survey Open-File Report 2014) and incorporate Required Design Features from the 2015 RMPAs and other applicable sources to include measures such as:
  - The timing of construction (i.e., no surface use is allowed from December 1 through March 15 in winter range and March 15 - July 15 in breeding and nesting habitats)
  - The timing of operations and maintenance (e.g., limit early morning and evening visits to wells near leks during the breeding season)
  - Locate surface disturbing and disruptive activities, such as linear features, infrastructure related to energy development, tall structures (e.g., communication or transmission towers, transmission lines), and low structures (e.g., fences, rangeland structures), to avoid and minimize impacts to seasonal habitats and movement corridors
  - Mitigate noise and related disruptive activities including those that do not result in habitat loss near leks and winter concentration areas

Waiver: The Authorized Officer may consider and grant a waiver to if the area mapped as possessing the attributes protected by the stipulation is determined during coordination with the appropriate state agency to lack those attributes and if the area associated with the site proposed for the waiver is no longer in a GRSG HMA through the appropriate planning process (i.e., plan maintenance or amendment).

Exception: The BLM determines that impacts to GRSG and its habitat are minimized such that the proposal will maintain the functionality of SG habitat, while meeting the General Habitat goals and objectives.

Modification: The AO may modify the area subject to the stipulation if an environmental analysis finds a portion of the GHMA is nonessential or no longer Greater Sage-Grouse habitat.

16.5.6 Controlled Surface Use: Greater Sage-Grouse Little Missouri HMA in Montana

Stipulation: Surface occupancy and use would be allowed with design features to minimize disturbance to sage-grouse habitat in the Little Missouri Habitat Management Area. This CSU only applies within the Montana portion of the Little Missouri HMA (i.e., the Cedar Creek Anticline).

Objective: To minimize disturbance to sage-grouse habitat and maximize restoration efforts while allowing for the permitted uses, the project proponent will prepare a plan to maintain functionality of habitats for Greater Sage-Grouse. The plan will be prepared prior to surface-disturbing or disruptive activities and implemented upon approval by the authorized officer. Plans to address impacts will in general:

- Emphasize collocation and reduction of duplicative infrastructure
- Consider conservation buffer distances (e.g. Conservation buffer distance estimates for Greater Sage-Grouse—A review: U.S. Geological Survey Open-File Report 2014)
- Incorporate Required Design Features such as RDF/BMP appendices from 2015 RMPAs.
- Timing of construction to avoid disruption to seasonal habitats
- Timing of operations and maintenance to minimize disruption to seasonal habitats
- Placing of linear features, related infrastructure, and surface disturbance in relation to leks.
- Noise and related disruptive activities including those that do not result in habitat loss

Exception: The AO may grant an **Exception** if the proposed action will meet the goals and objectives for sage-grouse habitat.

The BLM may approve actions in the Little Missouri HMA that are within the applicable lek buffer distance identified above only if:

- The BLM determines that impacts to GRSG and its habitat are minimized such that the project will cause minor or no new disturbance (ex. co-location with existing authorizations);
- Any residual impacts within the lek buffer-distances are addressed through compensatory mitigation measures sufficient to ensure a net conservation gain as outlined in the Mitigation approach.

Waiver: The Authorized Officer may consider and grant a waiver to if the area mapped as possessing the attributes protected by the stipulation is determined during coordination with the appropriate state authority to lack those attributes and if the area associated with the site proposed for the waiver is no longer in a GRSG HMA through the appropriate planning process (i.e., plan maintenance or amendment).

Modification: The AO may modify the area subject to the stipulation if an environmental analysis finds a portion of the Little Missouri HMA is nonessential or no longer Greater Sage-Grouse habitat after coordination with the appropriate state authority.

16.5.7 Controlled Surface Use: Greater Sage-Grouse CHMA

Stipulation: Surface occupancy and use will be avoided unless the project proponent can clearly demonstrate that the impacts to potential stopover sites can be adequately mitigated. Prior to such activities a plan to mitigate impacts will be prepared by the proponent and implemented upon approval by the AO.

Objective: To maintain the integrity of sage-grouse habitat and provide habitat for the movement and genetic diversity to support connected sage-grouse populations. Plans to address impacts will in general:

- Consider conservation buffer distances (e.g. Conservation buffer distance estimates for Greater Sage-Grouse—A review: U.S. Geological Survey Open-File Report 2014)
- Incorporate Required Design Features (See RDF/BMP appendices).
- Timing of construction to avoid disruption to movements between seasonal habitats
- Avoidance of placing of linear features, related infrastructure, and surface disturbance in existing or potential sagebrush ecosystems.
- Noise and related disruptive activities during spring and fall movement periods

Exception: The BLM may approve actions in CHMA if the BLM determines the proposed action will meet the objectives for sage-grouse stopover sites, through findings such as:

- The BLM determines that impacts to potential GRSG stopover sites are minimized such that the project will cause minor or no new disturbance (ex. co-location with existing disturbance);
- Any residual impacts are addressed through compensatory mitigation measures as outlined in the Mitigation approach.

Modification: The AO, in coordination with the appropriate state authority, may modify the boundaries of the stipulated area if portions of the leasehold are no longer sage-grouse habitat and future use by sage-grouse is unlikely.

Waiver: The Authorized Officer may consider and grant a waiver to if the area mapped as possessing the attributes protected by the stipulation is determined during coordination with the appropriate state authority to lack those attributes and if the area associated with the site proposed for the waiver is no longer in a GRSG HMA through the appropriate planning process (i.e., plan maintenance or amendment).

16.5.8 Timing Limitation: Greater Sage-Grouse HMAs

Stipulation: To protect Greater Sage-grouse populations utilizing important seasonal habitats, no surface use is allowed from December 1 through March 15 in winter range, March 15 - July 15 in breeding and nesting habitats and during migratory periods for stopover sites. This stipulation does not apply to operation and maintenance of production facilities.

Objective: The protection of sage-grouse leks, breeding and nesting habitat (e.g., 3.1 miles from leks), winter range, and stopover sites necessary for the long-term maintenance of sage-grouse populations.

Waivers, Exceptions & Modifications: (See Range-wide Issues)

Appendix 17

Proposed RMP Amendment and Analysis for Key Research Natural Areas in Oregon

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Appendix 17. Proposed RMP Amendment and Analysis for Key Research Natural Areas in Oregon

17.1 Introduction and Background

This appendix provides excerpts and background information from the 2015 (and 2019) BLM Oregon Greater Sage-grouse (Greater Sage-grouse) final environmental impact statements (EIS) and plan amendment efforts, as well as newer information about the BLM Oregon key Research Natural Areas (RNA) needed to support the current planning and analysis process presented in the body of this EIS. This current effort is limited to RMP-level actions needed to provide guidance for subsequent implementation-level actions.

The 2015 Oregon Greater Sage-grouse ARMPA identified 15 existing RNAs as key RNAs and allocated all or portions of 13 key RNAs in Oregon as unavailable for livestock grazing. The 2019 RMPA reversed that decision and made all or portions of those 13 key RNAs available for livestock grazing. These decisions affected approximately 22,000 acres within 13 existing, district designated, RNAs. The 2019 RMPA was and remains enjoined by the United States District Court for the District of Idaho and the 2015 ARMPA decision for these 13 key RNAs remains in effect. None of the other BLM state Greater Sage-grouse ARMPAs, either in 2015 or in 2019, included the identification of key RNAs or changes in the availability of livestock grazing.

The two other existing RNAs identified as key RNAs in the 2015 planning process were previously excluded from livestock grazing and neither the 2015 nor 2019 RMP amendment processes proposed changing these underlying district-level land use plan decisions. Both the Foster Flat key RNA in the Burns District and Guano Creek-Sink Lakes key RNAs in the Lakeview District were, and will remain, allocated as unavailable for livestock grazing.

The BLM Oregon is addressing key RNAs in this current planning effort to update key RNA affected environment and clarify or modify existing Greater Sage-grouse management direction.

The following excerpts from the 2015 EIS provide background, context, and history regarding the intents and purposes of the RNAs.

17.2 2015 Final EIS Excerpts

The following excerpt from Chapter 3 of the 2015 Oregon Greater Sage-grouse Final EIS describes Research Natural Areas (from Special Designations 3.16.5 Areas of Critical Environmental Concern (ACEC); page 3-134 to 3-135).

RNAs are a unique type of ACEC created to: preserve examples of all significant natural ecosystems for comparison with those influenced by humans; provide educational and nondestructive research for ecological and environmental studies; and preserve gene pools of typical and endangered plants and animals. RNAs are areas that are part of a national network of reserved areas under various ownerships that contain important ecological and scientific values and are managed for minimum human disturbance. RNAs are intended to represent the full array of North American ecosystems with their biological communities, habitats, natural phenomena, and geological and hydrological formations. In RNAs, natural processes are allowed to

predominate and are primarily used for nonmanipulative research and baseline data gathering on relatively unaltered plant community types.

Under certain circumstances (refer to BLM, 1987, section .37B), deliberate manipulation may be used to maintain the unique features for which the RNA was established. Because natural processes are allowed to dominate, RNAs also make excellent controls for similar communities that are being managed and for long-term vegetation monitoring for shifts resulting from changes in precipitation and temperature (climate change). In addition, RNAs provide an essential network of diverse habitat types that will be preserved in their natural state for future generations.

RNAs have important biological or physical attributes that are identified and designated in cooperation with the Pacific Northwest RNA Committee (Forest Service, BLM, and Washington and Oregon) following the Oregon Natural Areas plan (Oregon Natural Heritage Advisory Council 2010).

These areas can be used for long-term baseline plant community monitoring; they are areas where few management activities have influenced the plant community for which the RNA was established. Management practices necessary to maintain or restore ecosystems can be allowed and perhaps are necessary to maintain the values, especially invasive plant control.

17.3 PROPOSED RMP AMENDMENT AND EIS ALTERNATIVES

17.3.1 Alternative 1

Under Alternative 1 all or portions of 13 key RNAs, approximately 21,922 acres total (**Table 17-1** below), would be allocated as unavailable for livestock grazing as described in the 2015 Greater Sage-grouse ARMPA (p. 2-18). Making these areas unavailable for livestock grazing would provide areas where natural processes will proceed for long-term monitoring and research (BLM 2015a, p. 4-24) of the plant communities present. Managing the key RNAs as unavailable for livestock grazing could increase the ecological protection in areas where livestock grazing is removed, although vulnerability to wildfire may increase as fine fuel loads build in the absence of livestock grazing (BLM 2015a, p. 4-100). The BLM would continue to manage ACECs, including key RNAs, to protect their relevant and important values (BLM 2015a, p. 4-272).

17.3.2 Alternative 2

Under Alternative 2, all of the following 13 key RNAs would be available for livestock grazing, subject to applicable laws, regulations, policies, and other BLM Oregon Resource Management Plan decisions: Black Canyon, Dry Creek Bench, East Fork Trout Creek, Fish Creek Rim, Foley Lake, Lake Ridge, Mahogany Ridge, North Ridge Bully Creek, Rahilly-Gravelly, South Bull Canyon, South Ridge Bully Creek, Spring Mountain, and Toppin Creek Butte (BLM 2018a, p. 2-9). Impacts to habitat would not change from the conditions present when these RNAs were identified as key. Opportunities for comparison of ungrazed to grazed areas would be fewer than under alternatives 1, 3, 4, 5, 6 or the Proposed RMP Amendment (BLM 2018a, p. ES-8). The BLM would continue to manage ACECs to protect their relevant and important values (BLM 2015a, p. 4-272). Livestock and other herbivores consume vegetation and affect soils through hoof action and possible compaction. When these impacts are kept at appropriate levels, natural processes such as plant growth and recovery, freeze-thaw periods, and microbial activity in the soil surface result in recovery from these impacts and maintain site stability and health. (BLM 2018a, p. 4-40). Natural processes will predominate on the key RNAs which remain available for research and data gathering on relatively unaltered plant communities.

Table 17-1. Oregon Key RNAs – Summary of Estimated Acres and AUMs by Alternative[1]

RNA Name	District	Total Acres of the Key RNA	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternatives 5 and 6		Proposed RMP Amendment	
			Key RNA Acres Available for Livestock Grazing	Key RNA Acres / estimated AUMs Unavailable for Livestock Grazing	Key RNA Acres / estimated AUMs Available for Livestock Grazing	Key RNA Acres Unavailable for Livestock Grazing	Key RNA Acres Available for Livestock Grazing	Key RNA Acres / estimated AUMs Unavailable for Livestock Grazing	Key RNA Acres Available for Livestock Grazing	Key RNA Acres / estimated AUMs Unavailable for Livestock Grazing	2015 Key RNA Acres that would become Available for Livestock Grazing	Key RNA estimated Acres / estimated AUMs Unavailable for Livestock Grazing	2015 Key RNA Acres Available for Livestock Grazing	Key RNA estimated Acres / estimated AUMs Unavailable for Livestock Grazing
Black Canyon	Vale	2,600 [2]	0	2,600/260	2,600/260	0	0	2.600/260	0	2,600/260	2,600	0/0	2,600	0/0
Dry Creek Bench	Vale	1,637	1,015	622/52	1,637/52	0	0	1,637/52	1,015	622/52	1,637	0/0	1,637	0/0
East Fork Trout Creek	Burns	361	57	304/47	361/47	0	0	361/47 [3]	57	304/47	57 [3]	304/0 [3]	57	304/0
Fish Creek Rim	Lakeview	8,725	5,975	2,750/110	8,725/110	0	0	8,725/110	5,975	2,750/110	8,630	95/4 [4]	8,630	95/4
Foley Lake	Lakeview	2,228	959	1,269/51	2,228/51	0	0	2,228/51	959	1,269/51	1,431	797/33 [4]	1,431	797/33 [4]
Foster Flat	Burns	2,687	0	2,687	0	2,687	0	2,687	0	2,687	0	2,687	0	2,687
Guano Creek–Sink Lakes	Lakeview	11,185	0	11,185	0/0	11,185	0	11,185	0	11,185	0	11,809 [5]	0	11,809
Lake Ridge	Vale	3,857	3,088	769/74	3,857/74	0	0	3,857/74	3,088	769/74	3,844	13/0 [6]	3,844	13/0 [6]
Mahogany Ridge [7] (southern unit only)	Vale	444	289	155/27	444/27	0	0	444/27	289	155/27	304	140/0	375	69/0
North Ridge Bully Creek	Vale	1,569	1,405	164/19	1,569/19	0	0	1,569/19	1,405	164/19	1,569	0/0	1,569	0/0
Rahilly-Gravelly	Lakeview	18,678	10,396	8,282/586	18,678/586	0	0	18,678/586	10,396	8,282/586	16,653	2,025/144	16,653	2,025/144
South Bull Canyon [8]	Vale	770	21	749/116	770/116	0	0	770/116	21	749/116	513	257/0	513	257/0

RNA Name	District	Total Acres of the Key RNA	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternatives 5 and 6		Proposed RMP Amendment	
			Key RNA Acres Available for Livestock Grazing	Key RNA Acres / estimated AUMs Unavailable for Livestock Grazing	Key RNA Acres / estimated AUMs Available for Livestock Grazing	Key RNA Acres Unavailable for Livestock Grazing	Key RNA Acres Available for Livestock Grazing	Key RNA Acres / estimated AUMs Unavailable for Livestock Grazing	Key RNA Acres Available for Livestock Grazing	Key RNA Acres / estimated AUMs Unavailable for Livestock Grazing	2015 Key RNA Acres that would become Available for Livestock Grazing	Key RNA estimated Acres / estimated AUMs Unavailable for Livestock Grazing	2015 Key RNA Acres Available for Livestock Grazing	Key RNA estimated Acres / estimated AUMs Unavailable for Livestock Grazing
South Ridge Bully Creek	Vale	621	224	397/61	621/61	0	0	621/61	224	397/61	621	0/0	621	0/0
Spring Mountain	Vale	996	0	996/153	996/153	0	0	996/153	0	996/153	996	0/0	996	0/0
Toppin Creek Butte [9]	Vale	3,998	1,133	2,865/216	3,998/216	0	0	3,998/216	1,133	2,865/216	3,795	203 [10]/0	3,795	203/0
Totals		60,356	24,562	35,794/1,772	46,484/ 1,772	13,872	0	60,356/1,772	24,562	35,794/1,772	42,650	18,330/181	42,721	18,259/181

Notes:
1 – Acreage estimates and AUM estimates/calculations have been updated from the 2015 ARMPA ROD.
2 – Black Canyon ACEC/RNA acres were reduced by 40 acres to reflect updated GIS data for the boundary.
3 – The Oregon 2015 ARMPA estimated that 47 AUMs may be removed based strictly on the change in acreage. The 2019 RMPA used the same estimate of 47 AUMs. Alternatives 1 and 2 reflect the numbers from the prior EISs. This key RNA has been excluded from the allotment and pasture through an administrative process; no change to permitted AUMs is necessary because the remaining pasture can support the estimated 47 AUMs associated with the key RNA made unavailable for livestock grazing.
4 – Estimated AUMs for Alternatives 5 and 6 associated with the area allocated as 'unavailable for livestock grazing' would be absorbed in portions of the associated pasture and/or allotment in which the Key RNA exists. Site-specific monitoring would inform if AUMs cannot be absorbed, with site-specific NEPA and grazing decisions to implement any reductions in AUMs as a result of implementing removal of livestock from those areas allocated as unavailable for livestock grazing as a result of this alternative.
5 – The 2015 and 2019 estimates of acres used the Guano Creek Wilderness Study Area boundary. The Guano Creek-Sink Lakes ACEC/RNA is much smaller and contained entirely within the larger WSA boundary. The corrected acres reflect just the ACEC/RNA portion that is, and would continue to be, unavailable for livestock grazing use under all alternatives.
6 – Lake Ridge key RNA would become available for livestock grazing, however a 13-acre area adjacent to the 2015 ARMPA-identified Lakeridge key RNA and within the ACEC/RNA would be unavailable for livestock grazing.
7 – Mahogany Ridge ACEC/RNA is divided into two "Parcels", totaling 622 acres. The southern parcel is 444 acres; the Key RNA is located solely in the southern parcel and totals 155 acres. In Alternatives 5 and 6, 140 acres would be allocated as unavailable for livestock grazing.
8 – South Bull Canyon data has been revised based on updated district site-specific information. The entire ACEC/RNA acreage is 770 of which 749 acres were designated in 2015 as a key RNA (and allocated as unavailable for livestock grazing). Under Alternatives 5 and 6, 492 of the 749 acres previously allocated as unavailable for livestock grazing would be reallocated as available for livestock grazing.
9 – Exception criteria would be have to be met for construction of exclosure fencing within WSA or increased management presence would be needed.
10 – Toppin Creek Butte acres were corrected to reflect updated GIS data for the area.

17.3.3 Alternatives 3, 4, 5, 6, and Proposed RMP Amendment

Alternatives 3, 4, 5, 6, and the Proposed RMP Amendment are based upon changed habitat management area boundaries. In 2022, ODFW informed BLM that they were going to update core and low density HMAs. Using ODFW's published methodology to estimate core and low density HMA, the BLM drafted maps of what would likely be considered core and low density HMAs. These maps were used for the draft EIS. For the final EIS, we have adopted ODFW's revised habitat designations.

Under Alternative 3, ODFW's revised core and low-density habitat would become PHMA and GHMA respectively. In addition, GHMA would include the modelled sagebrush habitat as in the 2015 ARMPA from Durtsche et al. (2010). Under Alternative 3, all proposed PHMA and GHMA would become PHMA and be allocated as unavailable for livestock grazing, including all of the 13 key RNAs.

Under Alternative 4, ODFW's revised core and low-density habitat would become PHMA and GHMA respectively. In addition, the GHMA includes the modelled sagebrush habitat as in the 2015 ARMPA from Durtsche et al. (2010). This alternative would retain the 2015 decision that makes all or portions of the 13 key RNAs unavailable for livestock grazing.

Under Alternatives 5, 6, and the Proposed RMP Amendment, ODFW's revised core would become PHMA and GHMA would be comprised of their low-density lek areas plus HAF mapped seasonal habitat. Under all three of these alternatives all, some, or none of specific key RNAs would be unavailable for livestock grazing as shown below and described in **Table 17-1** above. Under all three alternatives, the entirety of the key RNAs identified in 2015 are key RNAs and all of these key RNAs would be retained. All three alternatives would update management direction to reflect this interpretation. Special Designation (SD) 4 would be changed to: manage key RNAs as baseline reference areas for sagebrush plant communities they represent that are important to Greater Sage-grouse. Active or passive restoration actions, including removal of encroaching juniper, are allowed within key RNAs to support maintenance or improvement of identified vegetation communities and to meet Greater Sage-grouse habitat objectives.

The Proposed RMP Amendment is nearly the same as Alternative 5 with the following exceptions:

- the area allocated as unavailable for grazing in the Mahogany Ridge key RNA is reduced from 140 acres to 69 acres.
- A 5-acre or less exclosure is proposed that would remove livestock use and other permitted activities to allow for nonmanipulative research and baseline data gathering within the North Ridge Bully Creek key RNA or within close proximity to this key RNA to allow for ungrazed comparison areas for evaluating effects of livestock on those vegetative communities identified as important for greater sage-grouse.
- A 5-acre or less exclosure is proposed that would remove livestock use and other permitted activities to allow for nonmanipulative research and baseline data gathering within the South Ridge Bully Creek key RNA or within close proximity to this key RNA to allow for ungrazed comparison areas for evaluating effects of livestock on those vegetative communities identified as important for greater sage-grouse.
- A 5-acre or less exclosure is proposed that would remove livestock use and other permitted activities to allow for nonmanipulative research and baseline data gathering within the Spring Mountain key RNA or within close proximity to this key RNA to allow for ungrazed comparison areas for evaluating effects of livestock on those vegetative communities identified as important for greater sage-grouse.

For purposes of this plan, a baseline reference area is one where ecological processes and current ecological condition are functioning within a normal range of variability and the plant community has adequate resistance to, and resiliency from, most disturbances. Ecological condition considers historical disturbance regimes, current authorized uses, climatic variability, and existing vegetation. The original designation of the Research Natural Areas that were later identified as key RNAs occurred because they possessed a typical representation of a common plant or animal association that is of scientific or other special interest. At the time of the RNA designation, livestock grazing and trailing on public, private, and state lands had occurred for decades; they were not undisturbed areas. Several of them, however, were topographically difficult for livestock to access or lacked nearby water sources and that remains true today. Preservation and protection of the natural attributes will predominate within the baseline reference areas. The baseline reference area is that area where grazing is restricted due to fences, topography, or active herd management.

17.3.4 Environmental Consequences

Under Alternatives 1 and 4 in 13 of the 15 key RNAs, 21,922 acres would be unavailable for livestock grazing, while under alternative 3, 46,484 acres would be unavailable for livestock grazing in the same areas; this would allow plant communities in these areas to be available for comparison with other areas that had more human influence for future research needs. Under these alternatives fencing might be present in and adjacent to key RNAs. These fences could affect livestock distribution. Modifications to existing water improvements and limitations on new water improvements may create additional limitations, however, livestock distribution outside of key RNAs should generally be maintained, and impacts should be limited from these actions (BLM 2015a, p. 4-203). Making portions of RNAs that contain plant communities important to Greater Sage-grouse unavailable for livestock grazing could provide the BLM with areas for baseline vegetation monitoring without the influence of livestock grazing. This could allow natural succession processes to proceed without the influence of livestock grazing, making these areas available for use as comparative controls to treated areas. Whether removal of livestock grazing would reduce the risk of invasive plant spread into the key RNAs is uncertain, as there are many vectors for invasive plants besides livestock, but reducing the physical disturbance from livestock grazing is likely to reduce one of those vectors (BLM 2018a, p. 4-4). OHV use would continue to be allowed or restricted as currently designated.

Under Alternative 2, livestock grazing management would be governed by the livestock grazing provisions in the 2019 ARMPA, which changed Objective Livestock Grazing 2 and deleted Management Direction Livestock 1 from the 2015 ARMPA to make all or portions of 13 key Research Natural Areas (key RNAs) available for livestock grazing. The key RNAs would continue to be required to meet rangeland health standards and other applicable BLM regulations and policies (BLM 2018a, p. 4-6). Impacts to habitat would not change from the conditions present when these RNAs were identified as key for Sage-grouse. Alternative 2 would result in 21,922 fewer undisturbed acres within Oregon available for research on the impact of livestock grazing on plant communities. However, these acres would remain available for long-term vegetation monitoring. Although the USFWS has determined improper livestock grazing can have adverse effects on Greater Sage-grouse habitat, properly managed livestock grazing may benefit the species (USFWS 2015, p. 59909). Under Alternative 2, the key RNAs would remain subject to management, including regulation of livestock grazing, to maintain and promote the key characteristics of the RNAs. Finally, making the key RNAs unavailable for livestock grazing would not address any threats to Greater Sage-grouse habitat identified in the COT report (USFWS 2013) that may exist within the boundaries of the RNAs. (BLM 2018a, p. 4-7).

Effects of Alternatives 5, 6, and the Proposed RMP Amendment are discussed below. The summarized impact analyses in Chapter 4 for the key RNAs in Oregon is supported by and based on the more detailed RNA

specific information presented in the following section. These alternatives are proposed to resolve or reduce specific conflicts and plan conformance issues.

Under all alternatives, the BLM would require changes to livestock grazing/management in the 13 key RNAs if a rangeland health evaluation finds that standard(s) are not being met and the determination document identifies existing livestock grazing as a causal factor in the failure to meet rangeland health standards. BLM may also require changes to livestock grazing/management for various reasons in accordance with its grazing regulations (43 CFR 4100 [2006]).

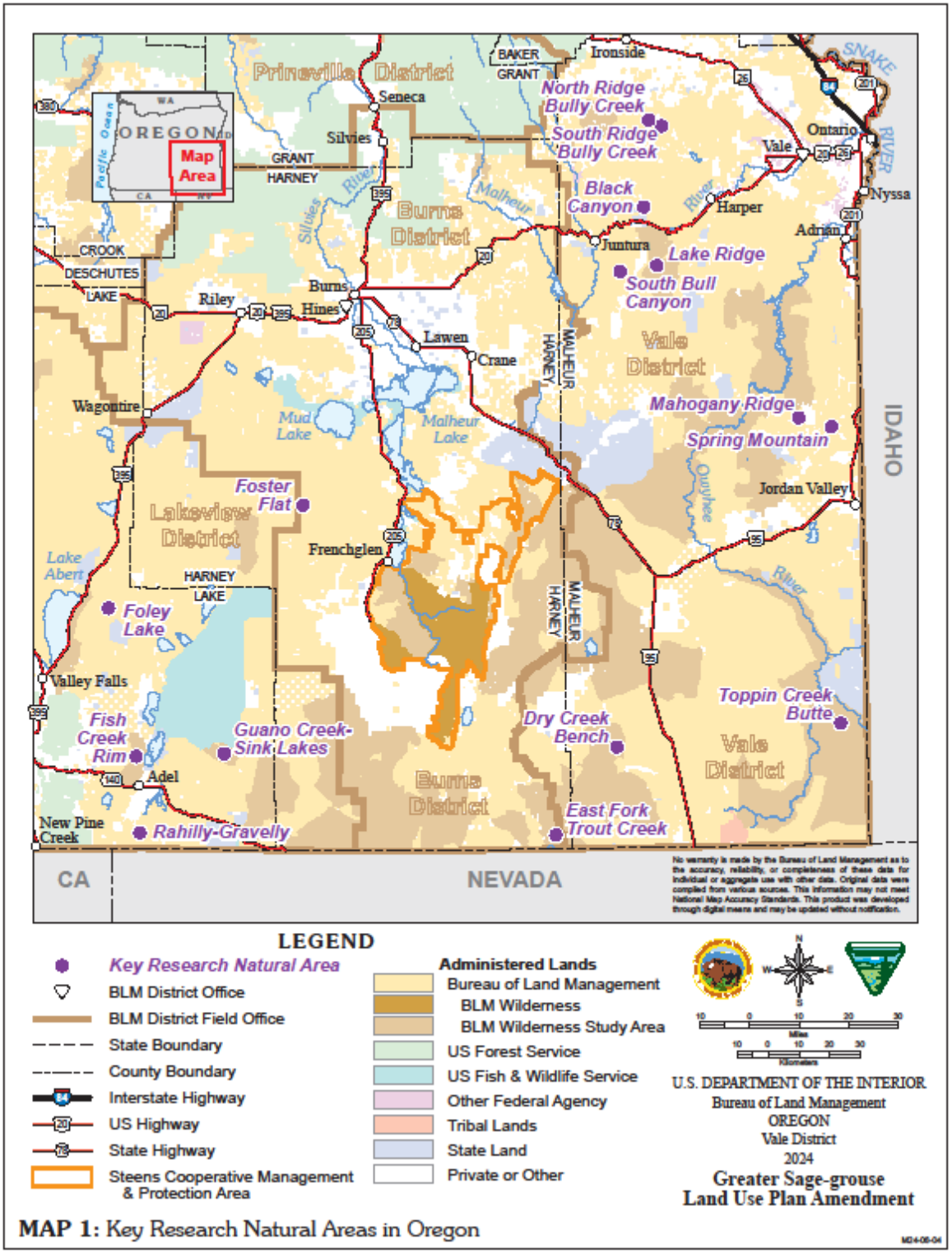
The BLM Assessment, Inventory and Monitoring (AIM) Strategy for Integrated Renewable Resources Management provides a framework for the BLM to quantitatively assess the condition, trend, amount, location, and spatial pattern of natural resources on the nation's public lands. The Landscape Monitoring Framework (LMF) is a component of the AIM strategy and is used to assess and monitor renewable resources on BLM-managed rangelands. We have identified the number of AIM and LMF plots, if any, within individual key RNAs. This information can be found in the description of the key RNAs.

17.4 KEY ACEC AND RNA DESCRIPTIONS

The key ACEC/RNAs in Oregon were identified as containing native sagebrush (*Artemisia* sp.) shrublands, grasslands, and other habitats that provide plant communities that sage-grouse use for breeding, nesting, brood rearing, foraging, and wintering. The plant community types that the RMPA/FEIS (BLM 2015a, p. 3-138 to 3-139) identified as important for sage-grouse are:

- Mountain big sagebrush (*Artemisia tridentata* spp. *vaseyana*)/grasslands
- Basin big sagebrush (*A. tridentata* spp. *tridentata*)/grasslands
- Wyoming big sagebrush (A. t. spp. *wyomingensis*)/grasslands
- Mountain mahogany (*Cercocarpus ledifolius*) and bitterbrush (*Purshia tridentata*) shrublands and grasslands
- Low sagebrush (*Artemisia arbuscula*)/grasslands
- Black sagebrush (*A. nova*)/grasslands
- Rigid sagebrush (*A. rigida*)/grasslands
- Silver sagebrush (*A. cana*)/grasslands
- Three-tip sagebrush (*A. tripartite*)/grasslands
- Shadscale, greasewood, and bud sagebrush *(A. canescens, A. confertifolia, Sarcobatus vermiculatus, Artemisia spinescens*)/desert scrub
- Vernal pools, playas, lake margins
- Black cottonwood (*Populus tricocarpa*), willow (*Salix* sp.) and aspen (*Populus tremuloides*) riparian areas, wet meadows, seeps, and springs

Map 1. Key Research Natural Areas in Oregon



17.4.1 Key ACECs

Three key ACECs were identified in the Proposed RMPA/Final EIS, all within the Lakeview Field Office: Abert Rim, High Lakes, and Red Knoll (BLM 2015a, p. 2-45). Current livestock grazing management would continue within all three key ACECs under all alternatives.

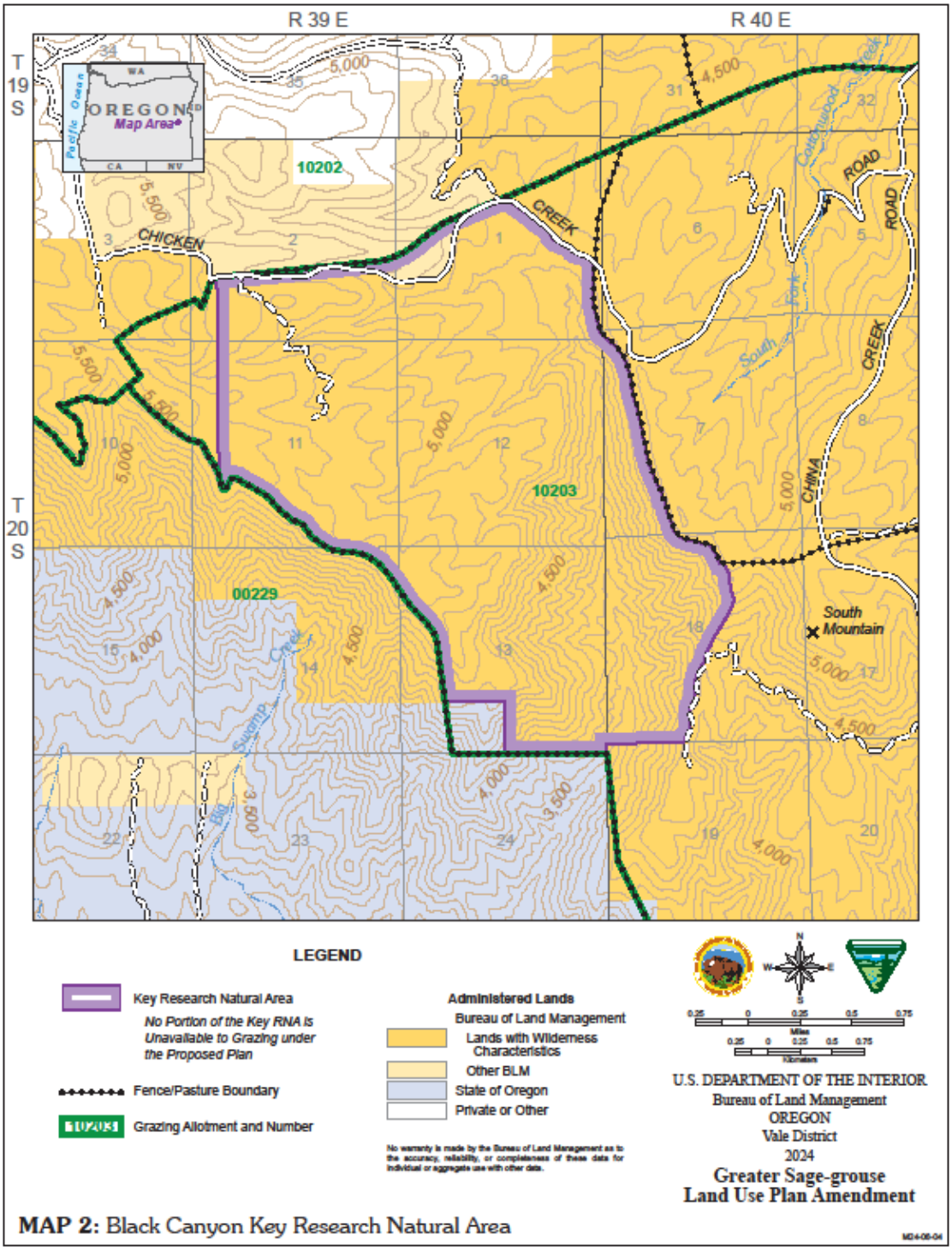
17.4.2 Key RNAs (District)

Black Canyon (Vale District)

Proposed RMP Amendment

Retain the area identified as a key RNA and reallocate the entire key RNA as available for livestock grazing.

Map 2. Black Canyon Key Research Natural Area



Affected Environment

The 2,600[1] acre Black Canyon ACEC/RNA, located north of the Malheur River above Jonesboro, Oregon, occupies the drainage of Black Canyon, a steep south-facing canyon that drains the uplands directly above the mainstem of the Malheur River. The drainage consists of an intermittent to perennial stream flowing just enough to develop riparian vegetation in the steep canyon. The uplands surrounding the drainage are sparsely vegetated due to the shallow soils and dry south-facing aspect. Elevations range from approximately 2,760 to 5,900 feet. There are two AIM plots within the area available for livestock grazing.

Livestock grazing and trailing on public, private, and state lands has occurred for decades in the area. Although there are flat benches conducive to livestock grazing in the upper elevations of the key RNA, the permittee does not currently push livestock to these areas, resulting in little to no use by livestock within the key RNA boundaries.

Specific Management under the 2002 SEORMP ROD, as Amended

OHV use will be limited to designated roads and trails. The ACEC/RNA is managed as VRM Classes II and III. Plant collecting requires a permit. Livestock use allocations will continue based on existing permit stipulations and approved AMPs, unless modified under subsequent land use planning. Any proposed changes in livestock grazing, including time and intensity of use, will be evaluated for impacts on the relevant and important values and will be permitted if values will be maintained or enhanced. Where adverse impacts are identified, existing livestock use allocations will be adjusted using a variety of methods that could include fencing, reduction in livestock numbers, and changes in livestock grazing season. Proposed projects in the area will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced.

Summary of Key RNA and Relevant and Important Values Evaluated for ACEC/RNA Designation

2002 Southeastern Oregon RMP (SEORMP) ACEC/RNA Designation

The relevant and important values of the ACEC/RNA are the following vegetation cells identified by the Oregon Natural Heritage Program (ONHP): stiff sagebrush/Sandberg bluegrass, western juniper/big sagebrush/bluebunch wheatgrass, riparian community dominated by coyote willow with Pacific willow, and first to third order stream system in sagebrush zone.

2015 Greater Sage-grouse ARMPA

The Black Canyon ACEC/RNA was identified as a key RNA for sagebrush plant communities that are important for Sage-grouse.

Updated Vegetation Communities and Sage-Grouse Habitats

Vegetation communities in the key RNA include old-growth western juniper/Wyoming big sagebrush/bluebunch wheatgrass, Wyoming big sagebrush/Idaho fescue (*Festuca idahoensis*), and stiff sagebrush/Sandberg bluegrass plant associations, as well as riparian community dominated by coyote willow and Pacific willow. Upland areas consist of shale rock outcroppings and steep canyons.

Vegetative communities in this key RNA that are important to Greater Sage-grouse habitat continue to be relatively unaltered. These are Wyoming big sagebrush/Idaho fescue (*Festuca idahoensis*), and stiff sagebrush/Sandberg bluegrass plant associations and the riparian community. These communities represent the Cool-Moist/Warm Dry sagebrush, Shallow-Dry Sagebrush, and Riparian communities important for

[1] Updated boundaries of some Key RNAs since publication of the 2015 Oregon ARMPA have resulted in minor change to acreages. No official boundary changes, however, have been made.

Greater Sage-grouse. Use by sage-grouse within the key RNA has not been documented, nor were signs of Greater Sage-grouse presence observed during site visits in 2022 (Fritts, Susan, McDaniel, Michele, and McGuire, Megan. Site visit. 10/12/2022). The key RNA is within 2015 ARMPA designated Greater Sage-grouse Priority and General Habitat Management Area (PHMA, GHMA); the nearest lek is more than three miles away.

The old-growth western juniper/Wyoming big sagebrush/bluebunch wheatgrass community is not suitable habitat for sage-grouse because the western juniper provides perch opportunities for predators.

Other Resources

The Black Canyon key RNA is wholly within the Trail Creek lands with wilderness characteristics unit OR-034-031. The 11,890-acre unit possesses naturalness and outstanding opportunities to experience solitude. The entire Black Canyon Creek drainage is within the unit. The BLM decided not to prioritize protection of the wilderness characteristics in the Trail Creek unit (BLM 2024a, Appendix A, p. A-4).

Some drainages possess varying woody riparian vegetation along portions of their canyon channels, dominated by coyote willow and Pacific willow. Existing human imprints within the unit consists of 5.3 miles of motorized primitive routes, 17.5 miles of rangeland fence, three earthen reservoirs, and four developed springs.

The key RNA is utilized by deer and pronghorn year-round and is designated as deer and elk winter range.

The Visual Resource Management Class (VRM) in the key RNA is mostly Class III with some Class II and Class IV.

Rationale for Proposing Alternative that Modifies Key RNA Management

Rationale for Retaining the Key RNA under All Alternatives

The vegetative communities identified as important for Greater Sage-grouse habitat within the key RNA continue to be in good condition. Management would continue to protect the relevant and important values of the RNA.

Benches of sagebrush provide suitable nesting and winter habitat for Greater Sage-grouse.

The key RNA retains the following vegetation types important for Greater Sage-grouse: Ecotone between cool-moist and warm-dry sagebrush, shallow-Dry Sagebrush, and Riparian-Wetlands.

Opportunities for nonmanipulative research and baseline data gathering on relatively unaltered plant community types continue to remain, along with vegetative communities identified as important for greater sage-grouse, due to the remote and rugged nature of the area.

Rationale for Reallocating the Area as Available for Livestock Grazing under Proposed RMP Amendment

Prior to the removal of livestock grazing from this key RNA, there was no indication of negative impacts from livestock grazing to these vegetative communities or the relevant and important values for which the RNA was designated (BLM. Monitoring data. 06/01/2018-06/02/2018; BLM. Monitoring data. 06/26/2020-06/27/2020).

The key RNA portion of the pasture is largely inaccessible to livestock grazing due to topography, such as steep, rugged slopes that are sparely vegetated due to shallow soils and dry south-facing aspects (BLM 2001b,

p. 296). The existing pasture boundaries, which encompass the key RNA on three sides, includes two areas that remain allocated to livestock grazing in the 2015 ARMPA.

Due to the deep canyons and rugged terrain that characterize the key RNA, the current and historical livestock use is limited and provides opportunities for ungrazed areas to be found within the key RNA (Fritts, Susan, McDaniel, Michele, and McGuire, Megan. Site visit. 10/12/2022; R. Bond & D. Thomas site visit 06/23/2023) without retaining an allocation of "unavailable for livestock grazing". The objective for which the RNA was designated in 2002 would continue to be met, which allows for scientific research objectives without the need to make the area unavailable for livestock grazing, thus eliminating the need for fence construction.

The key RNA would continue to provide opportunities to gather baseline data on relatively unaltered plant community types important to Greater Sage-grouse without additional fencing as field observations confirmed that the area has limited access for livestock due to extreme topographic features and it is presently largely undisturbed. Continued livestock grazing is not expected to adversely affect current conditions, and conditions continue to exist at the time the RNA was designated under the 2002 SEORMP.

Environmental Consequences

Consequences Common to all Alternatives

The terrain of the key RNA naturally excludes livestock access from all but the south-eastern boundary. Because of limited livestock presence or use occurring within the key RNA, vegetative communities that are important to Greater Sage-grouse habitat would continue to be relatively unaltered and available for provide baseline data on relatively unaltered plant community types important to Greater Sage-grouse.

Alternatives 1 and 4

The removal of livestock grazing under Alternative 1 has not changed the condition of the vegetative communities as access to the area by livestock was limited due to topography regardless of how livestock use is allocated for the area. Vegetative communities were in a desirable state prior to the removal of livestock grazing (BLM. Monitoring data. 06/01/2018-06/02/2018; BLM. Monitoring data. 06/26/2020-06/27/2020). Topography is currently the primary factor in livestock being removed from the area, along with livestock management practices such as herding and placement of salt or other active management practices that deter livestock from entering drainage areas within the key RNA. In the future, should the decision be made to construct fence to keep livestock out of the area, there could be ground disturbance associated with fence construction, and potential for increased weeds, unless specific design features are implemented to reduce or eliminate these negative effects. There would be short-term impacts to visual resources during fence construction.

Alternatives 2, 5, 6, and Proposed RMP Amendment

Allocating the 2600-acre area as available for livestock grazing would avoid the need to either construct fencing within areas possessing wilderness characteristics or to implement management actions that require the permittee to manage livestock to avoid incursion into the key RNA that currently receives very little to no use by cattle in the absence of fence construction. There would be no impacts to wildlife, including sage-grouse, from fencing or active livestock management because none would occur for the purposes of removing livestock from the key RNA. There would be no ground disturbance associated with fencing and no associated potential increase in weeds. There would be no impacts to visual resources because there would be no fencing.

No impacts to vegetative communities are expected from re-allocating this key RNA as available for livestock grazing. As stated in the rationale for maintaining the key RNA status, the vegetative communities identified as important for Greater Sage-grouse in 2015 are still present in their entirety as the area has not been subject to wildfire, even though until recently, actions to remove livestock from the area allocated as unavailable for such use had not been implemented. Topographical features allow for long-term natural succession in relatively undisturbed areas from livestock use throughout the majority of the key RNA, and where livestock use does occur, use would be negligible due to limited water availability and access to these areas. Therefore, the condition of the vegetative communities that were present when the 2002 SEORMP designated the RNA while retaining livestock grazing use would continue (BLM. Monitoring data. 06/01/2018-06/02/2018; BLM. Monitoring data. 06/26/2020-06/27/2020).

These alternatives, compared with Alternatives 1, 3, and 4, would have similar impacts from livestock grazing due to limited livestock presence or use occurring in the key RNA boundaries. Vegetation communities that are important to Greater Sage-grouse habitat would continue to be relatively unaltered and provide life-cycle needs (such as nesting, brood rearing, and wintering) under all alternatives.

Outstanding opportunities for solitude would not be negatively impacted because active management by livestock operators to exclude livestock from an unfenced key RNA would not occur nor would there be any short-term disturbances to these opportunities caused by fence construction. The wilderness characteristic of naturalness would not be negatively impacted by the presence of new fencing on the landscape. Fence related conflicts would not occur. Under these alternatives, the BLM could focus management responses on actions that maintain or improve Greater Sage-grouse habitat conditions outside the key RNA rather than focusing on actions that ensure livestock do not enter an area already witnessing limited use.

Alternative 3

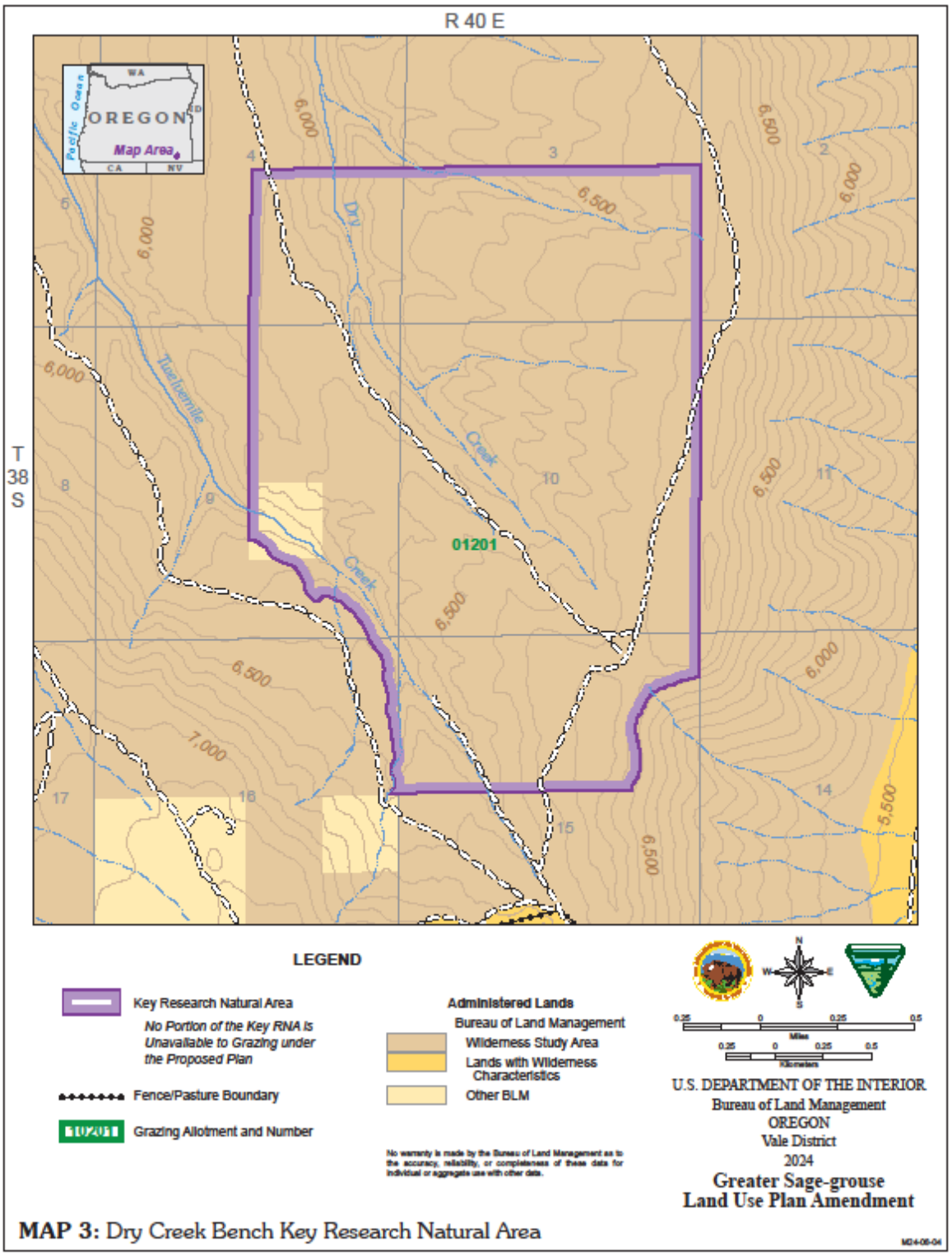
Because livestock grazing would not occur in the vicinity of this key RNA, there would be no need for fencing or active livestock management (herding). Wilderness characteristics of naturalness and outstanding opportunities for solitude would not be impaired under this alternative, nor would there be any short-term disturbances to these opportunities caused by fence construction. Fence related conflicts would not occur. An ungrazed reference for research would be retained.

Dry Creek Bench (Vale District)

Proposed RMP Amendment

Retain the area identified as a key RNA and reallocate the entire key RNA as available for livestock grazing.

Map 3. Dry Creek Bench Key Research Natural Area



Affected Environment

The 1,635-acre ACEC/RNA is located on the northern edge of the Oregon Canyon Mountains, taking in the upper basin of Dry Creek about 20 miles northwest of McDermitt, Nevada. Terrain of the key RNA naturally excludes livestock access from all but the south-eastern boundary. The area has sizeable patches of mountain mahogany in relatively good condition in association with Saskatoon serviceberry. The mountain mahogany stands in this area are extensive, compared to other stands in the basin, and cover large areas within the steep drainages as well as on the small plateaus that lie at the edge of the drainages. Use by sage-grouse within the key RNA has not been documented, nor were signs of Greater Sage-grouse presence observed during site visits in 2023. The ACEC/RNA is located in the Twelvemile Wilderness Study Area, and classified as VRM class I. The area is known big horn sheep habitat and range. The 2012 Holloway Fire burned through the ACEC/RNA impacting some but not all of the patches of mountain mahogany. The vegetation has been recovering from the fire with grasses and forbs coming back the following year, while mountain mahogany is slower growing and will take time for seedlings to mature.

The 1,635 acre key RNA, including the 622-acre area currently allocated as unavailable for livestock grazing, is in the Green Ponds pasture of the 15-Mile Community allotment (allotment #OR01201). The 15-Mile Community Allotment has seven livestock grazing authorizations associated with it. The allotment currently has a use area agreement in place that formalizes use areas between the livestock operators. There is one AIM plot within the area available for livestock grazing.

Specific Management under the 2002 SEORMP ROD, as Amended

OHV use is limited to existing roads and trails. Plant collecting requires a permit. Road maintenance will be limited to the existing roadway, and shoulder/ barrow ditch construction will be limited to that necessary to control runoff, minimize soil erosion, and ensure public safety and serviceability of the road. Livestock use allocations will continue based on existing permit stipulations and approved AMPs, unless modified under subsequent land use planning. Any proposed changes in livestock grazing, including time and intensity of use, will be evaluated for impacts on the relevant and important values and will be permitted if the values will be maintained or enhanced. Existing livestock use allocations will be adjusted where adverse impacts are identified using a variety of methods, that could include, but is not limited to, fencing, reduction in livestock numbers, and changes in livestock grazing season. Proposed projects in the area will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced.

Summary of Key RNA and Relevant and Important Values Evaluated for ACEC/RNA Designation

2002 SEORMP ACEC/RNA Designation

The relevant and important values of this ACEC/RNA are the mountain mahogany/whortleleaf snowberry/Idaho fescue and mountain mahogany/big sagebrush/Idaho fescue Basin and Range Province vegetation cells identified by the ONHP.

2015 Greater Sage-grouse ARMPA

The Dry Creek Bench ACEC/RNA was identified as a key RNA for sagebrush plant communities that are important for Sage-grouse.

Updated Vegetation Communities and Sage-Grouse Habitats

Vegetation communities in this ACEC/RNA include mountain mahogany/mountain big sagebrush woodland with mountain snowberry (*Symphoricarpus oreophilis*) and various bunchgrasses, and mountain mahogany/mountain big sagebrush/Idaho fescue plant associations. Although not mentioned in the 2015 ARMPA as a community present, low sagebrush/Idaho fescue and mountain big sagebrush/bluebunch

wheatgrass are present within the proposed key RNA as observed through site visits. These communities represent the Cool-Moist sagebrush and Shallow-Dry sagebrush communities.

The mountain mahogany plant community does not represent an important Greater Sage-grouse habitat type because the density of mountain mahogany within the key RNA boundaries and its elevated structure can pose an increased likelihood of predation by raptors. The key RNA is within Greater Sage-grouse PHMA; the nearest lek is 1.8 miles away. A total of four pending active leks are within four miles of the key RNA.

Other Resources

The visual resource management is Class I.

The Dry Creek Bench key RNA is wholly located in the 28,000-acre Twelvemile Creek WSA. It is one of five WSAs that make up the Trout Creek Mountains Group of WSAs. The WSA is located approximately 26 miles northwest of McDermitt Nevada. The Twelvemile Creek WSA consists of two fault block plateaus, steeply scarped on the east and sloping gently to the northwest. The elevation ranges from 6,000 to 6,800 feet. The predominant plant communities are typical of sagebrush/grass ecosystems, with low sagebrush dominant on the shallower rocky soils, Wyoming big sage dominant on deeper soils. The Twelvemile Creek WSA has outstanding opportunities for experiencing both solitude and primitive and unconfined recreation. Supplemental values include geologic, scenic, archaeological, big game Habitat, and diverse plant community.

Dry Creek Bench key RNA is utilized by mule deer and pronghorn year-round, designated as deer winter range, and is within bighorn sheep occupied habitat. Rugged topography in the area could constrict wildlife movement between deep drainages and steep terrain, focusing movement on flatter benches.

Rationale for Proposing Alternative that Modifies Key RNA Management

Rationale for Retaining the Key RNA under All Alternatives

Notwithstanding being burned by wildfire in 2012, the area continues to be in desirable condition for the vegetative communities identified in the 2015 ARMPA. Prior to the removal of grazing from this key RNA, there was no indication of negative impacts from livestock grazing to the vegetative communities identified as important for Greater Sage-grouse or the relevant and important values for which the RNA was designated (BLM. Monitoring data. 06/12/2013-06/13/2013; BLM. Monitoring data. 06/02/2018-06/13/2018; BLM. Monitoring data 07/06/2020). Management will continue to protect the relevant and important values. The area continues to recover and provides opportunities for nonmanipulative research and baseline data gathering where natural recovery post-fire was allowed to occur. Site visits indicate that mountain mahogany stands that were not impacted by the 2012 Holloway fire are dense and continuous, with mountain big sagebrush on the periphery of the mahogany stands. Mountain mahogany impacted by the 2012 wildfire are standing dead, creating perches for raptor species that may occur in the area. However, the key RNA as identified in the 2015 ARMPA includes the mountain big sagebrush that occurs within the mountain mahogany community type. Sagebrush communities within the key RNA provide suitable nesting and winter habitat for Greater Sage-grouse.

Retaining the Dry Creek Bench key RNA would continue to allow natural processes to predominate and research and baseline data gathering on relatively unaltered plant communities important for Greater Sage-grouse: cool-moist sagebrush and shallow-dry sagebrush. The key RNA would continue to be managed for minimum human disturbance and to allow natural processes to predominate.

Research opportunities continue to remain within the area due to its remote and rugged nature, including vegetative communities identified as relevant and important values that are important for greater sage-grouse.

Rationale for Reallocating the Area as Available for Livestock Grazing under Proposed RMP Amendment

Allocation of the key RNA as unavailable for livestock grazing is unnecessary as this portion of the pasture has limited water availability and consists of topographic features that limit access use. The pasture in which the key RNA is situated has historically received limited use by livestock; this portion of the pasture's vegetative community is in a desired condition. Additional actions or disturbance to exclude livestock are not necessary to protect the relevant and important values because there is limited adequate available water and the remote, rugged nature of the area naturally limits livestock use in this key RNA. Additionally, under the 2015 Biological Opinion this pasture currently receives a minimum 2-year rest followed by a maximum 2-year consecutive livestock grazing use, and livestock grazing use is allowed for a maximum of 61 days during the period of May 15 to July 30. Returning the low level of grazing that occurred until the area was made unavailable for livestock grazing in 2023 is not expected to adversely impact current conditions. Conditions continue to exist (excluding impacts from wildfire) as they did at the time the RNA was designated under the 2002 SEORMP. The potential need to construct fence to create an area to exclude livestock use would be eliminated, therefore reducing the amount of fence on the landscape, as well as the need to address fence maintenance on an annual basis due to snow loads that occur in the area.

The key RNA is located in a WSA. Not building fences to exclude livestock would avoid the potential conflicts fence (exclosure) construction in the WSA would have. Developments that would "impair the suitability of WSAs for the preservation as wilderness" cannot be permitted unless they were to meet one of the exception criteria described in BLM Manual 6330, Management of Wilderness Study Areas. "In determining whether a development meets the protecting or enhancing wilderness characteristics exception, the BLM will determine if the structure's benefits to the natural functioning of the ecosystem outweigh the increased presence of human developments and any loss of naturalness, or outstanding recreational opportunities caused by the new development" (BLM 2012, p. 1-17). However, developments that meet an exception criterion must still be carried out in the least impairing manner practical. Furthermore, if an impairing proposed development—even one that meets an exception—can be implemented outside of a WSA and accomplish the objectives identified in the purpose and need statement prepared under NEPA, the BLM should endeavor to ensure that the project is implemented outside the WSA (BLM 2012, p. 1-11). Under the Proposed RMP Amendment, not building fences to exclude livestock would avoid impacts to wilderness characteristics within the WSA.

Concerns from the public regarding impacts to bighorn sheep were identified through the public scoping process for completing site-specific analysis (BLM 2023a, BLM 2023b) for implementing the removal of livestock grazing from the key RNA. The area is in pristine condition, and in a seral state that is expected to occur post-wildfire, as indicated by the presence of green rabbitbrush within the big sage communities that were affected by the 2012 Holloway wildfire. Although impacts to vegetation and soils may be short-term in nature with the construction of a potential fence to further aid in deterring livestock from using the area allocated as unavailable for livestock grazing, the fence would adversely impact the pristine (naturalness) nature of the area.

The key RNA would continue to provide research opportunities to study relatively unaltered plant community types important to sage-grouse without additional fencing as it is largely undisturbed. Given the topography and limited water sources for livestock use, there are areas that are unused by livestock, allowing

for ungrazed comparison areas without the need of additional fencing or increased livestock grazing management practices to remove livestock from an unfenced exclusion area.

Environmental Consequences

Consequences Common to all Alternatives

Vegetative communities that are important to Greater Sage-grouse habitat would continue to be available for provide baseline data on relatively unaltered plant community types important to Greater Sage-grouse.

Alternatives 1 and 4

The removal of livestock grazing under Alternative 1 has not changed the condition of the vegetative communities as access to the area by livestock had been limited due in part to topographical features as well as the management practices prior to the removal of livestock grazing (BLM. Monitoring data. 06/12/2013-06/13/2013; BLM. Monitoring data. 06/02/2018-06/13/2018; BLM. Monitoring data 07/06/2020). Grazing management has been impacted by the need for increased presence to ensure livestock are not entering the area allocated as unavailable for livestock use. These impacts would be witnessed during the portion of the two-year rotation when grazing is allowed within the pasture per the currently prescribed grazing system.

Outstanding opportunities for solitude and primitive and unconfined recreation within the WSA are expected to be negatively impacted by active management to exclude livestock from 622 acres of the key RNA.

Topography and active livestock management through herding, salting, and increased checks on livestock location by the grazing permittee, as well as a grazing system that prescribes a 2-year rest cycle have removed livestock from the area allocated as unavailable for livestock grazing. In the future, should the decision be made to construct fence to exclude livestock from the area, the wilderness characteristic of naturalness would be impacted. Outstanding opportunities for solitude and primitive and unconfined recreation would be impacted by short-term impacts to solitude caused by fence construction. Fence construction may result in short-term disturbance to sage-grouse individuals and fence related conflicts (e.g. bird collisions and entrapments). The area occurs within Visual Resource Management (VRM) Class 1, which would require any fencing to be either screened from view of primary travel corridors by landform and vegetation, or the project elements be small enough and common enough in these landscapes so the level of change would be very low and would not attract attention. A fence is assumed to conform to VRM Class 1 if in an area that would allow for screening and location away from the travel corridor. There would be portions of the fence that would cross the travel corridor due to the location of the key RNA and associated area allocated as unavailable for livestock grazing under these alternatives. Fencing locations to exclude livestock use should consider natural barriers and other topographical features to reduce negative impacts to WSA and VRM Class 1 within the WSA; design features would also need to be incorporated to reduce negative impacts, although any impacts are not expected to be significant.

Wildlife identified for analysis may witness short-term impacts as a result of increased human presence during times when active herding is required to keep livestock out of the area allocated as unavailable for use during the two-year use cycles for the portions of the pasture that remain available for livestock use. If a fence is constructed in the future, impacts to movement within the area may be impacted, but are expected to be short-term in nature, and reduced through fence designs that are intended to reduce long-term impacts. Removal of livestock as a result of the unavailable for livestock use allocation within a portion of the Key RNA is not expected to have positive or negative impacts to wildlife or the associated habitat due to current conditions of the area.

Alternatives 2, 5, 6, and Proposed RMP Amendment

Reallocating the key RNA as available for livestock grazing eliminates the need for additional presence of livestock operators for managing livestock away from unfenced boundaries and the need for additional fence construction. Livestock management that prescribes a 2-year rest followed by 2 years of utilization, which had been in place prior to the 2023 grazing season, would resume.

Throughout the majority of the key RNA, topographical features and current livestock management practices restrict livestock access creating areas relatively undisturbed by livestock (BLM site visits by R. Bond and M. McDaniel July 2023; D. Thomas July 2023) which allows for long-term natural succession. Where livestock use does occur, use would be negligible due to limited water availability and access to these areas. This would result in limited livestock presence or use within the key RNA.

The condition of the vegetative communities that were present when the 2002 SEORMP designated the RNA while retaining livestock grazing use would continue. Livestock grazing management prescribed did not adversely impact conditions of the vegetative communities that support wildlife habitat important to the area or the condition of the important vegetative communities identified for the Greater Sage-grouse.

There are no existing unnatural conditions on the landscape attributed to the livestock grazing that occurred prior to the key RNA being allocated as unavailable for livestock grazing, therefore no additional impacts to wilderness characteristics are anticipated from reallocating livestock grazing in the key RNA.

Alternative 3

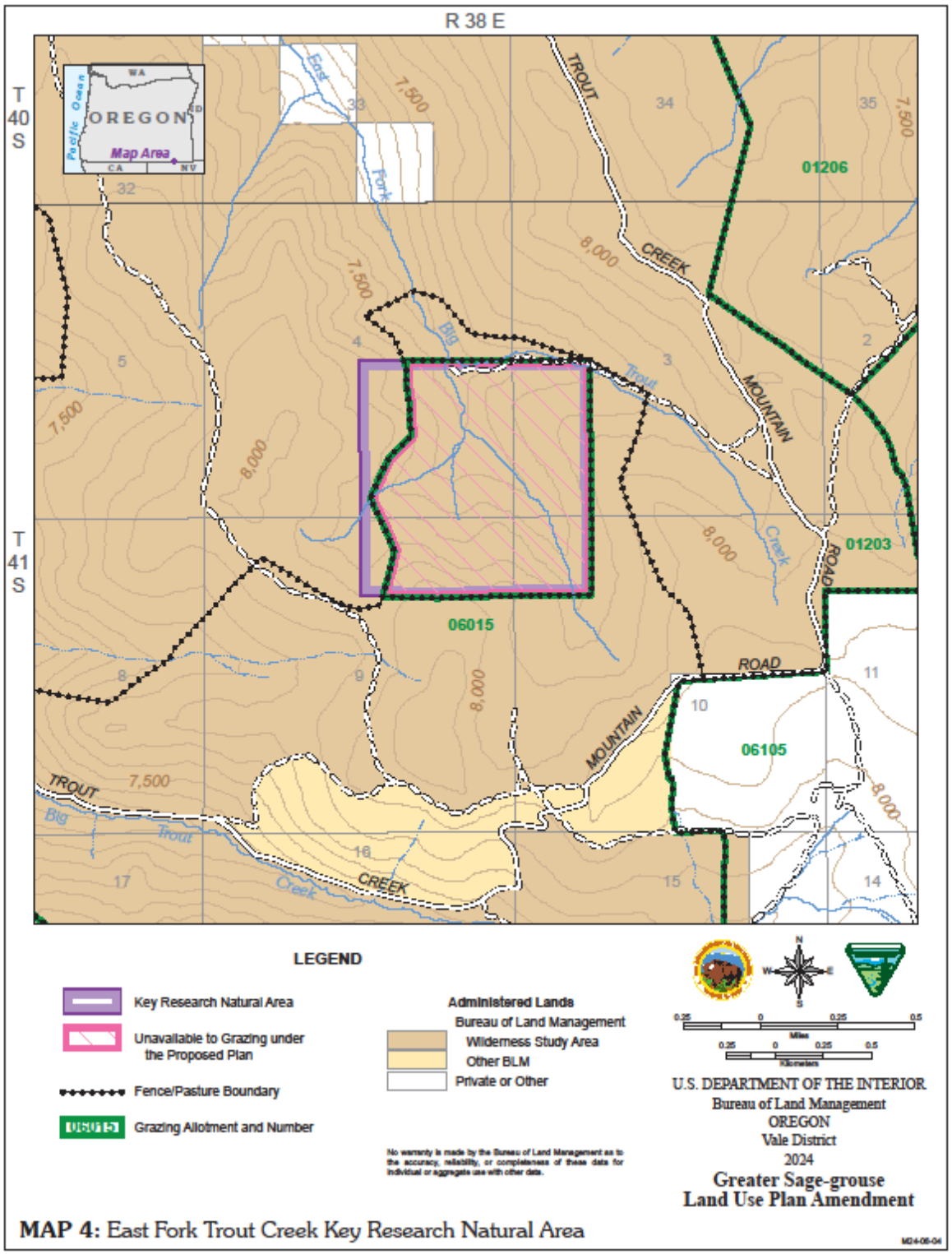
Because livestock grazing would not occur in the vicinity of this key RNA, there would be no need for fencing or active livestock management (herding). Wilderness characteristics of naturalness, opportunities for solitude, or primitive and unconfined recreation would not be impaired under this alternative, nor would there be any short-term disturbances to these characteristics caused by fence construction. Fence-related conflicts would not occur. An ungrazed reference for research would be retained.

East Fork Trout Creek (Burns)

Proposed RMP Amendment

No proposed changes from 2015 ARMPA; the portion of the key RNA that is currently unavailable for livestock grazing would remain unavailable for livestock grazing through a rangeline agreement, which removed the key RNA from the Headwaters Pasture and identified it as an area unavailable for livestock grazing.

Map 4. East Fork Trout Creek Key Research Natural Area



Affected Environment

The East Fork Trout Creek key RNA is located in Southeast Oregon, about 25 miles southeast of Fields, Oregon and 20 miles east of Denio, Nevada. It is situated at the headwaters of the East Fork of Trout Creek in the Trout Creek Mountains. The East Fork Trout Creek key RNA contains 361 acres of BLM managed land. The elevation of the key RNA ranges from 7,350 feet to 8,000 feet and the yearly rainfall averages from 16 to 35 inches per year. Temperatures range from a maximum of 90 degrees F in the summer to an occasional low of minus 20 degrees F in the winter. A 4-strand barbed wire fence runs for 0.75 mile through the west part of the key RNA, running from north to south. The fence will continue to be maintained because it is a pasture boundary. This fence splits the key RNA into two pieces. The piece north-west of the fence is in the East Fork Pasture which is still open to livestock grazing. The portion of the key RNA to the south-east of the fence was previously in the Headwater Pastures, and livestock grazing was limited to 5 days per year. This portion of the key RNA has now been made into its own pasture and has been unavailable for livestock grazing through a rangeline agreement with livestock operators. Livestock grazing is still authorized in the Headwaters Pasture which no longer includes the key RNA.

Specific Management under the 2005 Andrews Management Unit RMP ROD, as Amended

OHV use is limited to existing roads and trails.

Summary of Key RNA and Relevant and Important Values Evaluated for ACEC/RNA Designation

2005 Andrews Management Unit ROD/RMP ACEC/RNA Designation

The relevant and important values include several plant community types. The ONHP vegetation cells represented in this area include a riparian community dominated by quaking aspen and Scouler willow, a high-elevation wet meadow dominated by sedges, and a first-to-third order stream system originating in the subalpine zone.

2015 Greater Sage-grouse ARMPA

The East Fork Trout Creek ACEC/RNA was identified as a key RNA for sagebrush plant communities that are important for Sage-grouse.

Updated Vegetation Communities

The vegetation in the key RNA consists of three major plant communities, a riparian community, a mountain big sagebrush (*Artemisia tridentata s. vaseyana*) community and a quaking aspen community (BLM 2007, p. 3). The riparian community is made up of two first order streams with associated meadow and willow (*Salix spp.*) types along the stream route. Meadow types are quite extensive in some areas where springs emerge from the ground and saturate the soil. Sedges and Rushes (*Juncus spp.*) dominate these saturated areas with occasional willow patches. Other species that occur in the meadow type include: aspen, alder, false hellebore (*Veratrum californicum*), monkeyflower (*Mimulus guttatus*), clover (*Trifolium longipes*), cinquefoil (*Potentilla gracilis*), willow herb (*Epilobium watsonii*), and buttercup (*Ranunculus macounii*). The mountain big sagebrush community covers the most area within the RNA. This type covers the dryer upland areas around and between the riparian areas and the aspen groves. Portions of this type include late-lying snow accumulation zones where very little sagebrush grows. Mountain big sagebrush is the dominant shrub in this community and needle grass (*Achnatherum* spp.) and mountain brome (*Bromus carinatus*) are the dominant grass species. Other species include wax currant (*Ribes cereum*), service berry (*Amelanchier alnifolia*), Snowberry (*Symphoricarpos rotundifolius*), lupine (*Lupinus* spp.), Idaho fescue (*Festuca idahoensis*), and phlox (*Phlox* spp.).

The quaking aspen community covers nearly one third of the natural area and includes the Scouler willow vegetation type. Much of this community is comprised of very dense canopy cover with poorly vegetated

understory. Other areas are more sparsely covered with trees and have well vegetated understories. Some of the species include: yarrow (*Achillea millefolium*), columbine (*Aquilegia formosa*), bedstraw (*Galium triflorum*), miner's lettuce (*Mantia perfoliata*), Solomon's seal (*Smilacina stellata*), stinging nettle (*Urtica dioica*), rose (*Rosa woodsii*), snowberry, and creeping wildrye (*Leymus triticoides*). No special status plant species are known to occur within the natural area.

Other Resources

Some of the common wildlife species found in the key RNA include mule deer, pronghorn, cougar, coyote, bobcat, badger, Belding ground squirrel, beaver, weasel, golden eagle, raven, cottontail, snowshoe hare, and spotted frog. The East Fork of Trout Creek supports a population of hybrid rainbow/cutthroat trout up to 10 inches in length. Special status animal species that could be present in the key RNA include Greater Sage-grouse, ferruginous hawk, Northern goshawk, and spotted frog. Many species of migratory birds nest in and around the natural area.

The fire return interval for the area in and around the RNA could be up to 100 years at the top end but the best estimate is between 35 and 50 years. The fine fuels from perennial grasses have increased in the last 15 years due to the change in livestock use (limited to no more than 5 days per grazing season).

The key RNA is located entirely within the Mahogany Ridge Wilderness Study Area (WSA). The area will be managed according to the BLM WSA policy.

Two separate stream forks form the headwaters of the East Fork Trout Creek. Each fork originates as two first order streams coming together to form a second order stream. When the two second order streams flow together in the lower part of the RNA they form a third order stream. All of the first order streams originate at 7,600 feet or higher in elevation. In all, about 1.2 miles of the East Fork Trout Creek and its tributaries are present within the natural area.

The area is encompassed within the 1.2 mile lek buffer and within a WSA. In addition, there are special status species flora located adjacent to the key RNA. The key RNA has been removed from the pasture and a fence is not needed to exclude livestock grazing from the area identified as unavailable for livestock grazing as topography and water sources in lower elevations of the Headwaters Pasture typically prevent livestock from grazing within the RNA. By utilizing a rangeline agreement in lieu of a fence, the BLM removed any resource conflicts that fence construction might present.

Environmental Consequences

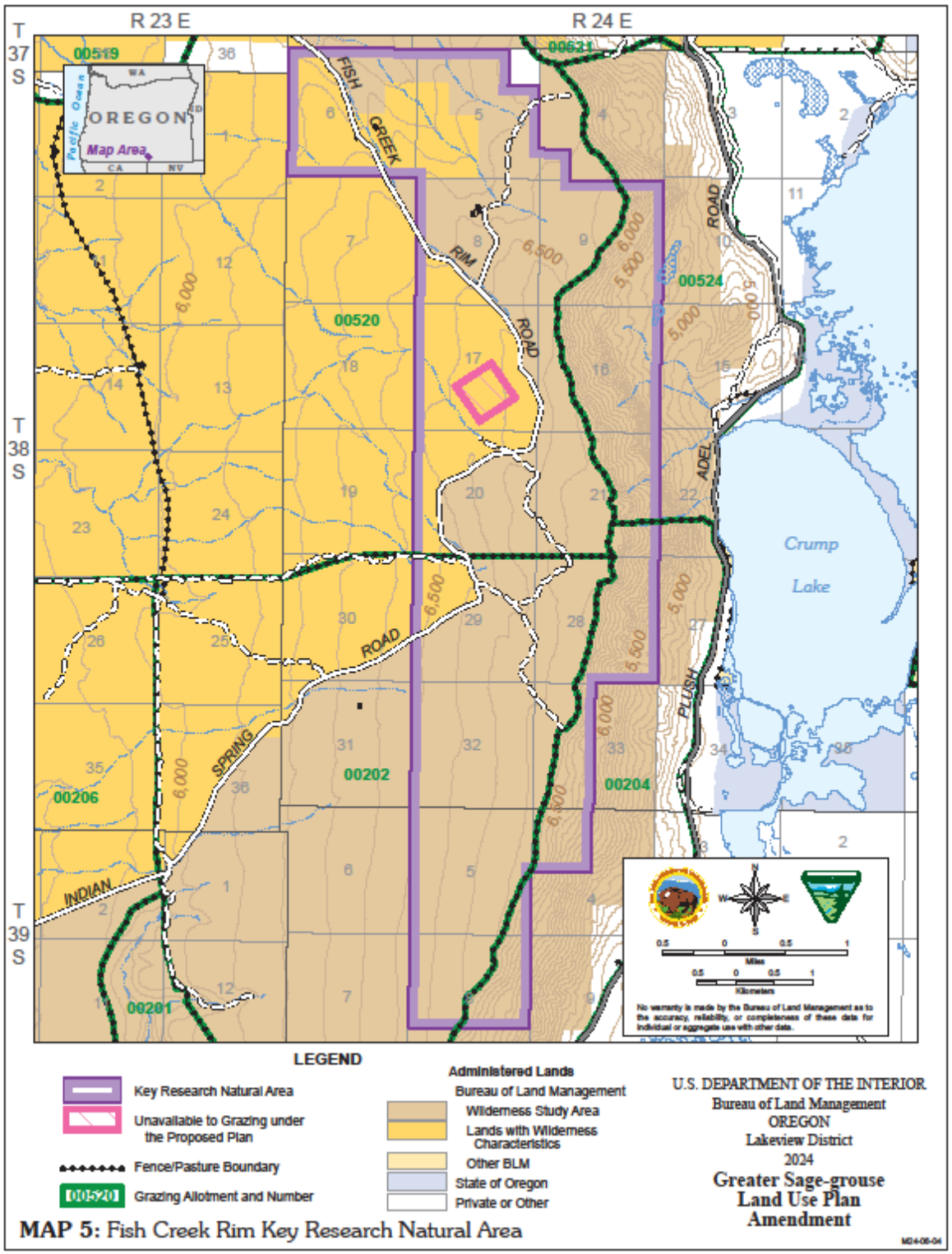
As there are no changes in livestock grazing management proposed in this planning effort there would be no effect to the vegetation communities and resources described above. An ungrazed reference for research would be retained.

Fish Creek Rim (Lakeview)

Proposed RMP Amendment

Retain the area identified as a key RNA and reduce the 2,750 acres allocated as unavailable for livestock grazing to 95 acres within a low sagebrush/grassland community.

Map 5. Fish Creek Rim Key Research Natural Area



Affected Environment

The 8,725-acre Fish Creek Rim ACEC/RNA is located about 22 miles northeast of Lakeview. The 2015 Proposed RMPA/Final EIS described the plant communities of the Fish Creek Rim ACEC/RNA as representing mountain mahogany/mountain big sagebrush, low sagebrush/Idaho fescue, low sagebrush/Sandberg's bluegrass, mountain big sagebrush/bitterbrush/Idaho fescue, and a snowbrush/bittercherry shrub (*Ceanothus velutinus*/*Prunus emarginata*) complex (BLM 2015a, p. 3-140). Approximately 2,700 acres of the ACEC/RNA contains these specific plant communities ("cells" identified in Vander Schaaf 1992; BLM 2000a, p. III-30). Sage-grouse use has not been documented in all of these communities. Wyoming big sagebrush, small stands of quaking aspen and white fir (*Abies concolor*), and dense western juniper stands are also found within the ACEC/RNA boundary (BLM 2000a, p. III-30). Only Wyoming big sagebrush, mountain big sagebrush, and low sagebrush communities represent potential sage-grouse habitat.

Specific Management under the Lakeview RMP/ROD

OHV use is limited to existing roads and trails.

Summary of Key RNA and Relevant and Important Values Evaluated for ACEC/RNA Designation

Lakeview RMP ACEC/RNA Designation

The Fish Creek Rim ACEC/RNA was designated in the Lakeview RMP/ROD to protect relevant/important natural system (plant communities) and cultural resource values (BLM 2000a, p. III-30; 2001a, p. A-242 to A-243; 2003b, p. 58).

During the development of the *Lakeview RMP*/*ROD* (BLM 2003b), the BLM expanded the Fish Creek Rim ACEC/RNA (from the original 2,700-acre proposal to 8,725 acres) solely to include important cultural values in the added acreage. These values included the presence of stone rings/occupation sites, lithic scatter, rock art sites, and hunting blinds (BLM 2000a, p. III-28; 2003b, p. 77).

2015 Greater Sage-grouse ARMPA

The 2015 Proposed RMPA/Final EIS described the plant communities of the Fish Creek Rim ACEC/RNA as representing mountain mahogany/mountain big sagebrush, low sagebrush/Idaho fescue, low sagebrush/Sandberg's bluegrass, mountain big sagebrush/bitterbrush/Idaho fescue, and a snowbrush/bittercherry shrub (*Ceanothus velutinus*/*Prunus emarginata*) complex (BLM 2015a, p. 3-140). Approximately 2,700 acres of the ACEC/RNA contains these specific plant communities ("cells" identified in Vander Schaaf 1992; BLM 2000a, p. III-30).

Updated Vegetation Communities

Based on ecological site inventory (ESI) data, the most dominant vegetation communities in the Fish Creek Rim ACEC/RNA include low sagebrush/squirreltail, low sagebrush/Idaho fescue, mountain mahogany/mountain big sagebrush/bluegrass, and juniper-encroached mountain big sagebrush/squirreltail associations.

The Fish Creek Rim ACEC/RNA has extensive current and historical whitetop species (*Lipidium draba, L. appelianum, and L. chalepense*) weed sites along the road system, Canada thistle (*Cirsium arvense*) near water developments, and scattered patches of cheatgrass (*Bromus tectorum*) throughout the area.

Other Resources or Issues

Small riparian/wetland areas occur around several livestock water developments and within existing exclosures around Cleland and Cox Springs (BLM 2024b, p. 24).

The Fish Creek Rim ACEC/RNA includes a diversity of wildlife habitats. The area contains occupied bighorn sheep habitat, mule deer winter habitat, year-round antelope habitat. While the key RNA includes PHMA and GHMA, there are no known leks within the key RNA (BLM 2015a, p. 3-140) and documented use by Greater Sage-grouse within the key RNA is limited. Telemetry data collected in the area from 2009-2017 as part of various studies, documented spring, summer, and winter use in portions of the key RNA, but the majority of use occurred west of the key RNA, and no use was documented within the area allocated as unavailable for livestock grazing considered under Alternative 1 (Olsen *et al.* 2021a, Olsen *et al.* 2021b, and unpublished data).

During the development of the *Lakeview RMP/ROD* (BLM 2003b), the BLM expanded the Fish Creek Rim ACEC/RNA (from the original 2,700-acre proposal to 8,725 acres) to include important cultural values in the surrounding area, in general these additional acres do not include sage-grouse habitat. These values included the presence of stone rings/occupation sites, lithic scatter, rock art sites, and hunting blinds (BLM 2000a, p. III-28). A small portion of the Fish Creek Rim Wilderness Study Area (WSA) (OR-1-117; 1,786 acres) overlaps a portion of the Fish Creek Rim key RNA. A small portion of the Monument Flat wilderness characteristics unit (OR-015-117A) also overlaps a portion of the Fish Creek Rim key RNA.

Fish Creek Rim ACEC/RNA is managed under two different VRM classifications. The Fish Creek Rim WSA portion is managed as VRM Class I. The remainder of the ACEC/RNA is managed as VRM Class II.

The Fish Creek Rim ACEC/RNA falls within portions of the 22,011-acre Lynch-Flynn (00520), 3,548-acre Crump Individual (00201), 3,054-acre Lane Individual (00524), and 8,073-acre Hickey Individual (00202) Allotments. The area allocated as unavailable for livestock grazing under Alternative 1 falls within a portion of the East Pasture of the Lynch-Flynn Allotment. A rangeland health assessment was completed for this allotment in 2003 and updated in 2013 (BLM 2003c, 2013b). During these assessments no rangeland health issues were identified within the allocated as unavailable for livestock grazing under Alternative 1.

Rationale for Proposing Alternative that Modifies Key RNA Management

Rationale for Retaining the Key RNA under All Alternatives

Prior to the removal of grazing from this key RNA, there was no indication of negative impacts from livestock grazing to the vegetative communities identified as important for Greater Sage-grouse or the relevant and important values for which the RNA was designated. Management would continue to protect the relevant and important values of the RNA.

The key RNA retains the following vegetation types important for Greater Sage-grouse: cool-moist sagebrush, shallow-dry sagebrush, mountain brush, and riparian-wetlands.

Opportunities for nonmanipulative research and baseline data gathering on relatively unaltered plant community types continue to remain, along with vegetative communities identified as important for greater sage-grouse, due to the remote and rugged nature of the area.

Rationale for Reallocating the Area as Available for Livestock Grazing under Proposed RMP Amendment

Portions of the boundary around the area allocated as unavailable for livestock grazing in Alternative 1 traversed terrain/topography where the BLM determined, based on further analysis and field inventory, it would be difficult to construct exclosure fencing.

The mountain mahogany plant community does not represent an important sage-grouse habitat type because of the high density and decadent condition of the mountain mahogany stands and lack of sagebrush

understory within this portion within the key RNA boundary. White fir and western juniper stands do not represent important sage-grouse habitats because Greater Sage-grouse are a sagebrush-obligate species and these are forest or woodland habitats rather than sagebrush habitats. In addition, other existing native plant communities within the key RNA boundary are severely degraded by western juniper encroachment. The mountain mahogany, white fir, and western juniper all present perching locations for raptors, decreasing security for sage-grouse and resulting in their avoidance of these areas.

Portions of the existing low sagebrush/grassland community would be located both inside and outside of the boundary of the area allocated as unavailable for livestock grazing creating both grazed and ungrazed (control) sites in the same area suitable for future research related to the effects of livestock grazing.

Environmental Consequences

Consequences Common to all Alternatives

Vegetative communities that are important to Greater Sage-grouse habitat would continue to be available for provide baseline data on relatively unaltered plant community types important to Greater Sage-grouse.

Alternatives 1 and 4

Livestock are currently being kept out of areas allocated as unavailable for grazing through active management (herding, adjustment of turnout dates, removal of nearby water developments, and/or placement of salt or other supplements). There is an ungrazed reference area for research.

In the future, should the decision be made to construct fence to keep livestock out of the area, there would be impacts to wildlife, including sage-grouse, from fence construction including possible bird collisions and entrapments. There would also be ground disturbance associated with fencing and an associated potential increase in weeds. Construction of fencing and subsequent livestock trailing along the fence would create new ground disturbance within an area that has been relatively undisturbed in the past. Any time equipment and people are working in new areas there is a potential risk of introducing new noxious weeds/invasive species into native communities from equipment and people doing the work. There would be short-term impacts to visual resources during fence construction.

The wilderness characteristic of naturalness, outstanding opportunities for solitude, and unconfined primitive recreation would not be impaired by fence construction under this alternative either in the short-term and long-term. There would be one-time fence construction costs to the BLM. Currently, fence construction costs are estimated at about $10,000 per mile (material and labor). Assuming that local contractors would be hired to construct the fence, there would be a small benefit to the local economy. There would also be additional operational costs to the permittee associated with the annual maintenance of the new exclosure fence.

Under these alternatives there are negative economic effects to affected livestock operators that arose from making 2750 acres (approximately 110 AUMs) unavailable for livestock grazing.

Alternative 2

Because the entire area would be allocated as available for livestock grazing, there would be no need for fencing, active livestock management (herding), or water developments for livestock. The wilderness characteristic of naturalness, outstanding opportunities for solitude, and unconfined primitive recreation would not be impaired under this alternative either short-term or long-term any more than it had been at the time that this unit was identified as one with wilderness characteristics. Fence-related conflicts would not occur.

Alternative 3

Because livestock grazing would not occur in the vicinity of this key RNA, there would be no need for fencing, active livestock management (herding), or water developments for livestock. Wilderness characteristics of naturalness, opportunities for solitude, or primitive and unconfined recreation would not be impaired under this alternative, nor would there be any short-term disturbances to these characteristics caused by fence construction. Fence-related conflicts would not occur. An ungrazed reference for research would be retained.

Alternatives 5, 6, and Proposed RMP Amendment

These alternatives would reallocate a portion of the WSA in the RNA as available for livestock grazing. Because the ecological condition had been good when grazing was allowed, the effect from this reallocation on wilderness characteristics is expected to be negligible.

Low sagebrush/grassland wildlife habitat would be present within the area allocated as unavailable for livestock grazing.

The modified boundary of the reduced area allocated as unavailable for livestock grazing under these alternatives would reduce amount of fencing needed within sage-grouse habitat and none of the boundary of the area allocated as unavailable for livestock grazing would be within 1.2 miles of any leks. This modification also eliminates the need for new fencing within the Fish Creek Rim WSA and eliminates the impact such fences would have on WSA values. The modified boundary would avoid all five existing livestock water sources and eliminate the need to mitigate for lost livestock watering sites. 2,655 acres would be reallocated as available for livestock grazing.

Construction of fencing and subsequent livestock trailing along the fence would create new ground disturbance within an area that has been relatively undisturbed in the past. Any time equipment and people are working in new areas there is a potential risk of introducing new noxious weeds/invasive species into native communities from equipment and people doing the work. However, the risk of weed introduction or expansion would be slightly less than Alternative 1 due to less fencing being needed, livestock trailing along the fence and associated ground disturbances.

All fencing would pose a low collision risk to sage-grouse and would be constructed with wildlife-friendly specifications.

No fencing or changes in livestock grazing use would occur within the VRM Class I (Fish Creek Rim WSA) area. As a result, there would be no impacts to scenic values within VRM Class I areas. The exclosure fencing would have minor, negative impacts on the scenic quality in the rest of the Fish Creek Rim ACEC/RNA, but these effects would be consistent with VRM Class II management objectives.

A portion of the boundary of the area allocated as unavailable for livestock grazing would be within the Monument Flat wilderness characteristics inventory unit. If it were to be fenced, the fencing would be noticeable within close proximity but would not be substantially noticeable across the unit as a whole.

These alternatives would substantially reverse negative economic effects to affected livestock operators that arose from making 2,750 acres unavailable for livestock grazing. Under these alternatives, 2,655 acres would be reallocated as available for livestock grazing (approximately 106 AUMs).

There would be one-time fence construction costs to the BLM. Currently, fence construction costs are estimated at about $10,000 per mile (material and labor). Assuming that local contractors would be hired

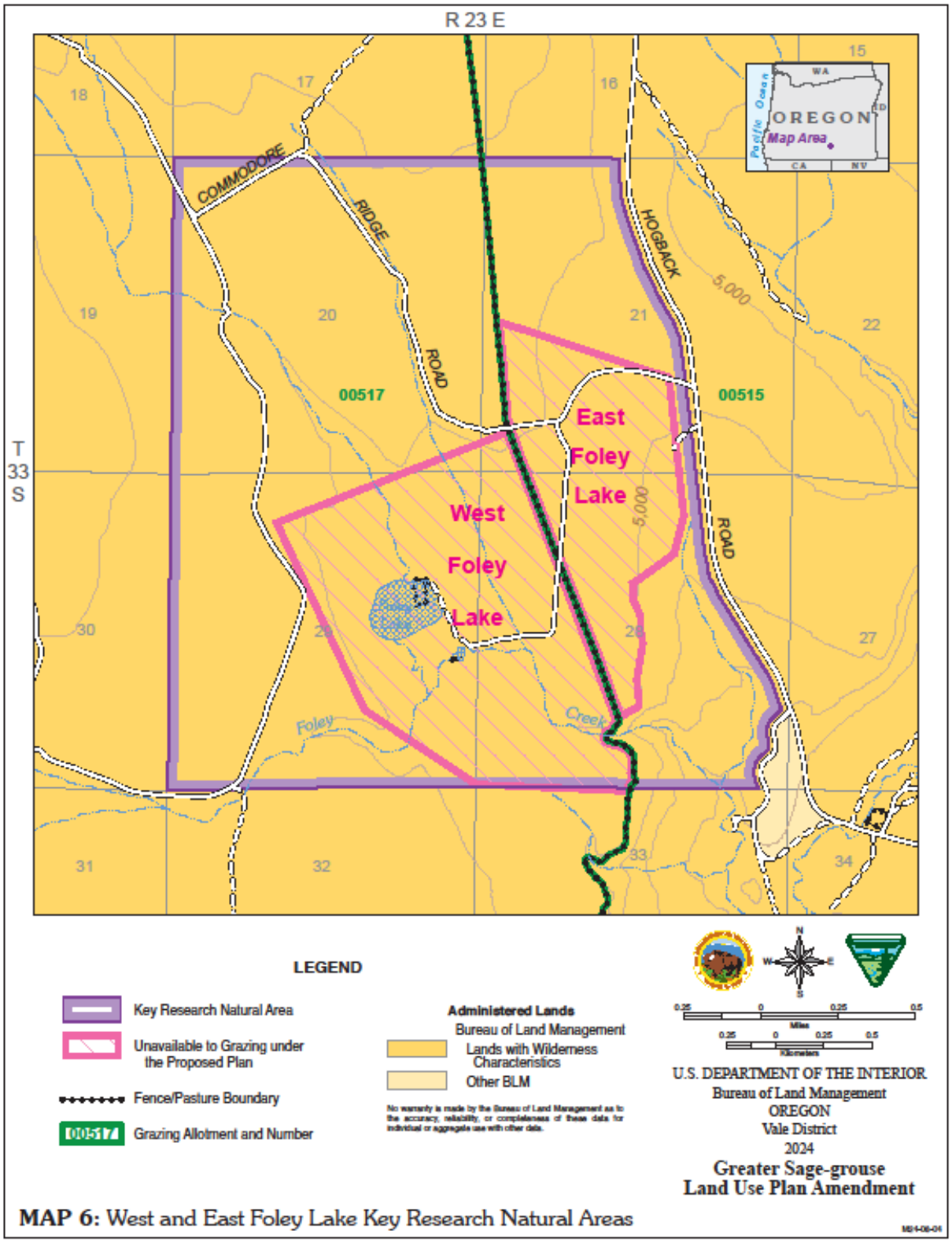
to construct the fence, there would be a small benefit to the local economy. There would also be additional operational costs to the permittee associated with the annual maintenance of the new exclosure fence.

Foley Lake (Lakeview)

Proposed RMP Amendment

Retain the area identified as a key RNA and reduce the area unavailable for livestock grazing use. The area allocated as unavailable for livestock grazing would be reduced from 1269 acres to 797 acres. The western portion would be reduced to 521 acres within the Coyote-Colvin Allotment that contains silver sagebrush/grassland, Wyoming big sagebrush/grassland, and black sagebrush/grassland plant communities. The eastern portion would be reduced to 276 acres within the Juniper Mountain Allotment that contains black sagebrush/grassland and Wyoming big sagebrush/grassland plant communities. Approximately one mile of the existing allotment boundary fence could be removed from the middle of the key RNA once the exclosure fences are completed.

Map 6. Foley Lake Key Research Natural Area



Affected Environment

The Foley Lake ACEC/RNA falls within portions of the 130,345-acre Coyote-Colvin (00517) and 86,518-acre Juniper Mountain (00515) Allotments. There is an existing allotment boundary fence running in a north-south direction through the center of this key RNA. Potential management changes would impact two livestock operators. For this reason, portions of the following discussion for Foley Lake key RNA are broken out into an eastern and western portion. An exclosure fence has been constructed in the western portion along the boundary of the area that would be allocated as unavailable for grazing in the Proposed RMP Amendment.

Updated Vegetation Communities

Foley Lake itself lies in a small basin on the gently sloping backside of the Abert Rim fault within a larger Wyoming big sagebrush/grassland landscape. Black sagebrush is the predominant shrub in the ACEC/RNA with low sagebrush common on lithic soils. Wyoming big sagebrush occurs on deeper soils and silver sagebrush on the large vernally wet playa and (Foley) lake margin. Bud sagebrush (*Artemisia spinescens*) is also present (BLM 2015a, p. 3-140).

The 2015 Proposed RMPA/Final EIS described the plant communities the Foley Lake ACEC/RNA contains as black sagebrush/Sandberg bluegrass shrubland and low sagebrush/bunch grass (Sandberg bluegrass, bottle brush squirreltail, Idaho fescue), silver sagebrush/Sandberg's bluegrass plant associations (BLM 2015a, p. 3-140), however, a smaller portion of this area (approximately 1,035 acres) actually contains those specific plant communities (Vander Schaaf 1992, map pp. 14-15).

Based on ESI data, the most dominant vegetation communities in the Foley Lake ACEC/RNA include Wyoming big sagebrush/squirreltail and black sagebrush/field smartweed plant associations in the western portion and Wyoming big sagebrush/squirreltail and black sagebrush/squirreltail and smartweed plant associations in the eastern portion. Silver sagebrush associated with the margins of Foley Lake also occur in the western portion of the ACEC/RNA. No wetland or riparian areas occur within the east half of the Foley Lake ACEC/RNA (BLM 2024b, p. 25).

There are no known noxious weeds documented in the Foley Lake key RNA. However, cheatgrass has been documented recently in the understory. No special status plants occur within the east half of the Foley Lake ACEC/RNA.

Other Resources

The entire ACEC/RNA area is classified as PHMA and as seasonal breeding, summer, and winter sage-grouse habitat. However, there are no documented leks located within the key RNA boundary. Telemetry data collected from 2009-2017 for various studies failed to document sage-grouse use in the Foley Lake RNA, though summer usage was documented to the northwest and southwest of the RNA. Usage of the RNA has been observed indirectly in recent years (e.g. fecal pellets) (BLM, unpublished data). The eastern portion of the ACEC/RNA lies within sage-grouse Warners PAC, mid-scale HAF (Warner-Meizner), and fine-scale HAF (Warner) boundaries.

The Foley Lake ACEC/RNA provides habitat for a variety of other sagebrush-associated birds, mammals, and reptiles (BLM 2024b, p. 50). The western portion of the key RNA is pronghorn habitat (BLM 2019b, p. 77). While two pygmy rabbit burrows were located near or within the western exclosure area in recent years, the majority of the exclosure area is not an area of high pygmy rabbit use or typical pygmy rabbit habitat due to the shallow, rocky soils. (BLM 2019b, p. 77).

The western portion of the Foley Lake key RNA falls within the Twin Lakes Pasture of the Coyote-Colvin Allotment. A rangeland health assessment was completed for this allotment in 2000 and updated in 2016. No rangeland health issues were identified in the Twin Lakes Pasture during either assessment (BLM 2000b, 2016).

The eastern portion of the Foley Lake key RNA falls within the Flint Hills Pasture of the Juniper Mountain Allotment. A rangeland health assessment was completed for this allotment in 2004 (BLM 2004). No rangeland health issues were identified in the assessment for the Flint Hills Pasture of the allotment which contains the proposed grazing exclosure area.

Specific Management under the Lakeview RMP/ROD

OHV use is limited to existing roads and trails. The Foley Lake ACEC/RNA is managed as VRM Class III.

Summary of Key RNA and Relevant and Important Values Evaluated for ACEC/RNA Designation

Lakeview RMP/ROD ACEC/RNA Designation

The 2,228-acre Foley Lake ACEC/RNA is located about 37 miles northeast of Lakeview and was designated in the Lakeview RMP/ROD to protect relevant/important natural system (plant communities) and cultural resource values (BLM 2000a, pp. II-9, III-39; 2001a, p. A-243 to A-244; 2003b, p. 58). In the *Lakeview RMP/ROD* the BLM expanded the original Foley Lake ACEC/RNA proposal (from 1,035 acres to 2,228 acres) solely to include important cultural resource values in the added acreage. These include the presence of stone rings, rock art, burial sites, rock shelters, and lithic scatters (BLM 2000a, p. III-37 to III-38; 2003a, p. 2-58).

Rationale for Proposing Alternative that Modifies Key RNA Management

Rationale for Retaining the Key RNA under All Alternatives

The vegetative communities identified as important for Greater Sage-grouse habitat within the key RNA continue to be in good condition. Management would continue to protect the relevant and important values of the RNA.

The key RNA retains the following vegetation types important for Greater Sage-grouse: warm-dry sagebrush, shallow-dry sagebrush, and playa.

Opportunities for nonmanipulative research and baseline data gathering on relatively unaltered plant community types continue to remain, along with vegetative communities identified as important for greater sage-grouse, due to the remote and rugged nature of the area. Prior to the removal of grazing from this key RNA, there was no indication of negative impacts from livestock grazing to these vegetative communities or the relevant and important values for which the RNA was designated.

Rationale for Reallocating the Area as Available for Livestock Grazing under Proposed RMP Amendment

Portions of the original boundary of the area allocated as unavailable for grazing (Alternative 1) traversed steep slopes and rocky surfaces. The modified proposal avoids these. The modified boundary would not be within 1.2 miles of active or pending active leks and would avoid creating a livestock trailing safety problem along County Road 3-10 (Hogback Road), a main, well-traveled county road on the east. The proposed boundary also takes advantage of existing topographic features (steep rim) on the south.

The western exclosure boundary includes all of the silver sagebrush/grassland community associated with Foley Lake, most of the surrounding black sagebrush/grassland community, and some of the Wyoming big sagebrush/grassland community. This allows both grazed and ungrazed (control) sites located in the same

area for future research related to the effects of livestock grazing on black sagebrush and Wyoming big sagebrush communities.

The proposed eastern exclosure boundary includes some of the black sagebrush/grassland and Wyoming big sagebrush/grassland communities. This would allow both grazed and ungrazed (control) sites to be located in same area for future research related to the effects of livestock grazing on black sagebrush/ grassland and Wyoming big sagebrush/grassland communities. The modified exclosure boundary avoids cultural sites located during field inventories of the original Alternative 1 alignment.

Environmental Consequences

Consequences Common to all Alternatives

Vegetative communities that are important to Greater Sage-grouse habitat would continue to be available for provide baseline data on relatively unaltered plant community types important to Greater Sage-grouse.

Alternatives 1 and 4

Livestock are currently being kept out of areas allocated as unavailable for grazing through active management (herding, adjustment of turnout dates, removal of nearby water developments, and/or placement of salt or other supplements).

The relevant and important values within the 1,269 acres allocated as unavailable for livestock grazing protected through the elimination of soil and vegetation disturbance. Native plant communities in this area are not subject to cattle trailing and trampling effects. There is an ungrazed reference for research.

Foley Lake waterhole and several existing natural water sources would no longer be available as livestock water sources for cattle grazing in the Twin Lakes Pasture. Excluding these water sources will change livestock distribution, and livestock grazing use will be less in the area immediately surrounding the exclosure and more concentrated in other areas of the Twin Lakes Pasture with water. Water will need to be hauled (at permittee's expense) to temporary troughs near two existing waterholes in the north end of the Twin Lakes Pasture on years when livestock water is limited which could create expanded disturbances due to increased cattle concentration and semi-truck use. These existing watering sites are located along existing roads and are not within 1.2 miles of leks or other important sage-grouse habitats (BLM 2019b, p. 103; Appendix D, Map 7). Vegetation disturbance would occur from semi-trucks turning around near the water trough sites (outside the key RNA).

Removal of livestock grazing removes one potential weed-spreading vector within the exclosure area. However, other vectors (wildlife, vehicles, wind, and water) would continue and potentially spread weed species. The lack of spring livestock grazing could allow more invasive annual grasses to flower and produce seed. Monitoring data has shown that removal of livestock from areas where weeds are present (such as riparian areas and exclosures) often leads to more robust weed infestations and allows the invasive species to negatively impact native vegetation (BLM 2019b, p. 50). Fenceline disturbance could represent an area of increased risk of potential cheatgrass invasion/expansion. Fencing would negatively affect the existing visual quality within the area, but would meet the VRM Class III management objectives.

In the absence of spring grazing, areas with high amounts of annual grasses will continue to degrade the landscape and create a less fire-resistant landscape. There will be an increase in fine fuels and a potential increase in the risk of catastrophic wildfire occurrence within this exclosure (BLM 2019b, p. 42). Should a wildfire occur and impact the proposed grazing exclosure, the exclosure area could be subject to increased

cheatgrass dominance and could require active vegetation management such as herbicide treatment or native grass seeding.

If fencing is used, there would be some surface disturbance to upland native vegetation communities, soils, and biological crusts from vehicle traffic during fence construction and removal and future maintenance of the proposed fence.

Making portions of the key RNA unavailable for livestock grazing would not prevent the use of Foley Lake as a water source by mule deer, pronghorn, bighorn sheep, or other wildlife. A fence could alter behavior and use patterns of big game species, but those effects would be mitigated to the extent feasible by building the fence to standard wildlife passage specifications (BLM 2019b, p. 77).

Fence construction would not impact pygmy rabbits at a population level and would not improve pygmy rabbit habitat or encourage movement of more pygmy rabbits into the exclosure area (BLM 2019b, p. 77).

Excluding the western portion of the Foley Lake RNA would remove approximately 31 AUMs of forage available for livestock grazing use in the Twin Lakes Pasture of the Coyote-Colvin Allotment. Excluding the eastern part of would remove about 32 AUMs of forage available for livestock grazing use in the Juniper Mountain Allotment. This total reduction of about 63 AUMs could be absorbed by spreading the AUMs across other pastures within the allotments, and would not require reducing the permitted number of AUMs.

There would be annual operational costs to the permittee associated with future fence maintenance (estimated at $600-1,200 per year) and water hauling.

Alternative 2

Reallocating the entire key RNA as available for livestock grazing is unlikely to harm the habitat quality of the area, as under the previous grazing regimen, it was in good ecological condition and met applicable rangeland health standards (BLM 2000b; BLM 2016, pp. 7, 9, 10, 12; BLM 2019b, p. 79). Because the entire area would be allocated as available for livestock grazing, there would be no need for additional fencing, active livestock management (herding), or water developments for livestock.

Alternative 3

Because livestock grazing would not occur in the vicinity of this key RNA, there would be no need for fencing, active livestock management through increased herding, or water developments for livestock. Eliminating livestock grazing would eliminate soil and vegetation disturbance caused by livestock. This would allow natural processes to occur in the absence of most human-caused disturbances and provide an area for future baseline monitoring and research purposes. Native plant communities and soils would no longer be subject to livestock grazing or trampling effects. An ungrazed reference for research would be retained.

Removal of livestock grazing would remove one potential weed-spreading vector. However, other vectors (wildlife, vehicles, wind, and water) would continue and potentially spread weed species. The lack of spring livestock grazing could allow more invasive annual grasses to flower and produce seed. Monitoring data has shown that removal of livestock from areas where weeds are present (such as riparian areas and exclosures) often leads to more robust weed infestations and allows the invasive species to negatively impact native vegetation (BLM 2019b, p. 50).

In the absence of spring grazing, areas with high amounts of annual grasses would continue to degrade the landscape and create a less fire-resistant landscape. There would be an increase in fine fuels and a potential increase in the risk of catastrophic wildfire occurrence within this exclosure (BLM 2019b, p. 42). Should a

wildfire occur and impact the proposed grazing exclosure, the exclosure area could be subject to increased cheatgrass dominance and could require active vegetation management such as herbicide treatment or native grass seeding.

Alternatives 5, 6, and Proposed RMP Amendment

These alternatives would reallocate a portion of the area that is currently unavailable for livestock grazing as available for livestock grazing. Because the ecological condition had been good when grazing was allowed, the effect from this reallocation on wilderness characteristics is expected to be negligible.

Foley Lake waterhole and several existing natural water sources would remain unavailable as livestock water sources for cattle grazing in the Twin Lakes Pasture, but this would not prevent the use of Foley Lake as a water source by mule deer, pronghorn, bighorn sheep, or other wildlife. For more details, see Alternatives 1 and 4.

There are two special status plant species (Columbia yellowcress and Mesamint) currently located within two existing small exclosures on the west side of Foley Lake RNA. However, most of the Columbia yellowcress and Mesamint populations are located within two smaller existing grazing exclosures (BLM 2019b, p. 49), so the larger exclosure proposed under Alternatives 1, 4, 5, 6, and the Proposed RMP Amendment would do little to further remediate this potential threat.

Reallocating a portion of the key RNA as available for livestock grazing is unlikely to harm the habitat quality of the area, as under the previous grazing regimen, it was in good ecological condition and met applicable rangeland health standards (BLM 2000b; BLM 2016, pp. 7, 9, 10, 12; BLM 2019b, p. 79).

If a fence were constructed to make the eastern portion unavailable for livestock, there would be some surface disturbance to upland native vegetation communities, soils, and biological crusts from vehicle traffic during fence construction and removal and future maintenance of the fence. (BLM 2019b, p. 30). A fence could alter behavior and use patterns of big game species, but those effects would be mitigated to the extent feasible by building the fence to standard wildlife passage specifications (BLM 2019b, p. 77). Construction of an exclosure fence would not impact pygmy rabbits at a population level and would not improve pygmy rabbit habitat or encourage movement of more pygmy rabbits into the exclosure area (BLM 2019b, p. 77).

No active or pending active leks are within 1.2 miles of the boundary of the area that would remain unavailable for livestock grazing, so there is not a high risk for fence-sage-grouse collisions.

The proposed exclosure fence would negatively affect the existing visual quality within the area, but would meet the existing visual resource management (VRM Class III) objectives for the surrounding area.

There would be annual operational costs to the permittee associated with future fence maintenance (estimated at $600-1,200 per year) and water hauling. There would also be additional one-time costs to the BLM associated with fence construction (about $10,000 per mile) totaling about $13,000 for the eastern portion. The western portion is already built. Assuming that local contractors would be hired to construct the fence, there would be a small benefit to the local economy.

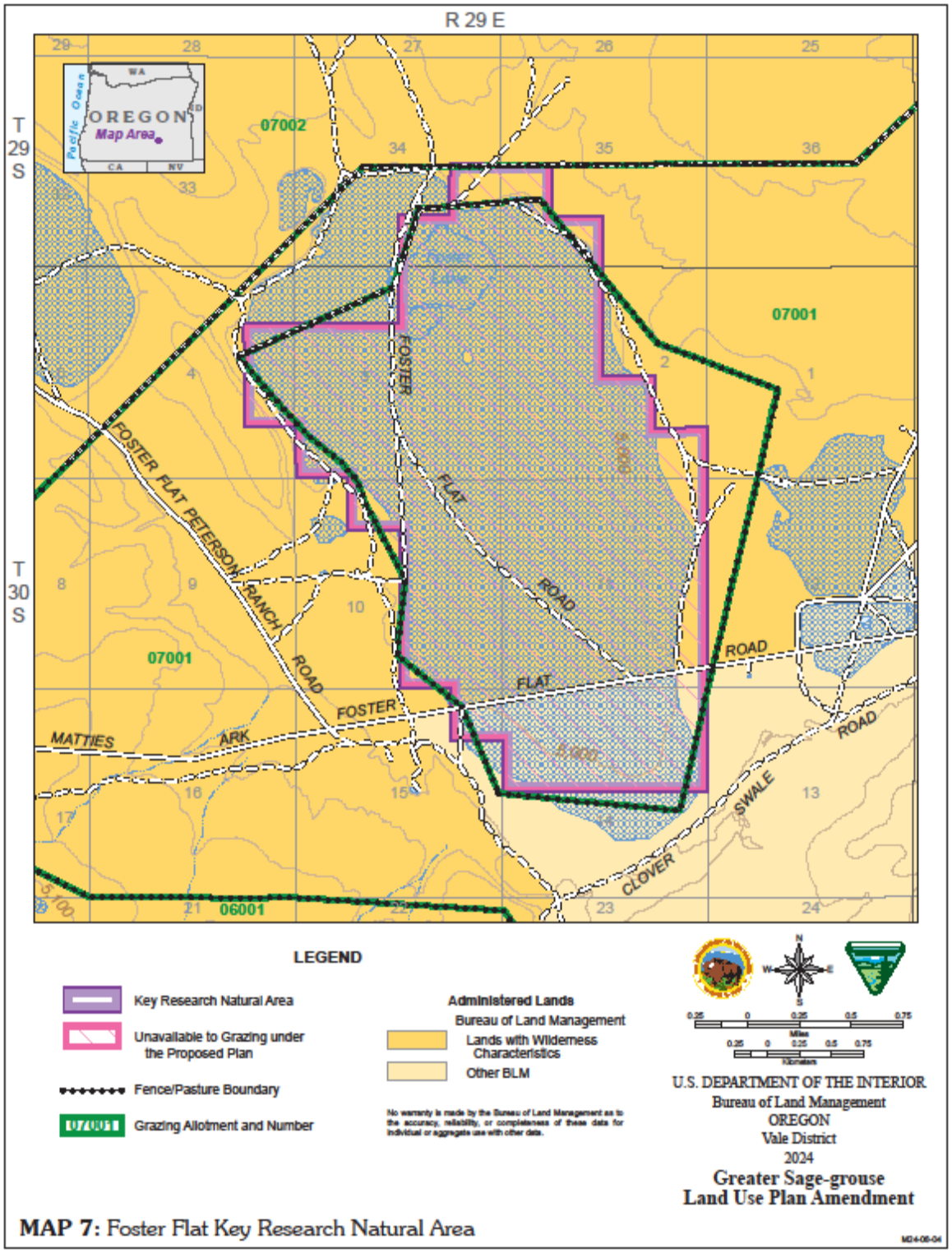
Foster Flat (Burns)

Proposed RMP Amendment

The Foster Flat key RNA was allocated as unavailable for livestock grazing prior to the 2015 OR Greater Sage-grouse ARMPA via the underlying 1992 Three Rivers Resource Management Plan ROD/RMP. Neither the 2015 nor the 2019 RMP amendment made any changes to the prior district decision. The Proposed RMP

Amendment would not make any changes to management of this RNA, and it would remain unavailable for livestock grazing.

Map 7. Foster Flat Key Research Natural Area



Affected Environment

Foster Flat RNA/ACEC is located in Harney County approximately 42 miles south of Burns, Oregon, and 20 miles west of Highway 205 near the Burns District boundary with Lakeview District. The Foster Flat RNA/ACEC is 2,687 acres in size. It is in East Warm Springs Allotment (No. 7001) and in the Warm Springs HMA. The elevation of the RNA/ACEC is approximately 5,000 feet. There is one AIM plot and one LMF plot within the area unavailable for livestock grazing.

Specific management under the 1992 Three Rivers Resource Management Plan ROD/RMP

The primary management goal of the Foster Flat RNA/ACEC is to the manage the area to preserve the characteristics of the ecosystem and to provide areas for ecological studies, monitoring and research, and education. The primary management action undertaken was construction of perimeter boundary fencing. The perimeter boundary fence excluded livestock and wild horse access the water source and vegetation in the northwestern corner of Foster Flat. The area is open to OHV use.

Summary of key RNA and Relevant and Important values evaluated for ACEC/RNA designation

Foster Flat RNA/ACEC was designated to represent silver sagebrush/Nevada bluegrass communities and provide an area for ecological studies, monitoring and research, and education opportunities.

1992 Three Rivers Resource Management Plan ROD/RMP ACEC/RNA Designation

Foster Flat RNA/ACEC was designated to represent silver sagebrush/Nevada bluegrass communities. This community is found in playas throughout the Great Basin in sites which are flooded for a period of months during the winter and early spring, but which dry up rapidly as the weather warms. Foster Flat covers a large area that is essentially devoid of topographic relief and is dominated by silver sagebrush. The silver sagebrush/Nevada bluegrass community covers approximately 800 acres in the central portion of the playa area. At slightly lower elevation on the playa is a silver sagebrush/rush community which stays wetter longer than the Nevada bluegrass association. The slightly higher elevation areas of the playa contain silver sagebrush/green rabbitbrush. There are also areas of basin wildrye, creeping wildrye or silver sagebrush with no understory. It is ringed by a slightly raised rim that is dominated by greasewood and big sagebrush.

2015 Greater Sage-grouse ARMPA

The Foster Flat RNA was identified as a key RNA for sagebrush plant communities that are important for Sage-grouse.

Updated Vegetation Communities

Large playa (dry lakebed) containing silver sagebrush/Baltic rush (*Juncus balticus*), silver sagebrush/Sandberg's blue grass, low sagebrush/Sandberg's bluegrass associations, grading into slightly higher areas and hummocks of basin or Wyoming big sagebrush/bluebunch wheatgrass associations.

Environmental Consequences

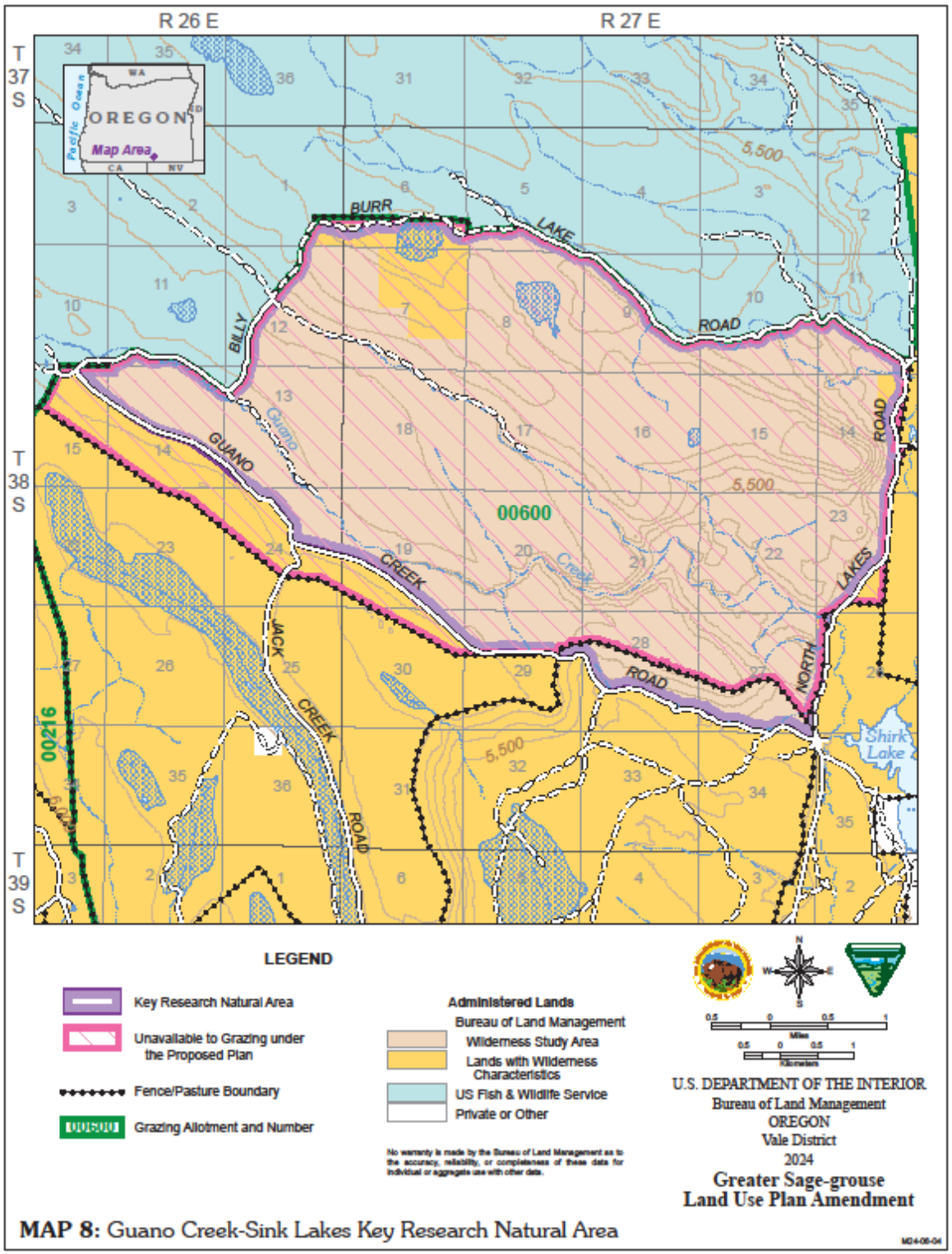
As there are no changes in livestock grazing management proposed in this planning effort there would be no potential changes in environmental effects. An ungrazed reference for research would be retained.

Guano Creek – Sink Lakes (Lakeview)

Proposed RMP Amendment

The Guano Creek-Sink Lakes ACEC/RNA falls within the larger Guano Creek wilderness study area (WSA), the majority of which was made unavailable for livestock grazing use through an Act of Congress in 1998. For this reason, no changes in livestock grazing use are proposed. The area unavailable for livestock grazing is set off by the pasture fences so it differs slightly from the ACEC boundary.

Map 8. Guano Creek-Sink Lakes Key Research Natural Area



Affected Environment

The 11,823-acre Guano Creek-Sink Lakes ACEC/RNA complex is located about 39 miles northeast of Lakeview. There are four AIM plots and four LMF plots within the area unavailable for livestock grazing.

Specific Management under the Lakeview RMP/ROD

OHV use is limited to existing roads and trails.

Summary of Key RNA and Relevant and Important Values Evaluated for ACEC/RNA Designation

The 11,823-acre Guano Creek-Sink Lakes ACEC/RNA complex is located about 39 miles northeast of Lakeview and was designated in the Lakeview RMP/ROD to protect relevant/important natural system (plant communities) values (BLM 2000a, pp. II-9, III-16, III-19; 2001a, p. A-244 to A-245; 2003b, p. 58).

Lakeview RMP/ROD

The Guano Creek-Sink Lakes ACEC/RNA complex contains Wyoming big sagebrush/needle-and-thread grass and low sagebrush/Sandbergs bluegrass scablands as well as low elevation vernal pool. The Sink Lakes area contains three vernal lakes (if Billy Burr Lake is included in site) which are essentially dry playas in the drought years and vernal pools during wet years. The playas are all ringed by silver sagebrush (*Artemisia cana*) and surrounded by uplands that are dominated by low sagebrush grasslands. The dry lakebeds differ in their vegetative composition and may be dominated by tansy-leaf evening primrose (*Camissonia tanacitifolia*). The middle lake or playa located in Section 8 is best characterized as a silver sagebrush/Nevada bluegrass (*Poa nevadensis*) community. This is a common playa community. The Guano Creek site has a high-quality natural community that is characterized by and Thurbers needlegrass. There is a rich community of Great Basin wildrye (*Zvmus cinerus*) and other forbs. Two Bureau sensitive plant species, grimy ivesia (J*vesia rhypara* var. *rhypara*) and Crosby's buckwheat (*Eriogonum crosbyae*) are also present. The two species do not grow in the same habitat at the Guano Creek site, nor do they occur in the big sagebrush/needle-and-thread grass community which is the prominent feature in the RNA. (BLM, 2000a, p. III-18).

2015 Greater Sage-grouse ARMPA

Updated Vegetation Communities

The Guano Creek-Sink Lakes ACEC/RNA complex contains Wyoming big sagebrush/needle-and-thread (*Hesperostipa comata*) and low sagebrush/Sandberg bluegrass scabland communities, as well as low elevation vernal ponds (aquatic ecosystem). Three vernal ponds (including Billy Burr Lake), which are dry playas in drought years and vernal pools during wet years, are present. The playas are ringed by silver sagebrush and the surrounding uplands contain low sagebrush/grasslands. The dry playa lake beds differ in their vegetative composition and may be dominated by tansy-leaf evening primrose (*Camissonia tanacitifolia*). The middle lake is characterized as a silver sagebrush/Nevada bluegrass (*Poa nevadensis*) playa community. Common riparian vegetation occurs along portions of Guano Creek (BLM 2001a, p. A-244, Vander Schaaf 1992, p. 12).

Environmental Consequences

As there are no changes in livestock grazing management proposed in this planning effort there would be no potential changes in environmental effects. An ungrazed reference for research would be retained.

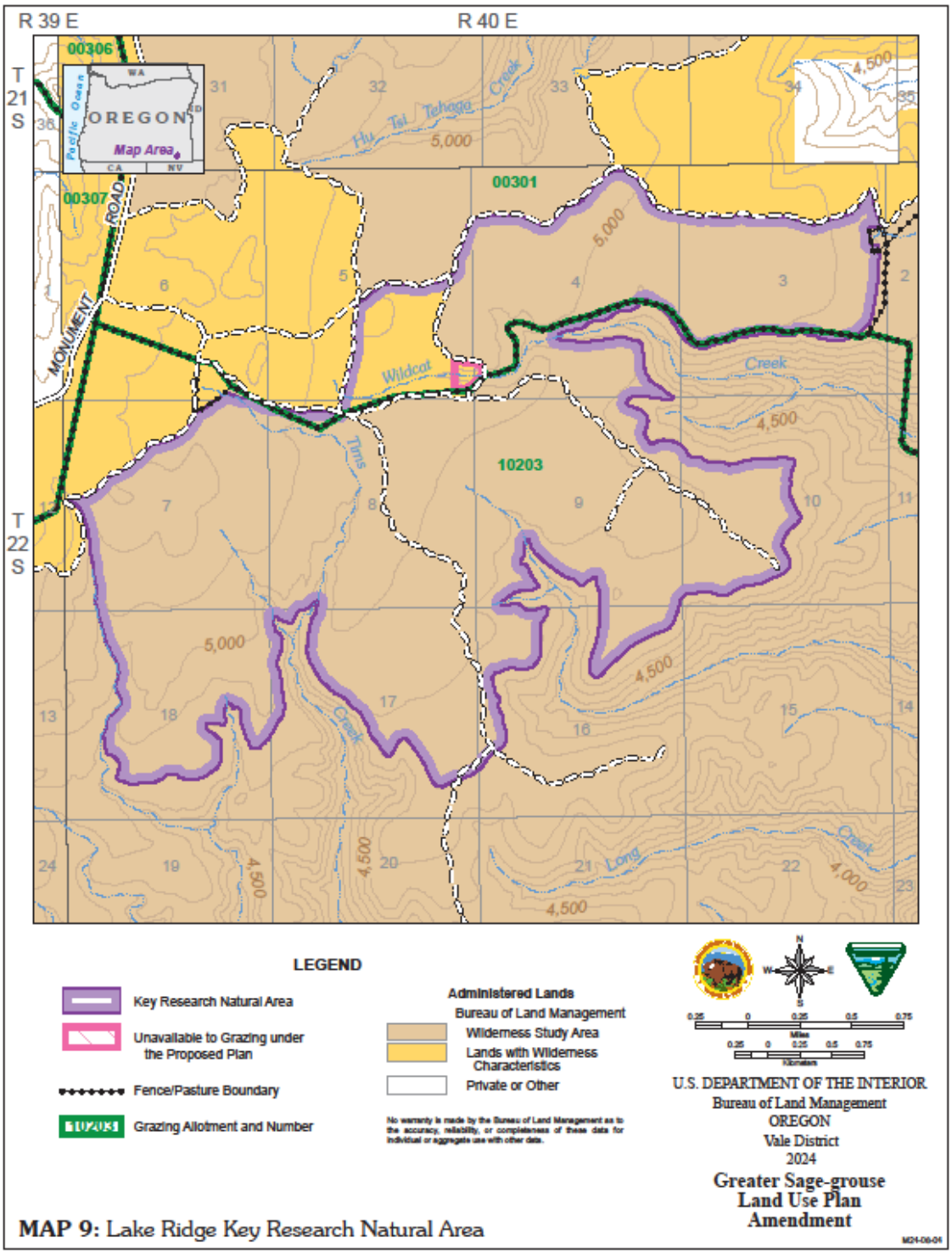
Lake Ridge (Vale)

Proposed RMP Amendment

BLM proposes no changes to the key RNA boundary, but has reduced the area allocated as unavailable for livestock grazing from 769 acres to 13 acres within the existing key RNA and to the west of the WSAs to reduce conflicts with other resources. The smaller exclosure would still maintain the vegetation

communities that are important to Greater Sage-grouse habitat. The proposed exclosure would be located in a Wilderness Characteristic unit that is prioritized for protection under the 2024 SEORMP Amendment ROD (BLM 2024a, Appendix A, p. A-4).

Map 9. Lake Ridge Key Research Natural Area



Affected Environment

The 3,857-acre Lake Ridge ACEC/RNA is located southeast of Juntura, Oregon, along Tim's Peak Road on a broad plateau dissected by steep canyons, with Tim's Peak rising to the north. A naturally occurring waterhole provides a perennial source of water. The ACEC/RNA is dominated by low sagebrush plant communities with both low sagebrush/bluebunch wheatgrass and low sagebrush/Idaho fescue present. Much of the ACEC/RNA is located in portions of both the Gold Creek and Camp Creek WSAs, where surface disturbing activities requiring reclamation are generally precluded until Congress makes a decision on Wilderness designation.

The key RNA and area allocated as unavailable for livestock grazing is in the Simmons Gulch pasture (55,402 acres) of the Harper allotment. There are six grazing authorizations (grazing permits) for the Harper allotment.

Specific Management under the 2002 SEORMP ROD, as Amended

OHV use is limited to existing roads and trails. Plant collecting requires a permit. The entire area is managed under VRM Class I. Road maintenance will be limited to the existing roadway, and shoulder/barrow ditch construction will be limited to that necessary to control runoff, minimize soil erosion, and ensure public safety and serviceability of the road. Leasable minerals activities will be open with special stipulations subject to seasonal/timing restrictions, restricted or no uses in avoidance areas for sage-grouse. Livestock use allocations will continue based on existing permit stipulations and approved AMPs, unless modified under subsequent land use planning. Any proposed changes in livestock grazing, including time and intensity of use, will be evaluated for impacts on the relevant and important values and will be permitted if values will be maintained or enhanced. Existing livestock use allocations will be adjusted where adverse impacts are identified using a variety of methods, that could include, but is not limited to, fencing, reduction in livestock numbers, and changes in grazing season. Proposed projects in the area will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced.

Summary of Key RNA and Relevant and Important Values Evaluated for ACEC/RNA Designation

2002 SEORMP ACEC/RNA Designation

The relevant and important values identified in this ACEC/RNA are the low sagebrush/bluebunch wheatgrass community and low sagebrush/Idaho fescue community vegetation cells identified by ONHP.

2015 Greater Sage-grouse ARMPA

The Lake Ridge ACEC/RNA was identified as a key RNA for sagebrush plant communities that are important for Sage-grouse.

Updated Vegetation Communities and Sage-Grouse Habitats

Vegetation communities represented in this ACEC/RNA include low sagebrush/bluebunch wheatgrass, low sagebrush/Idaho fescue, and silver sagebrush/Sandberg bluegrass plant associations.

Plant community types important for Greater Sage-grouse habitat continue to be present. These plant communities in this key RNA are low sagebrush/bluebunch wheatgrass, low sagebrush/Idaho fescue, and silver sagebrush/Sandberg bluegrass plant associations, and were observed to be present during site visits in 2023. These plant associations represent the Shallow-Dry Sagebrush community.

The Lake Ridge key RNA is within Greater Sage-grouse PHMA. The nearest active or pending active lek is 0.6 mile away. A total of four active or pending active leks are within 4 miles of the key RNA.

Other Resources or Issues

The visual resource management is Class I.

Most of the key RNA overlaps WSAs (3,677 acres). The remainder of the key RNA (approximately 180 acres) is located within an area identified by BLM as possessing wilderness characteristics. The 2024 SEORMP Amendment ROD prioritizes the protection of the Prava Peak wilderness characteristics unit, which is contiguous with two adjacent WSAs (BLM 2024a, Appendix A, p. A-4).

The proposed 13-acre exclosure is wholly within the Prava Peak lands with wilderness characteristics unit OR-034-042. This 20,654-acre unit possesses naturalness and is contiguous with three WSAs, and shares their outstanding opportunities to experience solitude, and primitive and unconfined recreation. Elevations range from about 4,140 to 5,690 feet (Monument Peak). Existing human imprints in the unit are: 14 earthen reservoirs, four developed springs, 23.2 miles of rangeland fence, one rangeland fenced enclosure, and 43.5 miles of 22 primitive route segments, all which appear substantially unnoticeable to the average visitor. Supplemental values in the unit include Greater Sage-grouse leks and their habitat. The Prava Peak OR-034-042 inventory documentation can be found at https://www.blm.gov/programs/planning-and-nepa/plans-in-development/oregon-washington/vale-wci.

The Camp Creek WSA consists of 19,200 acres. The northwestern portion of the WSA is characterized by tableland, while the rest of the WSA is dissected by steep canyons. The elevation ranges from 2,700 to 5,300 feet. The dominant vegetation on the tablelands is low sagebrush and bluebunch wheatgrass, with some bitterbrush and Idaho fescue. The canyon bottoms support pockets of riparian vegetation. The key RNA is within Greater Sage-grouse PHMA and four active leks are within 4 miles, two of which are within 1.2 miles of the key RNA.

The key RNA is utilized by mule deer during spring and summer, pronghorn year-round, and is designated as elk winter range.

Rationale for Proposing Alternative that Modifies Key RNA Management

Rationale for Retaining the Key RNA under All Alternatives

Prior to the removal of grazing from this key RNA, there was no indication of negative impacts from livestock grazing to the vegetative communities identified as important for Greater Sage-grouse or the relevant and important values for which the RNA was designated. The area continues to be in a desirable condition for the vegetative communities identified under the 2002 SEORMP and 2015 ARMPA; management will continue to protect the relevant and important values. Retaining the Lake Ridge key RNA would continue to allow natural processes to predominate and research and baseline data gathering on plant communities important for Greater Sage-grouse.

The key RNA as identified in the 2015 ARMPA is predominately comprised of low sagebrush communities that provide suitable nesting and winter habitat for Greater Sage-grouse.

Values associated with the Shallow-Dry vegetation type would be retained.

Rationale for Modifying the Area Allocated as Unavailable for Livestock Grazing

Active management of livestock to keep them out of the area allocated as unavailable for livestock grazing under the 2015 ARMPA is being undertaken. Construction of a fence to exclude cattle from this same area would require fence construction within a WSA. Fence construction within a WSA requires careful consideration. Developments that would "impair the suitability of WSAs for the preservation as wilderness"

cannot be permitted unless they were to meet one of the exception criteria described in BLM Manual 6330, Management of Wilderness Study Areas. "In determining whether a development meets the protecting or enhancing wilderness characteristics exception, the BLM will determine if the structure's benefits to the natural functioning of the ecosystem outweigh the increased presence of human developments and any loss of naturalness, or outstanding recreational opportunities caused by the new development" (BLM 2012, p. 1-17). However, developments that meet an exception criterion must still be carried out in the least impairing manner practical. Furthermore, if an impairing proposed development—even one that meets an exception—can be implemented outside of a WSA and accomplish the objectives identified in the purpose and need statement prepared under NEPA, the BLM should endeavor to ensure that the project is implemented outside the WSA (BLM 2012, p. 1-11).

An approximately 13-acre fenced exclosure area that would be allocated as unavailable for livestock use would be built outside of the WSA and within the key RNA. The proposed exclosure would be located and designed to avoid resource conflicts while still providing a baseline reference area for the plant communities present that would be undisturbed by livestock grazing. The exclosure would be located more than 1.2 miles from active or pending active Greater Sage-grouse leks.

Environmental Consequences

Consequences Common to all Alternatives

Vegetative communities that are important to Greater Sage-grouse habitat would continue to be available for provide baseline data on relatively unaltered plant community types important to Greater Sage-grouse.

Alternatives 1 and 4

The current active management of livestock to keep them out of the key RNA impacts opportunities for solitude and primitive and unconfined recreation within the WSAs. In the future, should the decision be made to construct fence to keep livestock out of the area allocated as unavailable for livestock grazing, it would require fence construction within a WSA and within 1.2 miles of active or pending active leks. A conservation benefit to Greater Sage-grouse or important habitat is not expected from construction of a fence to eliminate livestock grazing due to the current condition of the vegetative communities prior to and after the removal of livestock from the area. There would be short-term and long-term impacts to the WSAs' wilderness characteristics of naturalness, solitude, and primitive and unconfined recreation. There could be short-term negative impacts to opportunities for solitude and primitive and unconfined recreation from construction activities as well as effects to naturalness caused by the soil surface and vegetative disturbance associated with fence construction. These impacts would be expected to fade within one to three years with new vegetation growth. Long-term negative impacts to naturalness would be the additional human imprint of the completed fence in the WSA. If no fence were constructed, there would be long-term impacts to opportunities for solitude and primitive and unconfined recreation from active management of livestock to keep them out of the key RNA.

Alternative 2

Because the entire area would be allocated as available for livestock grazing, there would be no need for fencing or active livestock management (herding). The wilderness characteristic of naturalness, outstanding opportunities for solitude, and unconfined primitive recreation would not be impaired under this alternative either short-term or long-term any more than it had been at the time that this unit was identified as one with wilderness characteristics. Fence-related conflicts would not occur.

Alternative 3

Because livestock grazing would not occur in the vicinity of this key RNA, there would be no need for fencing or active livestock management (herding). Wilderness characteristics of naturalness, opportunities for solitude, or primitive and unconfined recreation would not be impaired under this alternative, nor would there be any short-term disturbances to these characteristics caused by fence construction. Fence-related conflicts would not occur. An ungrazed reference for research would be retained.

Alternatives 5, 6, and Proposed RMP Amendment

Relocating and reducing the size of the area allocated as unavailable for livestock grazing would eliminate any need to build fence to exclude livestock within WSAs. Fencing to create a 13-acre exclosure could be constructed outside of any WSA and would be designed to limit or avoid impacts to the Prava Peak protected unit. Low sagebrush/bluebunch wheatgrass and low sagebrush/Idaho fescue vegetative communities identified as important for greater sage-grouse as well as relative and important values at the time the RNA was designed are present within the exclosure. Although the silver sagebrush/Sandberg bluegrass plant community occurs within the key RNA, it is not represented in the proposed exclosure and was not identified as a relevant and important value for the RNA. Vegetation communities important to Sage-grouse within the proposed exclosure would be allowed to proceed through natural succession in the absence of livestock grazing.

If this 13-acre exclosure is fenced, such fencing would be located more than 1.2 miles from active/pending active leks, would not be considered a high risk for sage-grouse collisions, and would not negatively impact sage-grouse.

BLM monitoring indicates the habitat quality of the area within the key RNA and beyond the 13-acre exclosure is expected to remain in good ecological condition as it was before livestock grazing was made unavailable in this area (BLM. Monitoring data. 06/13/2017-06/15/2017; BLM. Monitoring data. 6/28/2020).

Due to limited livestock use occurring in the key RNA, prior to management agreements initiated annually since 2023, as well as limited presence as a result of annual agreements to manage livestock from accessing the area, vegetative communities that are important to Greater Sage-grouse habitat would continue to be relatively unaltered under both Alternatives 1 and 5. When compared to Alternative 1, impacts to wildlife, including sage-grouse, of reallocating 769 acres as available, and allocating 13 acres as unavailable, to livestock grazing under the Proposed RMP Amendment would eliminate the need for additional presence of livestock operators for managing livestock away from unfenced boundaries. This would benefit wildlife by reducing disturbance to individual animals caused by increased activity from livestock operators around unfenced boundaries.

These alternatives would reallocate portion of the WSAs in the key RNA as available for livestock grazing. Because the presence of livestock in the RNA has been low in the past, and the ecological condition has been good when grazing has been allowed, the effect from this reallocation on wilderness characteristics is expected to be negligible.

The proposed 13-acre exclosure that would continue to be allocated as unavailable for livestock grazing would be located in the Prava Peak wilderness characteristics unit which, under the 2024 SEORMP Amendment ROD (BLM 2024a, Appendix A, p. A-4) is prioritized for protection. Approximately one-half mile of new fence would be constructed in the Prava Peak wilderness inventory unit to create the 13-acre exclosure. This could result in short-term negative impacts to naturalness caused by the soil surface and vegetative disturbance associated with the construction. These impacts would be expected to fade within

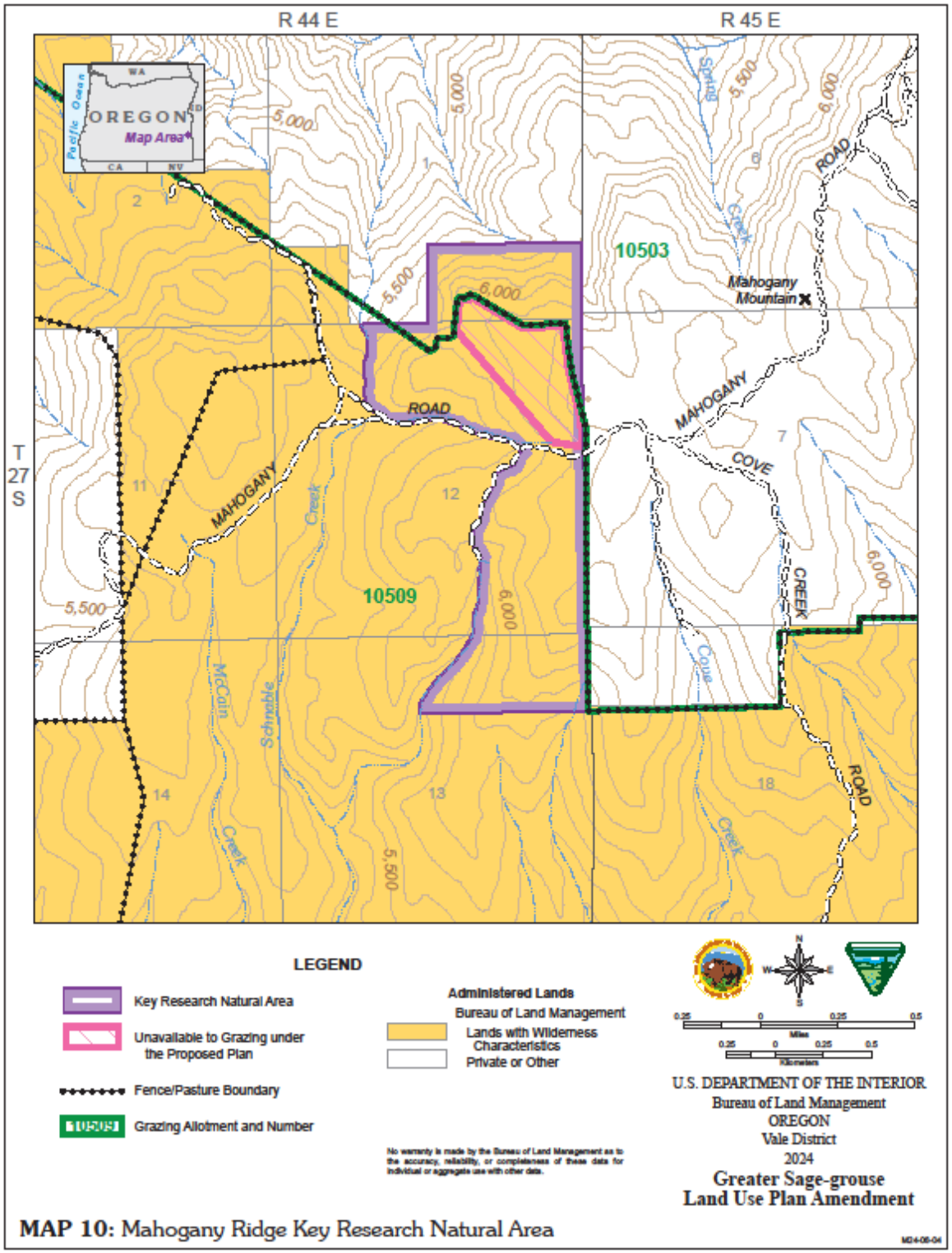
one to three years with new vegetation growth. Long-term negative impacts to naturalness would be the additional human imprint of the completed fence in the Prava Peak unit. However, design features to minimize impacts to lands with wilderness characteristics would be implemented. The addition of an exclosure fence would result in a minimal, long-term additional impact to the characteristic of naturalness within the Prava Peak unit. The extent of the additional fence —individually and collectively with the other existing human imprints present in the Prava Peak unit—would result in the Prava Peak unit, overall, still being affected primarily by the forces of nature with the imprint of human work being substantially unnoticeable to the average visitor.

Mahogany Ridge—South Unit Only (Vale)

Proposed RMP Amendment

Retain the Mahogany Ridge key RNA boundary. Clarify that the key RNA identification applies to only the southern portion of the ACEC/RNA (444 acres). Reduce the area allocated as unavailable for livestock grazing from 155 acres to 69 acres to reduce conflicts with other resources. The smaller exclosure would still maintain the vegetation communities that are important to Greater Sage-grouse habitat.

Map 10. Mahogany Ridge Key Research Natural Area



Affected Environment

The 682-acre Mahogany Ridge ACEC/RNA is comprised of two areas; the key RNA is limited to the southern unit (444 acres) and is located on the slope of Mahogany Mountain, west of U.S. Highway 95 and north of Jordan Valley, Oregon. The ACEC/RNA includes undisturbed stands of mountain mahogany on parcels of the northern and western slopes of Mahogany Ridge. It fills a vegetation cell need for mountain mahogany-sagebrush and mountain mahogany-Oregon grape complex identified by ONHP and includes a higher-elevation mountain big sagebrush mountain mahogany/slender wheatgrass-bluebunch wheatgrass community. The unit is bounded on the east and north by private land ownership.

The Mahogany Ridge ACEC/RNA is located within the East Mahogany pasture of the Mahogany Mountain Allotment.

Specific Management under the 2002 SEORMP ROD, as Amended

OHV use will be limited to designated roads and trails. Road maintenance will be limited to the existing roadway, and shoulder/barrow ditch construction will be limited to that necessary to control runoff, minimize soil erosion, and ensure public safety and serviceability of the road. The area is VRM Class II. Plant collecting requires a permit. Development of leasable minerals is subject to the No Surface Occupancy stipulation. Livestock use allocations will continue based on existing permit stipulations and approved AMPs, unless modified under subsequent land use planning. Any proposed changes in livestock grazing use, including time and intensity of use, will be evaluated for impacts on the relevant and important values and will be permitted if values will be maintained or enhanced. Where adverse impacts are identified, existing livestock use allocations will be managed using a variety of methods, including fencing, reduction in livestock numbers, and changes in livestock grazing season. Proposed projects will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced.

Summary of Key RNA and Relevant and Important Values Evaluated for ACEC/RNA Designation

2002 Southeastern Oregon RMP (SEORMP) ACEC/RNA Designation

The relevant and important values in the ACEC/RNA include habitat for the broad-tailed hummingbird and other neotropical migratory birds, a special status plant species (Owyhee clover), and the mountain mahogany-big sagebrush vegetation communities identified by ONHP.

2015 Greater Sage-grouse ARMPA

The Mahogany Ridge ACEC/RNA was identified as a key RNA for sagebrush plant communities that are important for Sage-grouse.

Updated Vegetation Communities and Sage-Grouse Habitats

Vegetation communities represented in this key RNA, that are important to Greater Sage-grouse habitat, continue to be relatively unaltered. These communities are mountain big sagebrush/Idaho fescue associations. These communities represent the Cool-Moist sagebrush community.

The mountain mahogany/mountain big sagebrush woodland and lesser amounts of a mountain mahogany/Oregon grape (*Mahonia repens*) plant communities in this key RNA are not suitable habitat for sage-grouse because the dominant growth structure of mountain mahogany is more tree like, providing no understory cover and providing perch opportunities for predators. These represent the Mountain Shrub vegetation community.

The key RNA is within PHMA and is part of the Cow Lakes Priority Area of Conservation. It is included within the boundary of sage-grouse spring nesting, summer brood-rearing, and winter habitat. The nearest active or pending active lek and the only lek within 4 miles of the key RNA is approximately 3.4 miles away.

Other Resources or Issues

The visual resource management category of the key RNA is Class II.

With the exception of a boundary road between two wilderness characteristics units (The Tongue (OR-034-054) and Schnable Creek (OR-034-057)) the southern portion (444 acres) of the Mahogany Ridge key RNA is within an area possessing wilderness characteristics. The area allocated as unavailable for livestock grazing under the 2015 ARMPA is wholly in The Tongue wilderness characteristics unit. The wilderness characteristics of neither unit are prioritized for protection under the 2024 SEORMP Amendment ROD (BLM 2024a, Appendix A, p. A-4).

The Mahogany Ridge key RNA is located on the edge of bighorn sheep core herd range and is winter range for deer. It is utilized by deer and elk year-round. ODFW's Oregon Connectivity Assessment and Mapping Project (OCAMP) categorized this area as a Priority Wildlife Connectivity Area (PWCA) – Region. Regions are the top 1% of connectivity priorities and represent the highest-value habitat for facilitating species movement. In addition, this area has a priority Recommended Conservation Action of 'Protect', the strongest conservation measure for maintaining wildlife connectivity. Because of the limited number of mountain mahogany stands in southeast Oregon among an abundance of shrublands and grasslands, this key RNA is important nesting and migration habitat for neotropical migratory birds, as is highlighted in the relevant and important values identified in the 2002 ACEC/RNA designation.

Rationale for Proposing Alternative that Modifies Key RNA Management

Rationale for Retaining the Key RNA under All Alternatives

Prior to the removal of grazing from this key RNA, there was no indication of negative impacts from livestock grazing to the vegetative communities identified as important for Greater Sage-grouse or the relevant and important values for which the RNA was designated. The area continues to be in a desirable condition for the updated vegetative communities identified under the 2015 ARMPA. Management will continue to protect the relevant and important values. Retaining the Mahogany Ridge Bench key RNA would continue to allow natural processes to predominate and research and baseline data gathering on relatively unaltered plant communities important for Greater Sage-grouse.

Sagebrush communities of the key RNA provide for suitable nesting, brood-rearing, and winter habitat for Greater Sage-grouse.

Site visits indicate that the vegetation types identified for the key RNA in 2015 are present. The area retains the Cool-Moist Sagebrush and Mountain Shrub Vegetation Type.

Rationale for Modifying the Area Allocated as Unavailable for Livestock Grazing

In the 2024 Greater Sage-grouse DEIS, Alternative 5 proposed modifying the boundary of the area allocated as unavailable for livestock grazing from 155 acres to 140 acres. This was proposed to avoid or reduce conflicts between the fence location and wildlife movement, primarily big game species. The modified boundary proposed in the 2024 Greater Sage-grouse DEIS occurred partially within bighorn sheep habitat and passed through a major big game migration area, which would alter natural movement and potentially increase risks of fence collision and/or entanglement. The location of the fenceline was proposed to limit the number of gates by avoiding road crossings and to minimize disturbance to adjacent riparian resources.

Furthermore, the 2024 Greater Sage-grouse DEIS proposal would eliminate the administrative issue of relocating existing fence to avoid private lands and prevent the need to trail livestock through the key RNA.

Further review of the 2024 Greater Sage-grouse DEIS fenceline modification revealed the need for additional modification of the proposed fence location. A new location for the proposed fence was identified that would further minimize remaining issues and concerns identified in the 2024 Greater Sage-grouse DEIS. The Proposed RMP Amendment would result in a reduction from 140 acres to a 69-acre area that is allocated as unavailable for livestock grazing. This modification reduces wildlife conflicts and improves movement by relocating the fence to an area with less topography, requires less fence, and eliminates bighorn sheep habitat concerns. Additionally, this modification avoids potential impacts to riparian resources adjacent to the previously proposed fence by eliminating the travel and congregation of livestock and wildlife along fences near springs and riparian areas. The smaller exclosure would still maintain the vegetation communities consisting of mountain big sagebrush/Idaho fescue associations.

Environmental Consequences

Consequences Common to all Alternatives

Vegetative communities that are important to Greater Sage-grouse habitat would continue to be available for provide baseline data on relatively unaltered plant community types important to Greater Sage-grouse.

Alternatives 1 and 4

Livestock grazing would not occur in the 155 acres allocated as unavailable for livestock grazing in the southern portion Mahogany Ridge key RNA. Livestock could be kept from this area through active livestock management or the construction of fencing along the border of the area allocated as unavailable for grazing.

Fence construction could disturb nesting sage-grouse if it occurs during the breeding season. Restricting activity during the breeding season to two hours after sunrise to two hours before sunset would minimize disturbance to any sage-grouse that may be present in the area. Sage-grouse-fence collisions are unlikely to occur as the nearest pending active or active lek is approximately 3.45 miles away, the key RNA is in a V-shaped valley with rock outcrops and mountain mahogany stands that present perching locations for raptors, decreasing security for sage-grouse, and abundant habitat to the south and west of the key RNA provides higher quality nesting and brood-rearing habitat, which is not represented in the key RNA.

A fence constructed on the boundary of the area allocated as unavailable for livestock grazing could create conflicts between the fence location and wildlife movement, primarily big game species. This would alter natural movement and potentially increase risks of fence collision and/or entanglement.

An ungrazed reference for research would be retained.

Alternative 2

Because the entire area would be allocated as available for livestock grazing, there would be no need for fencing or active livestock management (herding). The wilderness characteristic of naturalness, outstanding opportunities for solitude, and unconfined primitive recreation would not be impaired under this alternative either short-term or long-term any more than it had been at the time that this unit was identified as one with wilderness characteristics. Fence-related conflicts would not occur.

Alternative 3

Because livestock grazing would not occur in the vicinity of this key RNA, there would be no need for fencing or active livestock management (herding). Wilderness characteristics of naturalness, opportunities for

solitude, or primitive and unconfined recreation would not be impaired under this alternative, nor would there be any short-term disturbances to these characteristics caused by fence construction. Fence-related conflicts would not occur. An ungrazed reference for research would be retained.

Alternatives 5 and 6

Fifteen acres would be reallocated as available for livestock grazing. Livestock could be kept from the 140 acres allocated as unavailable for livestock grazing through active livestock management or the construction of fencing along the border of the area allocated as unavailable for grazing. The minor deviations from Alternative 1 would reduce resource conflicts between the boundary location and wildlife movement, primarily big game species. The modified boundary occurs partially within bighorn sheep habitat and passes through a major big game migration area, which would alter natural movement and potentially increase risks of fence collision and/or entanglement. The deviations also help maintain fence integrity by limiting the number of gates and keeping the fence design as straight as possible given the topography of the landscape and allotment/pasture. Effects from fence construction would be the same as identified in Alternative 1, but occur to a lesser extent due to the reduced exclosure size.

Impacts to the wilderness characteristic of naturalness would occur, but be limited to near boundary roads or internal primitive trails. If management actions (e.g., herding) other than fence construction were employed to exclude livestock from the unavailable area, there would be no impact to naturalness. Outstanding opportunities for solitude would not be impacted as short-term impacts to solitude caused by fence construction and long-term impacts to solitude caused by active management to exclude livestock from key RNA would not occur.

Proposed RMP Amendment

Eighty-six acres would be reallocated as available for livestock grazing. Livestock could be kept from the 69 acres allocated as unavailable for livestock grazing through active livestock management or the construction of fencing along the border of the area allocated as unavailable for grazing. The deviations from Alternatives 1, 5, and 6 would further reduce resource conflicts. It reduces wildlife conflicts and improves movement by relocating the boundary to an area with less topography, eliminating bighorn sheep habitat concerns. Additionally, this modification avoids potential impacts to riparian resources adjacent to the previously proposed fence by eliminating the travel and congregation of livestock and wildlife along fences near springs and riparian areas. The smaller exclosure would still maintain the vegetation communities consisting of mountain big sagebrush/Idaho fescue associations. Effects from fence construction would otherwise be the same as identified in Alternative 1, but would occur to a lesser extent due to the reduced exclosure size.

Impacts to wilderness characteristics would be reduced with the smaller enclosure. Impacts to naturalness would occur, but be limited to near boundary roads or internal primitive trails. If management actions (e.g., herding) other than fence construction were employed to exclude livestock from the unavailable area, there would be no impact to naturalness. Outstanding opportunities for solitude would not be impacted as short-term impacts to solitude caused by fence construction and long-term impacts to solitude caused by active management to exclude livestock from key RNA would not occur.

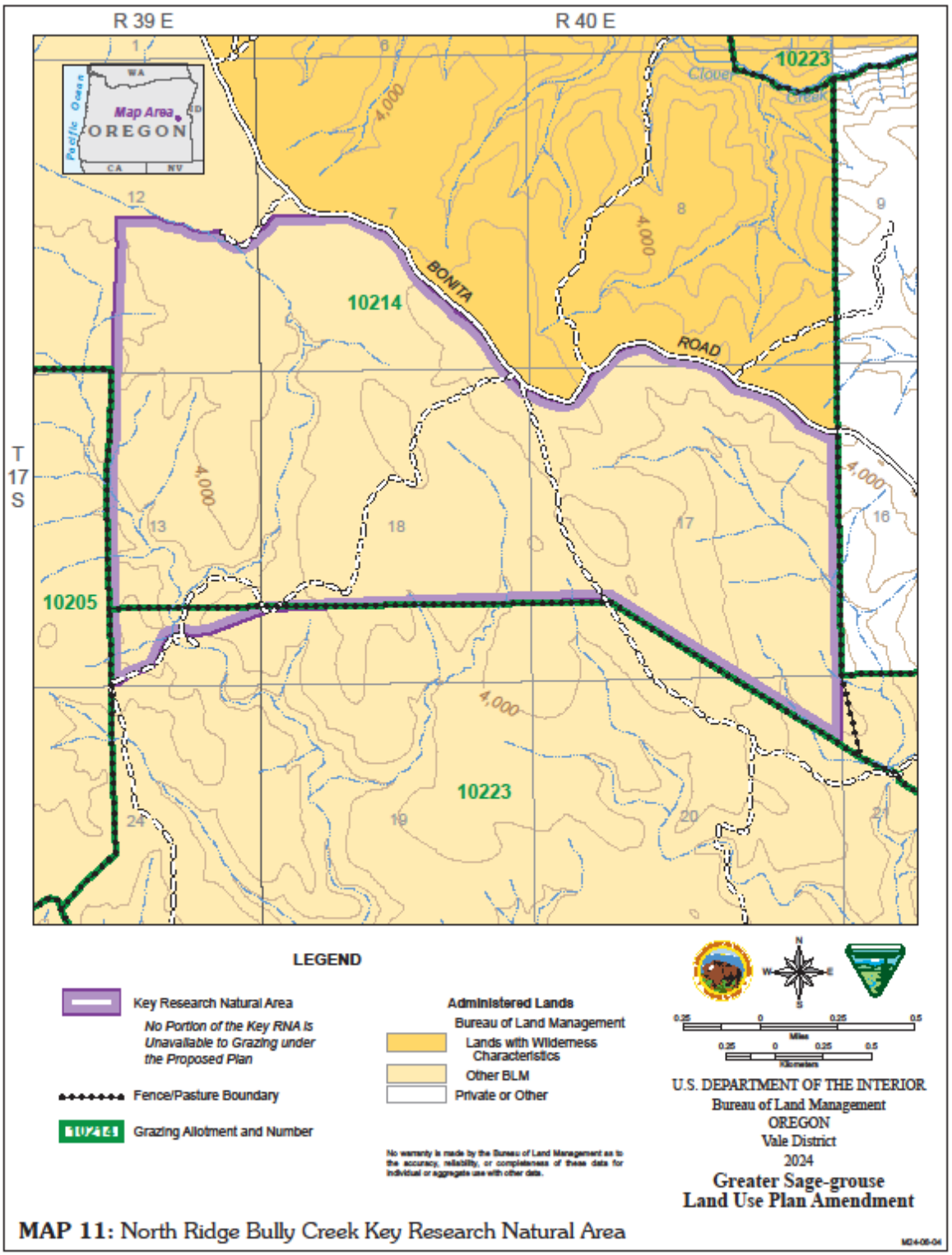
North Ridge Bully Creek (Vale)

Proposed RMP Amendment

Retain the area identified as a key RNA and reallocate the entire key RNA as available for livestock grazing. Construct a 5-acre or less exclosure that would remove livestock use and other permitted activities to allow for nonmanipulative research and baseline data gathering within the Key RNA or within close proximity to

the Key RNA to allow for ungrazed comparison areas for evaluating effects of livestock on those vegetative communities identified as important for greater sage-grouse within the North Ridge Bully Creek key RNA. The location, size, and design of the exclosure site would adhere to variations in lek buffers and required designed features as specified in Appendiees B and C of the Oregon 2015 GRSG Approved RMP Amendment.

Map 11. North Ridge Bully Creek Key Research Natural Area



Affected Environment

The 1,569-acre North Ridge Bully Creek ACEC/RNA is located west of Westfall, Oregon, along the ridge that separates Clover Creek drainage to the north and Bully Creek drainage to the south. The ACEC/RNA encompasses a number of grassland communities that occur both as distinct communities as well as intermixed within a larger mosaic of types.

A 164-acre area of the key RNA is allocated as unavailable for livestock grazing. The key RNA is wholly within the North Ridge pasture of the Richie Flat allotment. The key RNA is within Greater Sage-grouse PHMA and four active or pending active leks are within 1.2 miles of the key RNA boundary. There is one AIM plot within the area available for livestock grazing.

Specific Management under the 2002 SEORMP ROD, as Amended

OHV use is limited to existing roads and trails. Plant collecting requires a permit. The ACEC/RNA is VRM Class III. Road maintenance will be limited to the existing roadway, and shoulder/barrow ditch construction will be limited to that necessary to control runoff, minimize soil erosion, and ensure public safety and serviceability of the road. Livestock use allocations will continue based on existing permit stipulations and approved AMPs, unless modified under subsequent land use planning. Any proposed changes in livestock grazing outside of the current authorization, including time and intensity of use, would be analyzed through the appropriate process. Such analysis would evaluate impacts on the associated relevant and important values so that, if permitted, values would be maintained or enhanced. Existing livestock use allocations will be adjusted where adverse impacts are identified using a variety of methods, including, but not limited to, fencing, reduction in livestock numbers, and changes in grazing season. Proposed projects in the area will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced.

Summary of Key RNA and Relevant and Important Values Evaluated for ACEC/RNA Designation

2002 Southeastern Oregon RMP (SEORMP) ACEC/RNA Designation

The relevant and important values identified in this ACEC/RNA are the Wyoming big sagebrush/Thurber needlegrass community and big sagebrush-threetip sagebrush/Idaho fescue community vegetation cells identified by ONHP.

2015 Greater Sage-grouse ARMPA

The North Ridge Bully Creek ACEC/RNA was identified as a key RNA for sagebrush plant communities that are important for Sage-grouse.

Updated Vegetation Communities and Sage-Grouse Habitats

Wyoming big sagebrush/Thurber's needlegrass, Wyoming big sagebrush/wild crab apple (*Peraphyllum ramosissimum*)/bluebunch wheatgrass, and threetip sagebrush/bluebunch wheatgrass are common plant communities throughout the RNA.

Vegetative communities in this key RNA that are important to Greater Sage-grouse habitat continue to be relatively unaltered. These are Wyoming big sagebrush/Thurber's needlegrass, Wyoming big sagebrush/wild crab apple (*Peraphyllum ramosissimum*)/bluebunch wheatgrass, and threetip sagebrush/bluebunch wheatgrass. These communities represent the Cool-Moist/Warm-Dry Sagebrush Communities. The key RNA is within Greater Sage-grouse PHMA and four active or pending active leks are within 1.2 miles of the key RNA boundary. The North Ridge Bully Creek ACEC/RNA burned in the 2012 Bonita Fire and the 2015 Bendire Fire removing much of the sagebrush present. The North Ridge Bully Creek ACEC/RNA was aerially sprayed with the preemergent herbicide imazapic in October 2015, after the Bendire Fire to reduce invasive annual grasses in the area.

Other Resources

The visual resource management is Class III.

The key RNA is utilized by deer during spring and summer, pronghorn year-round, and is designated as elk winter range.

Rationale for Proposing Alternative that Modifies Key RNA Management

Rationale for Retaining the Key RNA under All Alternatives

The area continues to be in desirable condition for the vegetative communities identified for the purposes of providing vegetative communities that are important for Greater Sage-grouse habitat. Although the area burned in 2012 and 2015, the application of herbicide in 2015 prevented the increase of invasive annual grasses that often follow multiple fires. Management would continue to protect the relevant and important values, although shrub components have been impacted by past wildfires. However, in the long-term, shrub components are expected to return. Continued management would retain the Ecotone between Cool-Moist/Warm-Dry vegetation types.

Research opportunities continue to remain, with vegetative communities identified as relevant and important values that are important for Greater Sage-grouse. The area continues to recover and provides opportunities for research and baseline data gathering where post-fire ecological conditions occur. Prior to the removal of grazing from this key RNA, there was no indication of negative impacts from livestock grazing to the vegetative communities identified as important for Greater Sage-grouse or the relevant and important values for which the RNA was designated.

Rationale for Reallocating the Key RNA as Available for Livestock Grazing

Allocating the entire key RNA as available for livestock grazing removes the possibility of construction of an exclosure fence, reducing conflicts with lek buffers and reducing collision risk. Livestock management prior to the 2015 ARMPA (Alternative 1) did not have a negative impact on the relative and important values identified for the RNA (BLM. Monitoring data. 06/05/2013).

Livestock grazing within the key RNA is not expected to adversely impact current conditions, and conditions continue to exist as they were (excluding impacts from wildfire) at the time the RNA was designated under the 2002 SEORMP (see BLM, North Ridge Bully Creek RNA monitoring data). There is no indication that improper livestock grazing practices are occurring given the current conditions (Site visits, 06/05/2013; 05/30-31/2018; 06/26/2020).

Environmental Consequences

Consequences Common to all Alternatives

Vegetative communities that are important to Greater Sage-grouse habitat would continue to be present and provide life-cycle needs (such as nesting, brood rearing, and wintering) under all alternatives.

Alternatives 1 and 4

Presence, time, and resources for active management of livestock grazing would continue to be necessary. Vegetative conditions may witness slightly increased recovery with continued elimination of livestock use from the area. Due to the proximity and number of leks within the area and the risk of Greater Sage-grouse-fence collisions, fencing to exclude livestock from the area allocated as unavailable for livestock grazing is not feasible and could not conform with Required Design Features. As a fence within 1.2 miles of leks poses a collision hazard, and the area that would be protected from grazing had previously been properly grazed, which USFWS has said is compatible with GRSG conservation, there is no conservation benefit to

GRSG from placing a fence within 1.2 miles of a lek. While research in the ungrazed area could provide data and insights that could benefit GRSG habitat management, this benefit is not only difficult to measure but would not outweigh the fence collision risk for GRSG. Other wildlife noted to use the area may be negatively impacted, at least seasonally due to increased human presence when managing livestock from entering areas unavailable for livestock use.

Alternatives 2, 5, and 6

Under these alternatives, reallocating the entire key RNA as available for livestock grazing would allow for the resumption of management practices employed prior to 2023 throughout the North Ridge pasture of the Richie Flat allotment. Prior to the removal of grazing from this key RNA, livestock grazing management prescribed had not adversely impacted conditions of the vegetative communities that support wildlife habitat important to the area as well as the condition of the important vegetative communities identified for the Greater Sage-grouse (BLM. North Ridge Bully Creek RNA Monitoring data. 06/05/2013-06/06/2013; 5/30/2018-5/31/2018; 06/26/2020).

Current conditions of the vegetative communities are in a desirable state and are not expected to be adversely affected under proper livestock grazing management. The condition of the vegetative communities that were present when the 2002 SEORMP designated the RNA would continue. Livestock management prior to the 2015 ARMPA does not appear to have had a negative impact on the relative and important values identified for the key RNA (BLM. North Ridge Bully Creek RNA Monitoring data. 06/05/2013-06/06/2013; 5/30/2018-5/31/2018; 06/26/2020). As stated in the rationale for maintaining the key RNA status, the vegetative communities identified as important for Greater Sage-grouse in 2015 are still present post-fire with the exception of sagebrush.

The area continues to recover and provides opportunities for research and data gathering where post-fire ecological conditions occur.

Increased presence, time, and resources for active management to keep livestock from the area identified as unavailable for livestock grazing would not be necessary and impacts to wildlife, including sage-grouse, from these activities would not occur.

Alternative 3

Because livestock grazing would not occur in the vicinity of this key RNA, there would be no need for fencing or active livestock management (herding), An ungrazed reference for research would be retained.

Proposed RMP Amendment

Under this alternative, reallocating the entire key RNA as available for livestock grazing would allow for the resumption of management practices employed prior to 2023 throughout the North Ridge pasture of the Richie Flat allotment. Prior to the removal of grazing from this key RNA, livestock grazing management prescribed had not adversely impacted conditions of the vegetative communities that support wildlife habitat important to the area as well as the condition of the important vegetative communities identified for the Greater Sage-grouse (BLM. North Ridge Bully Creek RNA Monitoring data. 06/05/2013-06/06/2013; 5/30/2018-5/31/2018; 06/26/2020).

Current conditions of the vegetative communities are in a desirable state and are not expected to be adversely affected under proper livestock grazing management. The condition of the vegetative communities that were present when the 2002 SEORMP designated the RNA would continue. Livestock management prior to the 2015 ARMPA does not appear to have had a negative impact on the relative and important

values identified for the key RNA (BLM. North Ridge Bully Creek RNA Monitoring data. 06/05/2013-06/06/2013; 5/30/2018-5/31/2018; 06/26/2020). As stated in the rationale for maintaining the key RNA status, the vegetative communities identified as important for Greater Sage-grouse in 2015 are still present post-fire with the exception of sagebrush.

Active and pending leks are currently documented to exist within less than 1.2 miles of the area identified for livestock removal in Alternatives 1 and 4. However, the construction of a 5-acre or less exclosure that would remove livestock use and other permitted activities would allow for nonmanipulative research and baseline data gathering within close proximity to the Key RNA. This would allow for ungrazed comparison areas for evaluating effects of livestock on those vegetative communities identified as important for greater sage-grouse within the North Ridge Bully Creek key RNA. The location, size, and design of the exclosure site would adhere to variations in lek buffers and required designed features as specified in Appendiees B and C of the Oregon 2015 GRSG Approved RMP Amendment. There would be at least short-term impacts from fence construction outside of, but near to, the key RNA.

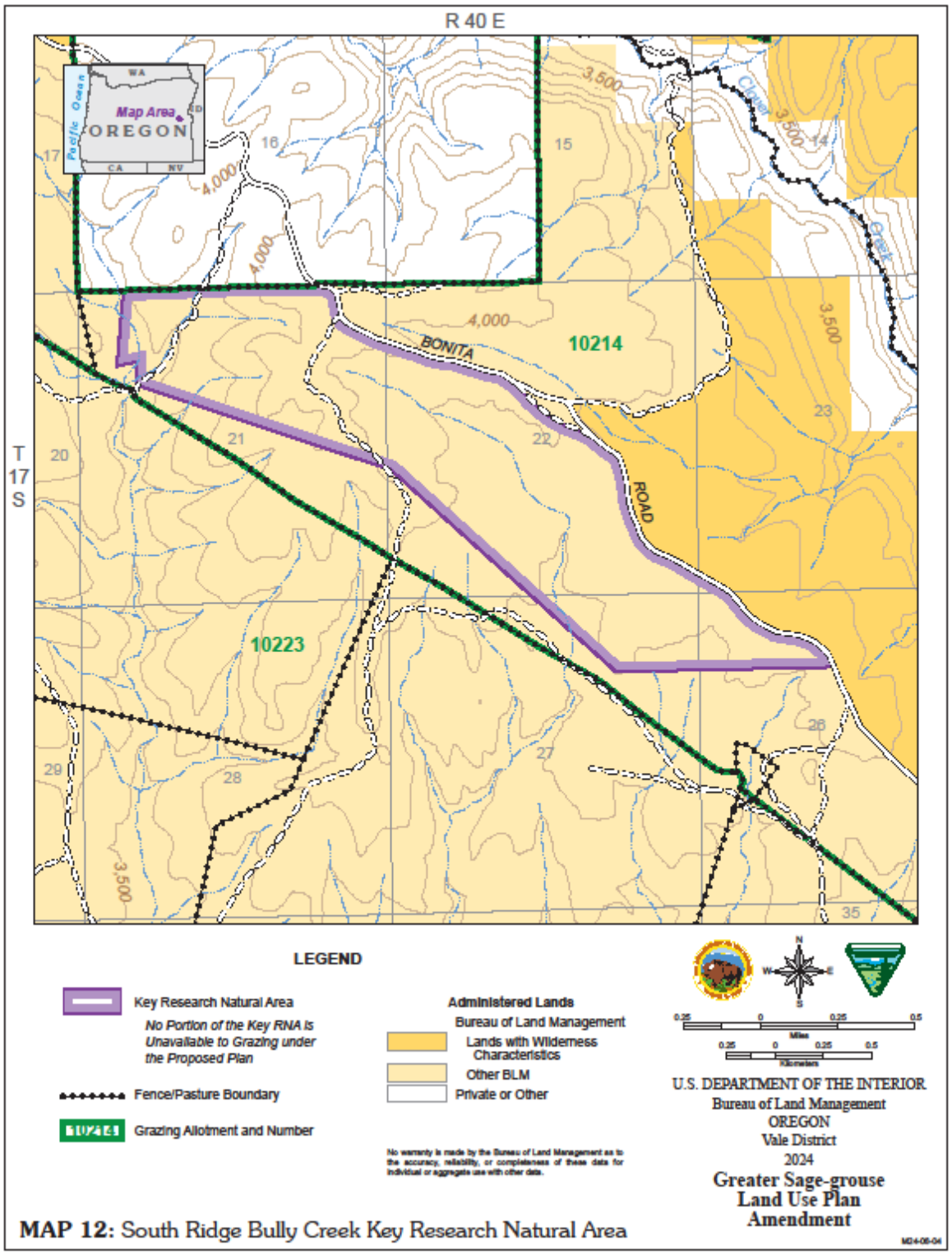
Increased presence, time, and resources for active management to keep livestock from the area identified as unavailable for livestock grazing would not be necessary and impacts to wildlife, including sage-grouse, from these activities would not occur.

South Ridge Bully Creek (Vale)

Proposed RMP Amendment

Retain the area identified as a key RNA and reallocate all portions of the key RNA as available for livestock grazing. Construct a 5-acre or less exclosure that would remove livestock use and other permitted activities to allow for nonmanipulative research and baseline data gathering within the Key RNA or within close proximity to the Key RNA to allow for ungrazed comparison areas for evaluating effects of livestock on those vegetative communities identified as important for greater sage-grouse within the South Ridge Bully Creek key RNA. The location, size, and design of the exclosure site would adhere to variations in lek buffers and required designed features as specified in Appendices B and C of the Oregon 2015 GRSG Approved RMP Amendment.

Map 12. South Ridge Bully Creek Key Research Natural Area



Affected Environment

The 621-acre South Ridge Bully Creek ACEC/RNA is located west of Westfall, Oregon, along the ridge that separates Clover Creek drainage to the north and Bully Creek drainage to the south. The ACEC/RNA encompasses a number of grassland communities that occur as distinct entities intermixed within a larger mosaic of types in excellent ecological condition.

The South Ridge Bully Creek key RNA and 397-acre area allocated as unavailable for livestock grazing occurs within the South Ridge pasture of the Richie Flat allotment. The key RNA is adjacent to the North Ridge Bully Creek key RNA and North Ridge Bully Creek pasture. The key RNA is within Greater Sage-grouse PHMA and two active or pending active leks are within 1.2 miles of the key RNA boundary. There is one AIM plot within the area available for livestock grazing.

Specific Management under the 2002 SEORMP ROD, as Amended

OHV use will be limited to existing roads and trails. Plant collecting requires a permit. The ACEC/RNA is managed as VRM Class III. Road maintenance will be limited to the existing roadway, and shoulder/barrow ditch construction will be limited to that necessary to control runoff, minimize soil erosion, and ensure public safety and serviceability of the road. Livestock use allocations will continue based on existing permit stipulations and approved AMPs, unless modified under subsequent land use planning. Any proposed changes in livestock grazing, including time and intensity of use, will be evaluated for impacts on the relevant and important values and will be permitted if values will be maintained or enhanced. Where adverse impacts are identified, existing livestock use allocations will be adjusted using a variety of methods that could include fencing, reduction in livestock numbers, and changes in grazing season. Proposed projects in the area will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced.

Summary of Key RNA and Relevant and Important Values Evaluated for ACEC/RNA Designation

2002 Southeastern Oregon RMP (SEORMP) ACEC/RNA Designation

The relevant and important values of the ACEC/RNA are the Wyoming big sagebrush/Thurber needlegrass community and Wyoming big sagebrush- wild crab apple (*Peraphyllum ramosissimum*)/Idaho fescue community vegetation cells identified by ONHP.

2015 Greater Sage-grouse ARMPA

The South Ridge Bully Creek ACEC/RNA was identified as a key RNA for sagebrush plant communities that are important for Sage-grouse.

Updated Vegetation Communities and Sage-Grouse Habitats

Vegetation communities represented in this key RNA include Wyoming big sagebrush/Thurber's needlegrass, a Wyoming big sagebrush/wild crab apple/Idaho fescue, and threetip sagebrush/blue bunch wheatgrass (Idaho fescue) plant association.

Vegetative communities in this key RNA that are important to Greater Sage-grouse habitat continue to be relatively unaltered. These are Wyoming big sagebrush/Thurber's needlegrass, a Wyoming big sagebrush/wild crab apple/Idaho fescue, and threetip sagebrush/blue bunch wheatgrass (Idaho fescue) plant association. These communities represent the Cool-Moist/Warm-Dry Sagebrush Communities. The key RNA is within Greater Sage-grouse PHMA and two active or pending active leks are within 1.2 miles of the key RNA boundary. The South Ridge Bully Creek ACEC/RNA burned in the 2012 Bonita Fire and the 2015 Bendire Fire removing much of the sagebrush present. The South Ridge Bully Creek ACEC/RNA was aerially sprayed with the preemergent herbicide imazapic in October 2015 after the Bendire Fire to reduce invasive annual grasses in the area.

Other Resources

The visual resource management is Class III.

The key RNA is utilized by deer during spring and summer, pronghorn year-round, and is designated as elk winter range.

Rationale for Proposing Alternative that Modifies Key RNA Management

Rationale for Retaining the Key RNA under all Alternatives

The area continues to be in a desirable condition for the vegetative communities identified. Although the area burned in 2012 and 2015, the application of herbicide in 2015 prevented the increase of invasive annual grasses that often follow multiple fires. Management would continue to protect the relevant and important values, although shrub components have been impacted by past wildfires. In the long-term, shrub components are expected to return. Research opportunities continue to remain with vegetative communities identified as relevant and important values. The area continues to recover and provides opportunities for research and baseline data gathering where post-fire ecological conditions occur. The key RNA retains the following vegetation types important for Greater Sage-grouse: Ecotone between cool-moist and warm-dry sagebrush, shallow-Dry Sagebrush, and Riparian-Wetlands.

Rationale for Reallocating the Area as Available for Livestock Grazing under Proposed RMP Amendment

Allocating the entire key RNA as available for livestock grazing removes the possibility of construction of an exclosure fence, reducing conflicts with lek buffers and reducing collision risk. Livestock management prior to the 2015 ARMPA (Alternative 1) did not have a negative impact on the relative and important values identified for the RNA (BLM. South Ridge Bully Creek RNA Monitoring data. 06/05/2013; 05/30-31/2018; 06/26/2020).

Livestock grazing within the key RNA is not expected to adversely impact current conditions, and conditions continue to exist (excluding impacts from wildfire) as they were at the time the RNA was designated under the 2002 SEORMP (BLM. South Ridge Bully Creek RNA Monitoring data. 06/05/2013; 05/30-31/2018; 06/26/2020). There is no indication that improper livestock grazing practices are occurring given the current conditions (BLM. South Ridge Bully Creek RNA Monitoring data. 06/05/2013; 05/30-31/2018; 06/26/2020).

Environmental Consequences

Consequences Common to all Alternatives

Vegetative communities that are important to Greater Sage-grouse habitat would continue to be present and provide life-cycle needs (such as nesting, brood rearing, and wintering) under all alternatives.

Alternatives 1 and 4

Presence, time, and resources for active management of livestock grazing would continue to be necessary. Vegetative and soil conditions are recovering post-wildfire and as expected for the vegetative communities present prior to eliminating livestock from the area allocated as unavailable for livestock use under the 2015 ARMPA ROD. Vegetative conditions may witness slightly increased recovery with the elimination of livestock use from the area. Due to the proximity and number of leks within the area and the risk of Greater Sage-grouse- fence collisions, fencing to exclude livestock from the area allocated as unavailable for livestock grazing is not feasible and could not conform with Required Design Features. As a fence within 1.2 miles of leks poses a collision hazard, and the area that would be protected from grazing had previously been properly grazed, which USFWS has said is compatible with GRSG conservation, there is no conservation benefit to GRSG from placing a fence within 1.2 miles of a lek. While research in the ungrazed area could provide data

and insights that could benefit GRSG habitat management, this benefit is not only difficult to measure but would not outweigh the fence collision risk for GRSG. Other wildlife noted to use the area may be impacted, at least seasonally due to increased human presence when managing livestock from entering areas unavailable for livestock use.

Alternatives 2, 5, and 6

Under these alternatives, reallocating the entire key RNA as available for livestock grazing would allow for the resumption of management practices employed prior to 2023 throughout the South Ridge pasture of the Richie Flat allotment, while continuing to allow for research opportunities. Prior to the removal of grazing from this key RNA, livestock grazing management prescribed had not adversely impacted conditions of the vegetative communities that support wildlife habitat important to the area as well as the condition of the important vegetative communities identified for the Greater Sage-grouse. There is no indication that earlier grazing management practices had negative impacts to Greater Sage-grouse habitat within the key RNA.

Current conditions of the vegetative communities are in a desirable state and are not expected to be adversely affected under proper livestock grazing management. The condition of the vegetative communities that were present when the 2002 SEORMP designated the RNA while retaining livestock grazing use would continue. Livestock management prior to the 2015 ARMPA does not appear to have had a negative impact on the relative and important values identified for the key RNA. As stated in the rationale for maintaining the key RNA status, the vegetative communities identified as important for Greater Sage-grouse in 2015 are still present post-fire with the exception of sagebrush.

The area continues to recover and provides opportunities for research and data gathering where post-fire ecological conditions occur.

Increased presence, time, and resources for active management to keep livestock from the area identified as unavailable for livestock grazing would not be necessary and impacts to wildlife, including sage-grouse, from these activities would not occur.

Alternative 3

Because livestock grazing would not occur in the vicinity of this key RNA, there would be no need for fencing or active livestock management (herding), An ungrazed reference for research would be retained.

Proposed RMP Amendment

Under this alternative, reallocating the entire key RNA as available for livestock grazing would allow for the resumption of management practices employed prior to 2023 throughout the South Ridge pasture of the Richie Flat allotment. Prior to the removal of grazing from this key RNA, livestock grazing management prescribed had not adversely impacted conditions of the vegetative communities that support wildlife habitat important to the area as well as the condition of the important vegetative communities identified for the Greater Sage-grouse.

Current conditions of the vegetative communities are in a desirable state and are not expected to be adversely affected under proper livestock grazing management. The condition of the vegetative communities that were present when the 2002 SEORMP designated the RNA would continue. Livestock management prior to the 2015 ARMPA does not appear to have had a negative impact on the relative and important values identified for the key RNA. As stated in the rationale for maintaining the key RNA status, the

vegetative communities identified as important for Greater Sage-grouse in 2015 are still present post-fire with the exception of sagebrush.

Active and pending leks are currently documented to exist within less than 1.2 miles of the area identified for livestock removal in Alternatives 1 and 4. However, the construction of a 5-acre or less exclosure that would remove livestock use and other permitted activities would allow for nonmanipulative research and baseline data gathering within close proximity to the Key RNA. This would allow for ungrazed comparison areas for evaluating effects of livestock on those vegetative communities identified as important for greater sage-grouse within the South Ridge Bully Creek key RNA. The location, size, and design of the exclosure site would adhere to variations in lek buffers and required designed features as specified in Appendices B and C of the Oregon 2015 GRSG Approved RMP Amendment. There would be at least short-term impacts from fence construction outside of, but near to, the key RNA.

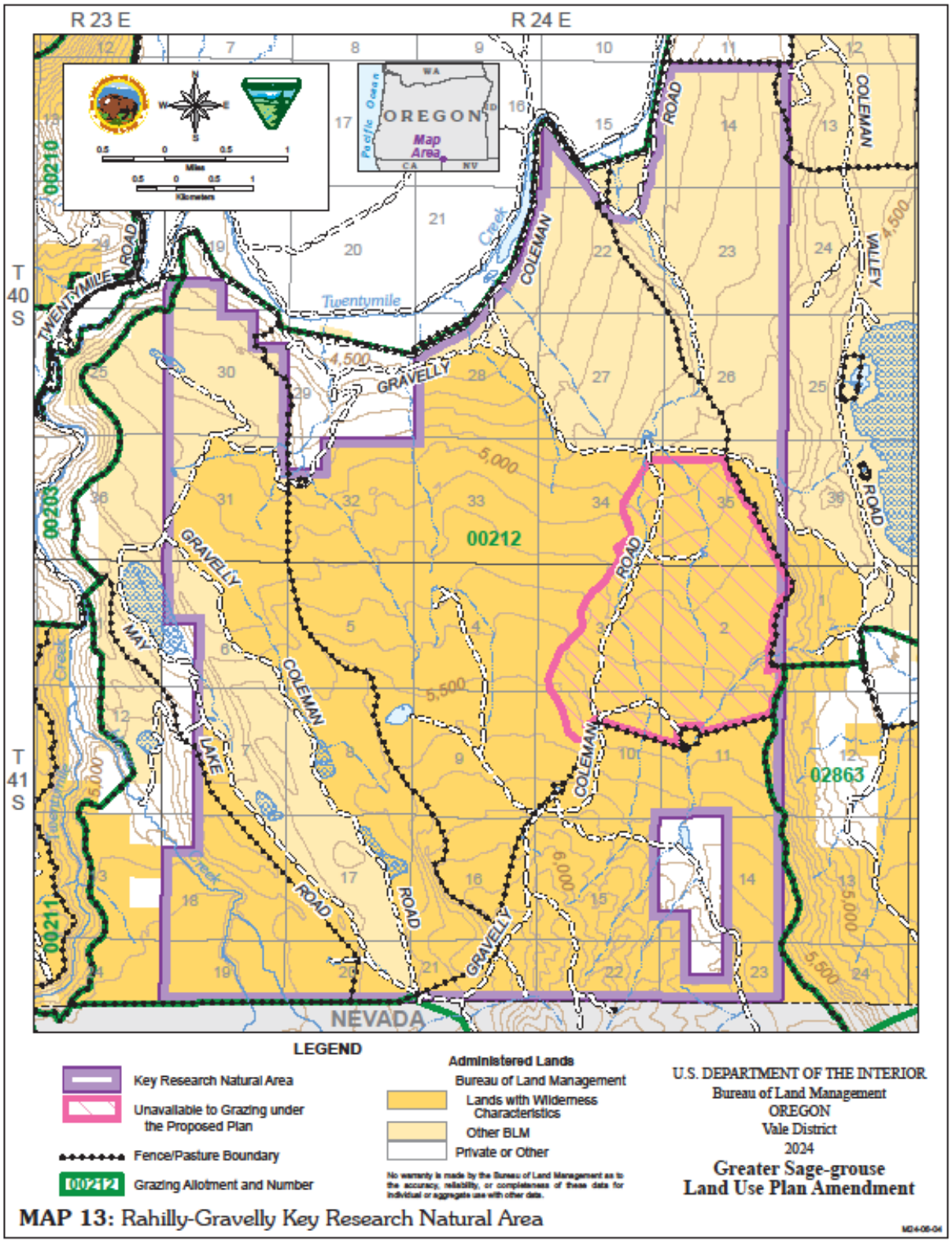
Increased presence, time, and resources for active management to keep livestock from the area identified as unavailable for livestock grazing would not be necessary and impacts to wildlife, including sage-grouse, from these activities would not occur.

Rahilly-Gravelly (Lakeview)

Proposed RMP Amendment

Retain the area identified as a key RNA and reduce the area allocated as unavailable for livestock grazing from 8,282 to 2,025 acres within a portion of the Sucker Creek Pasture (Rahilly-Gravelly Allotment) that contains low sagebrush/Sandberg's bluegrass grassland and Wyoming big sagebrush/bluebunch wheatgrass grassland plant communities.

Map 13. Rahilly-Gravelly Key Research Natural Area



Affected Environment

The 18,734-acre Rahilly-Gravelly ACEC/RNA is located about 24 miles southeast of Lakeview.

Specific management under the Lakeview RMP/ROD

OHV use is limited to existing roads and trails.

Summary of key RNA and Relevant and Important values evaluated for ACEC/RNA designation

Lakeview RMP/ROD

The 18,734-acre Rahilly-Gravelly ACEC/RNA was designated in the Lakeview RMP/ROD to protect relevant/important natural system (plant communities) and cultural resource values (BLM 2000a, pp. II-9, III-37; 2001a, p. A-247; 2003b, p. 68).

During the development of the Lakeview Resource Management Plan and Record of Decision, the BLM expanded the Rahilly-Gravelly ACEC/RNA (from the original 1,400-acre proposal to over 18,700 acres) to include significant cultural values in the added acreage (BLM 2000a, p. III-33). These site types included stone rings, rock art, lithic scatters, rock cairns, hunting blinds, and occupation sites (BLM 2000a, p. III-33 to III-34, III-37; 2003a, p. 2-58).

2015 Greater Sage-grouse ARMPA

The Proposed RMPA/Final EIS described the plant communities of the Rahilly-Gravelly ACEC/RNA as containing important sage-grouse plant communities including western juniper/Wyoming big sagebrush-bitterbrush woodland and some unusual shrublands described by the Oregon Biodiversity Information Center (ORBIC), such as a mountain big sagebrush/bitterbrush/wild crab apple and a mountain big sagebrush/bitterbrush/mountain snowberry/Thurber's needlegrass shrubland. The ACEC/RNA also contains Wyoming big sagebrush/bunchgrass, bluebunch wheatgrass, Thurber's needlegrass, and Sandberg's bluegrass associations, as well as areas of low sagebrush/grassland vegetation types (BLM 2015a, p. 3-142).

Updated Vegetation Communities

Approximately 1,400 acres of this ACEC/RNA contains the plant communities identified in the 2015 ARMPA and they are located within the Nevada Pasture (Vander Schaaf 1992, pp. 15-16 including map; BLM 2000a), not within the original (Alternative 1) exclosure area in the Sucker Creek Pasture. The Sucker Creek Pasture is the portion of the RNA with Greater Sage-grouse habitat and documented Greater Sage-grouse use.

Based on ESI data, the most dominant vegetation communities in the Rahilly-Gravelly ACEC/RNA include low sagebrush/Sandberg bluegrass, big sagebrush/cheatgrass, big sagebrush/Sandberg bluegrass, big sagebrush with no understory, and mountain big sagebrush/bluegrass. However, no mountain big sagebrush/bitterbrush/mountain snowberry/Thurber's needlegrass shrubland communities are present. In addition, western juniper is encroaching into, and degrading the habitat quality of the Wyoming big sagebrush/bitterbrush, big sagebrush, and some of the low sagebrush communities within the ACEC/RNA.

There are some cocklebur species (*Xanthium* sp.) and Canada thistle located around spring and water developments in the Rahilly-Gravelly key RNA. Many of these sites are located in areas that already exclude livestock grazing. This RNA also has a documented site of Mediterranean sage *(Mediterranean sage)* that is a high management priority for containment/control.

The BLM sensitive plant species, Cooper's goldflower (*Hymenoxys cooperi* var *canescens ~ H. lemmonii*), occurs in four places within the ACEC/RNA (BLM 2000a, p. III-26). Cooper's goldflower grows in rocky soils in arid

regions from southern California to New Mexico, north as far as Idaho and Oregon. Not much is known about the life history requirements of this species.

Other Resources

Small riparian/wetland areas occur around Terry Spring, Spearpoint Spring, several livestock water developments, and short reaches of Sucker Creek (BLM 2024b, p. 28).

The Rahilly-Gravelly key RNA lies within the Warner-Meizner mid-scale HAF, and the Warner fine-scale HAF boundaries, but is part of the Beaty PAC. The entire RNA is classified as PHMA and nearly all the area is mapped as seasonal breeding, summer, and winter sage-grouse habitat. Telemetry data collected across several years has documented spring, summer, and winter use within much of the key RNA including the Sucker Creek Pasture (unpublished data). As of 2022 lek surveys, there were 3 active and 4 inactive leks within the Sucker Creek Pasture.

Juniper areas provide habitat for woodland nesting species and cover for big game, while the shrubland/grassland areas provide habitat and forage for sage-steppe associated species. The area includes mule deer winter range, bighorn sheep occupied habitat, and pronghorn winter range and migration (BLM 2024b, p. 51).

The Twelvemile-Horse Creek (OR-015-157 and CA-020-1005; 24,081 acres) and Sucker Creek (OR-015-120A; 7,118 acres) wilderness characteristics units overlap portions of the key RNA.

The Rahilly Gravelly ACEC/RNA is managed as VRM Class III.

The Rahilly-Gravelly ACEC/RNA falls within the 33,571-acre Rahilly-Gravelly (00212) Allotment.

Rationale for Proposing Alternative that Modifies Key RNA Management

Rationale for Retaining the Key RNA under All Alternatives

The vegetative communities identified as important for Greater Sage-grouse habitat within the key RNA continue to be in good condition. Management would continue to protect the relevant and important values of the RNA.

The key RNA retains the following vegetation types important for Greater Sage-grouse: cool-moist sagebrush, warm-dry sagebrush, shallow-dry sagebrush, and mountain brush.

Opportunities for nonmanipulative research and baseline data gathering on relatively unaltered plant community types continue to remain, along with vegetative communities identified as important for greater sage-grouse, due to the remote and rugged nature of the area. Prior to the removal of grazing from this key RNA, there was no indication of negative impacts from livestock grazing to these vegetative communities or the relevant and important values for which the RNA was designated.

Rationale for Reallocating the Area as Available for Livestock Grazing under Proposed RMP Amendment

Portions of the original boundary of the area allocated as unavailable for livestock grazing (Alternative 1) were based on property lines that traversed terrain/topography (e.g., steep slopes, rocky surfaces) where the BLM determined, based on further analysis and field inventory, it would be difficult to construct fencing. The modified exclosure boundary would take advantage of existing topographic barriers (e.g. steep rims) and reduce the amount of fencing needed within sage-grouse habitat from an estimated 4.7 miles (under Alternative 1) to about 2.5 miles and move fencing approximately 0.2 miles further from two active leks.

The mountain big sagebrush/ bitterbrush/mountain snowberry/Thurber's needlegrass shrubland plant community was described as occurring in the key RNA by the 2015 ARMPA, however, the BLM has no documentation that this plant community exists within the key RNA. The proposed area to be unavailable for livestock grazing in the Sucker Creek Pasture contains Wyoming big sagebrush and low sagebrush plant communities.

Environmental Consequences

Consequences Common to all Alternatives

Vegetative communities that are important to Greater Sage-grouse habitat would continue to be available for provide baseline data on relatively unaltered plant community types important to Greater Sage-grouse.

Alternatives 1 and 4

Livestock are currently being kept out of areas allocated as unavailable for grazing through active management (herding, adjustment of turnout dates, removal of nearby water developments, and/or placement of salt or other supplements). Leaving 8,282 acres of the Rahilly-Gravelly ACEC/RNA unavailable for livestock grazing use could eliminate soil and vegetation disturbance from livestock in a portion of the key RNA. This would allow natural succession processes to occur in the absence of most human-caused disturbances and provide an area for future baseline monitoring and research purposes. An ungrazed reference for research would be retained.

If the area were to be made unavailable for livestock grazing using fencing, the new fencing would result in additional cattle trampling/trailing along the fenceline within an area that has been relatively undisturbed in the past. Native plant communities and soils would be impacted. There would be an increased potential risk of introducing new noxious weeds/invasive species into native communities during fence construction. The new disturbance would represent an area of potential cheatgrass invasion/expansion that could potentially impact the Cooper's goldflower over the long-term. A fence would negatively affect existing visual quality, but would meet VRM Class III objectives

Four existing livestock water sources located in areas unavailable for livestock grazing would not be available under these alternatives.

Alternative 2

Because the entire area would be allocated as available for livestock grazing, there would be no need for fencing or active livestock management (herding). The wilderness characteristic of naturalness, outstanding opportunities for solitude, and unconfined primitive recreation would not be impaired under this alternative, either short-term or long-term, any more than it had been at the time that this unit was identified as one with wilderness characteristics. Fence-related conflicts would not occur.

Alternative 3

Because livestock grazing would not occur in the vicinity of this key RNA, there would be no need for fencing or active livestock management (herding). Wilderness characteristics of naturalness, opportunities for solitude, or primitive and unconfined recreation would not be impaired under this alternative, nor would there be any short-term disturbances to these characteristics caused by fence construction. Fence-related conflicts would not occur. An ungrazed reference for research would be retained.

Alternatives 5, 6, and Proposed RMP Amendment

Under these alternatives 6,257 acres would be reallocated as available for livestock grazing. An ungrazed 2,025 acre reference area for research would be retained.

If access to the 2,025 acres unavailable for livestock grazing were to be limited by using fencing, the new fencing would result in additional cattle trampling/trailing along the fenceline within an area that has been relatively undisturbed in the past. Native plant communities and soils would be impacted. There would be an increased potential risk of introducing new noxious weeds/invasive species into native communities during fence construction. The new disturbance would represent an area of potential cheatgrass invasion/expansion that could potentially impact the Cooper's goldflower over the long-term. Because there would be less fence construction than under Alternative 1 as portions of natural rim rock would be used as part of the barrier, there would be fewer associated wildlife impacts than under Alternative 1. The western and northern portions of the fence would be moved further away from two active leks and the western fence would not be located in open terrain. These design measures would decrease the risk of collision by sage-grouse when compared to Alternative 1. A fence would negatively affect existing visual quality, but would meet VRM Class III objectives.

These alternatives would reverse negative economic effects to affected livestock operators that arose from making 8,282 acres unavailable for livestock grazing. Under these alternatives, 6,257 acres would be reallocated as available for livestock grazing (approximately 442 AUMs). Compared to Alternative 1 the permittee would not experience as much additional forage costs.

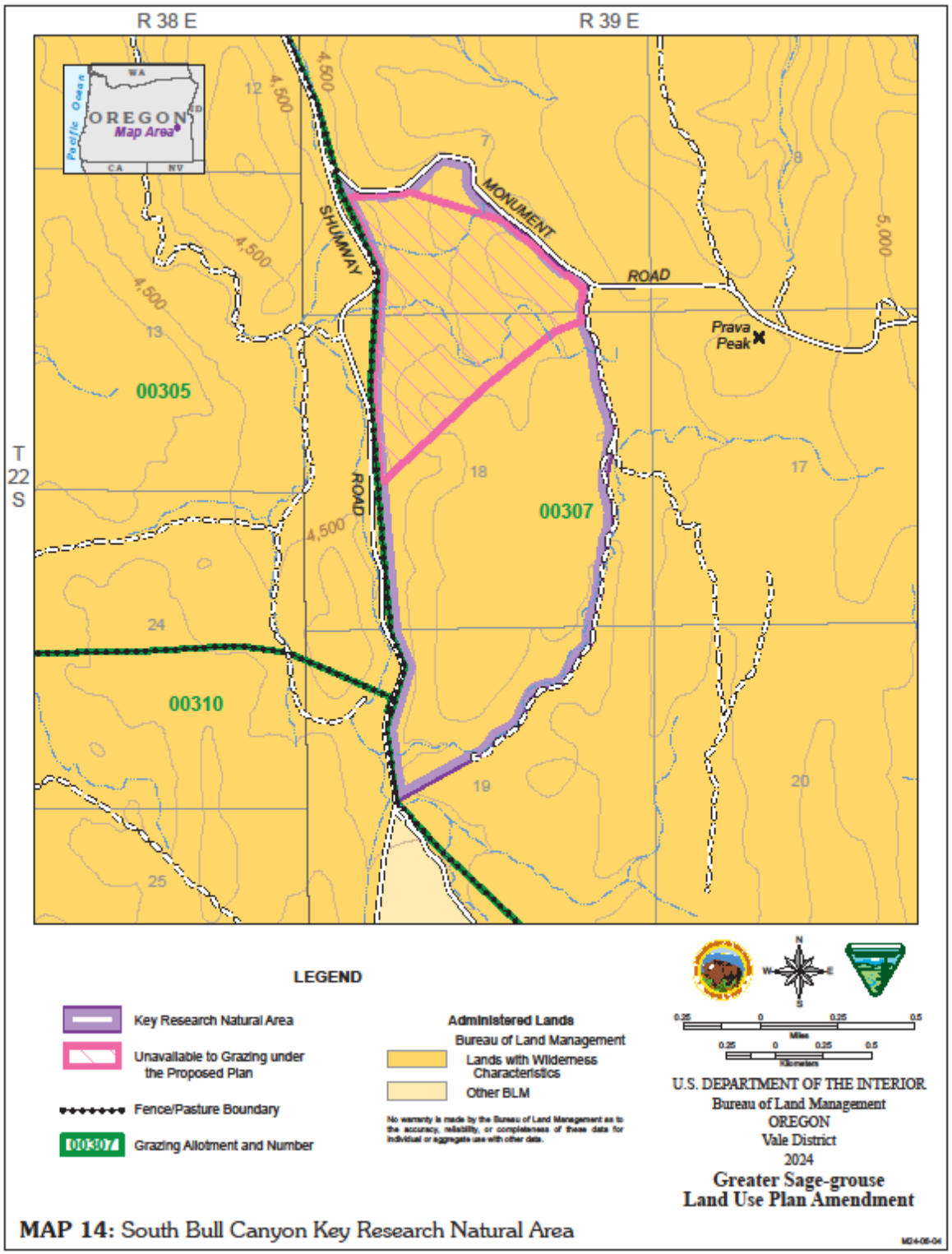
Four existing livestock water sources would be available for livestock grazing that would not be available under alternatives 1 and 4. This would reduce the need to mitigate for lost livestock watering sites when compared to Alternative 1 (BLM, 2024b, p. 17).

South Bull Canyon (Vale)

Proposed RMP Amendment

BLM proposes no changes to the key RNA boundary, but has reduced the area allocated as unavailable for livestock grazing from 749 acres to 257 acres to reduce conflicts with other resources. The smaller exclosure would still maintain the vegetation communities that are important to Greater Sage-grouse habitat.

Map 14. South Bull Canyon Key Research Natural Area



Affected Environment

The 770-acre South Bull Canyon ACEC/RNA is located south of the Malheur River, approximately six miles to the southeast of Juntura, Oregon, along the road that leads to Creston and Turnbull lakebeds. The landscape consists of a series of small drainages off of a low north-south ridge with relatively deep soils and large surface rocks. The gently sloped hills are covered by a mix of plant communities in generally late seral conditions. The ACEC/RNA includes a range of vegetation communities and their subtle variations across the landscape. The key RNA is located wholly within the 20,315-acre Prava Peak wilderness characteristics unit that is identified for prioritized protection of those wilderness values under 2024 SEORMP Amendment ROD (BLM 2024a, Appendix A, p. A-4). South Bull Canyon ACEC/RNA is managed for visual resources as VRM Class II (BLM 2024, p. ARMPA-2).

The South Bull Canyon key RNA and 749-acre area[2] allocated as unavailable for livestock grazing occurs within the Upper Field pasture of the Boney Basin allotment. The terrain in the South Bull Canyon key RNA has a number of hills and drainage features scattered throughout the 749 acres. There are two livestock watering developments within this area, and another three water developments bordering on or directly adjacent to that unavailable area.

Specific Management under the 2002 SEORMP ROD, as Amended

OHV use will be limited to designated roads and trails. Road maintenance will be limited to the existing roadway, and shoulder/barrow ditch construction will be limited to that necessary to control runoff, minimize soil erosion, and ensure public safety and serviceability of the road. The area will be closed to saleable minerals development, while remaining open for leasable and locatable minerals. Livestock use allocations will continue based on existing permit stipulations and approved AMPs, unless modified under subsequent land use planning. Any proposed changes in livestock grazing, including time and intensity of use, will be evaluated for impacts on the relevant and important values and will be permitted if values will be maintained or enhanced. Existing livestock use allocations will be adjusted where adverse impacts are identified using a variety of methods, including but is not limited to, fencing, reduction in livestock numbers, and changes in grazing season. Proposed projects in the area will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced.

Summary of Key RNA and Relevant and Important Values Evaluated for ACEC/RNA Designation

2002 SEORMP ACEC/RNA Designation

The relevant and important value of the ACEC/RNA is the big sagebrush-antelope bitterbrush/Idaho fescue vegetation cell as identified by ONHP.

2015 Greater Sage-grouse ARMPA

The South Bull Canyon ACEC/RNA was identified as a key RNA for sagebrush plant communities that are important for Sage-grouse.

[2] The South Bull Canyon ACEC/RNA was originally identified in the 2002 SEORMP ROD as containing 792 acres of public lands in the Malheur Field Office; the entire RNA was identified in the 2015 ARMPA as a Key RNA, of which 747 acres were allocated as unavailable for livestock grazing. The original boundary was updated on the west to the existing pasture boundary (fenceline) and on the north and east to the existing primitive route. This adjustment reduced the total acres in the ACEC/RNA to 770 acres. The adjustment also increased by two acres to 749 the area allocated as unavailable for livestock grazing.

Updated Vegetation Communities and Sage-Grouse Habitats

Wyoming big sagebrush-antelope bitterbrush/Idaho fescue plant association is represented in the South Bull Canyon ACEC/RNA.

Vegetative communities in this key RNA that are important to Greater Sage-grouse habitat continue to be relatively unaltered. These are Wyoming big sagebrush-antelope bitterbrush/Idaho fescue plant association. This community represents the Cool-Moist Sagebrush community. The southern portion of the South Bull Canyon ACEC/RNA burned in the 2016 Sheep Rock Fire. Due to the reduced abundance of these species following the Juntura Complex Fires in 2016, 176 acres in the burned area were planted in the fall of 2017 with sagebrush and bitterbrush seedlings during Emergency Stabilization and Rehabilitation efforts (BLM Vale District Office. 2016. BLM Oregon Post-Fire Recovery Plan: Emergency Stabilization and Burned Area Rehabilitation Juntura Complex Fire). The entire South Bull Canyon ACEC/RNA was aerially treated with the preemergent herbicide imazapic in 2022 to reduce invasive annual grasses in the area.

The key RNA is within PHMA and is in the Crowley Priority Area of Conservation. There are two active leks within 1.2 miles of the key RNA; seven active leks within two miles; and nine active and one pending active lek within four miles of the key RNA.

Other Resources

The South Bull Canyon key RNA is wholly within the Prava Peak (OR-034-042) lands with wilderness characteristics unit and is located in the northwest corner of the Prava Peak unit. The 20,654-acre Prava Peak unit possesses naturalness and is contiguous with three WSAs, and shares their outstanding opportunities to experience solitude, and primitive and unconfined recreation. Elevations range from about 4,140 to 5,690 feet (Monument Peak). Existing human imprints in the unit are: 14 earthen reservoirs, four developed springs, 23.2 miles of rangeland fence, one rangeland fenced enclosure, and 43.5 miles of 22 primitive route segments, all of which appear substantially unnoticeable to the average visitor. Supplemental values in the unit include Greater Sage-grouse leks and their habitat.

The key RNA is utilized by mule deer during spring and summer, pronghorn year-round, and is designated as elk winter range. This area is not classified as an ODFW PWCA. Many migratory birds nest in the area, including many sagebrush obligates such as Brewer's sparrow and sagebrush sparrow, as well as other sagebrush-associated species such as golden eagles and loggerhead shrikes. Many more bird species move through the area during migration. Although habitat potential exists for pygmy rabbits, no known populations exist here.

Rationale for Proposing Alternative that Modifies Key RNA Management

Rationale for Retaining the Key RNA under All Alternatives

The area continues to be in a desirable condition for the vegetative communities identified (BLM. Monitoring data. 05/31/2017;BLM. Monitoring data. 06/28/2020). Although the area burned in 2012 and 2015, the application of herbicide in 2015 prevented the increase of invasive annual grasses that often follow multiple fires. Management would continue to protect the relevant and important values. Herbaceous vegetative communities important to Greater Sage-grouse are present throughout the key RNA, although shrub components have been impacted by past wildfires in the southern portion of the area. Prior to the removal of grazing from this key RNA, there was no indication of negative impacts from livestock grazing to the vegetative communities identified as important for Greater Sage-grouse or the relevant and important values for which the RNA was designated.

Management would retain the ONHP-identified vegetation communities identified as relevant and important and the cool/moist vegetation communities identified under the 2015 ARMPA that are important for sage-grouse and for research purposes. Sagebrush communities of the key RNA provide for suitable nesting, brood-rearing, and winter habitat for Greater Sage-grouse.

Rationale for Modifying the Area Allocated as Unavailable for Livestock Grazing

The proposed, 257-acre livestock exclosure, still within the key RNA, would locate fencing greater than 1.2 miles from active or pending active Greater Sage-grouse leks. This fencing would be constructed by hand.

Reallocating livestock grazing to the remaining, unexclosed area of the key RNA would reduce the impacts to wilderness characteristics from non-infrastructure methods (e.g., decisions that direct the permittee actively manage livestock to avoid incursion). The exclosure would enable the BLM to retain opportunities for research that includes control areas ungrazed by livestock. Relevant and important vegetative communities identified for the key RNA as important for Greater Sage-grouse are relatively unaltered within the excluded area.

The smaller exclosure excludes the portion of the key RNA that burned in 2016 and which was planted with bitterbrush and sagebrush. The seed source for the plants is not from the vegetation within or directly adjacent to the key RNA. The genetics are therefore different and may not represent the local genetics and could impact a research study. This key RNA has one vegetation community present: Wyoming big sagebrush-antelope bitterbrush/Idaho fescue plant association; this community is present in the smaller exclosure area.

Environmental Consequences

Consequences Common to all Alternatives

Vegetative communities that are important to Greater Sage-grouse habitat would continue to be available for provide baseline data on relatively unaltered plant community types important to Greater Sage-grouse.

Alternatives 1 and 4

Keeping livestock out of the area allocated as unavailable for livestock grazing would require the additional presence and resources of the grazing operator or construction of an exclosure fence. There could be long-term impacts to solitude and primitive and unconfined recreation caused by active management to exclude livestock from the key RNA. Constructing fences to keep livestock out would not conform with the 2015 ARMPA (Management Direction MD LG 10 and RDF Livestock Grazing No. 7). Two leks with "active" or "pending active" status occur less than 1.2 mile from the area boundary with the closest lek occurring approximately 0.5 miles away. A conservation benefit to Greater Sage-grouse or important habitat is not expected from construction of a fence to eliminate livestock grazing due to the current condition of the vegetative communities prior to and after the removal of livestock from the area. Other wildlife noted to use the area may be negatively impacted, at least seasonally due to increased human presence when managing livestock from entering areas unavailable for livestock use, or in the short-term (1-3 years) due to construction of new fence to exclude livestock from these areas. Additionally, there are no allowed variations to the RDF that would fall within the requirements described in Appendix C,. As a fence within 1.2 miles of leks poses a collision hazard, and the area that would be protected from grazing had previously been properly grazed, which USFWS has said is compatible with GRSG conservation, there is no conservation benefit to GRSG from placing a fence within 1.2 miles of a lek. While research in a fenced, ungrazed area could provide data and insights that could benefit GRSG habitat management, this benefit is not only difficult to measure but would not outweigh the fence collision risk for GRSG.

Alternative 2

Because the entire area would be allocated as available for livestock grazing, there would be no need for fencing or active livestock management (herding). The wilderness characteristic of naturalness would not be impaired under this alternative, either short-term or long-term, any more than it had been at the time that this unit was identified as one with wilderness characteristics. Fence-related conflicts would not occur.

Alternative 3

Because livestock grazing would not occur in the vicinity of this key RNA, there would be no need for fencing or active livestock management (herding). The wilderness characteristic of naturalness would not be impaired under this alternative either short-term or long-term. Fence-related conflicts would not occur. An ungrazed reference for research would be retained.

Alternatives 5, 6, and Proposed RMP Amendment

Allocating the southern portion of the key RNA as available for livestock grazing would allow livestock grazing to return to 513 acres of the key RNA which contains the majority of reliable water sources for the Upper Field of the Boney Basin allotment. If the area is not fenced, additional presence and resources of the grazing operator would be required for active management in order to keep livestock out of the unfenced area.

If the 257-acre area allocated as unavailable for livestock grazing is fenced, impacts to livestock management would be minimized as available water sources would remain available for use throughout the remaining portions of the Upper Field pasture. A fence surrounding the area allocated as unavailable for livestock grazing would have minor effects on the movement of big game through the area. The Oregon Conservation Assessment Mapping Program did not consider this area a high priority for wildlife movement, and therefore it was not designated as a Priority Wildlife Connectivity Area. The risk to big game movement would be minimized by using wildlife-friendly fence design, as big game would be able to move more easily under, over, and through the fence.

Constructing the fence would cause temporary disturbance to migratory bird habitat. Minor damage to sagebrush within the disturbance area could destroy nesting habitat, but fence construction by hand – particularly where the new fence construction is along the existing boundary road for the key RNA - generally doesn't damage much vegetation. If constructed during nesting season, some individuals could be displaced at the time, but the effects of temporary minor habitat disturbance to the overall population of migratory birds would be negligible.

Similar to migratory birds, if a fence is constructed during breeding or nesting season it could disturb sage-grouse nesting habitat or temporarily displace nesting sage-grouse. Minor damage to sagebrush could occur but fence construction by hand generally doesn't damage much vegetation. Restricting activity during those months to two hours after sunrise to two hours before sunset would minimize this disturbance. A fence is this area is not modeled as high collision risk for sage-grouse. However, if monitoring suggests collisions could occur, anti-strike fence markers could reduce the risk.

Returning livestock grazing to the remaining 513 acres of the key RNA would not cause measurable impacts to big game or migratory birds.

Outstanding opportunities for solitude and unconfined and primitive recreation would be impacted in the short-term by fence construction. The long-term negative effects to naturalness caused by the addition of fencing would be the additional structures in the Prava Peak wilderness characteristics unit. If encounters

with visitors occur during construction of the proposed fence, they may be temporarily disruptive to visitors who may be in the proximity, but this adverse impact would be brief.

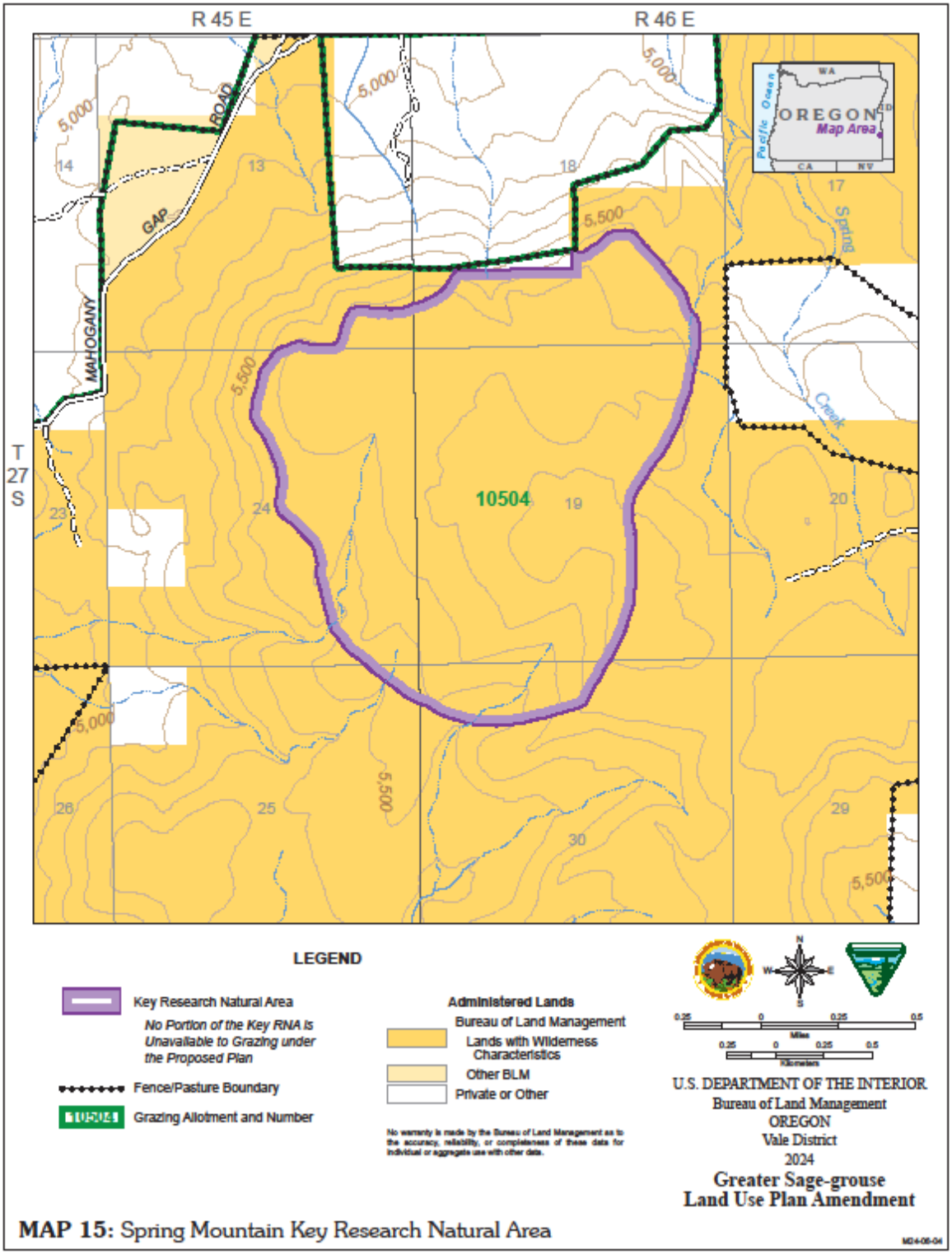
The VRM in the project area is Class II. A fence would affect the existing visual quality within the area, but would meet the existing visual resource management objectives for the surrounding area.

Spring Mountain (Vale)

Proposed RMP Amendment

Retain the area identified as a key RNA and reallocate the entire key RNA as available for livestock grazing. Construct a 5-acre or less exclosure that would remove livestock use and other permitted activities to allow for nonmanipulative research and baseline data gathering within the key RNA or within close proximity to the key RNA to allow for ungrazed comparison areas for evaluating effects of livestock on those vegetative communities identified as important for greater sage-grouse within the Spring Mountain key RNA. The location, size, and design of the exclosure site would adhere to variations in lek buffers and required designed features as specified in Appendices B and C of the Oregon 2015 GRSG Approved RMP Amendment.

Map 15. Spring Mountain Key Research Natural Area



Affected Environment

The 996-acre Spring Mountain ACEC/RNA is located west of U.S. Highway 95 and north of Jordan Valley, covering a portion of the top of Spring Mountain east of Mahogany Mountain. The top of the mountain is a mix of mountain big sagebrush/Idaho fescue steppe in areas with deep soils. The northern portion of the ACEC/RNA is composed of steep, talus scree. This area supports stands of western chokecherry, whortleleaf snowberry, Saskatoon serviceberry, and Lewis' mock orange. The scree tops out to a larger, relatively flat tableland dominated by diverse, large low sagebrush scablands.

The Spring Mountain key RNA is located in the Spring Mountain Native Range pasture of the Spring Mountain allotment. This area contains the majority of the access routes for livestock from one side of the pasture to the other in the upper elevations. The developed Aspen Grove Spring is a critical water source along these routes for livestock. Steep and extremely rocky slopes descend over 1000 feet in elevation to the lower pasture boundaries. Access and travel along the steep rocky slopes are limited to livestock/wildlife and are extremely difficult. The north and east sides of the pasture have fenced private land inholdings that are either partially or entirely within the pasture boundary, further compounding access and travel issues. The key RNA is centrally located in the northern portion of the "top" of Spring Mountain, creating numerous issues with access and travel routes for livestock. There is one AIM plot within the area available for livestock grazing.

The key RNA occurs within the highest elevations of the Spring Mountain Native Range pasture, and in an area where topography allows for feasible movement of livestock within and throughout the Spring Mountain Native Range pasture, as well as to other pastures within the Spring Mountain allotment. Fencing is expected to be difficult to construct due to the talus slopes and would also require above-normal (annual) maintenance by BLM due to weather conditions (evidence of natural snowbanks are common) as well as a result of anticipated damage by elk and other big game. The area is reported to have significant use by elk traveling between Oregon and Idaho ranges.

To achieve the orderly administration of livestock grazing management, throughout that season of use, livestock operators are authorized to move livestock through the key RNA, utilizing existing trailing routes. Trailing occurs to access to BLM pastures within both the Spring Mountain and adjacent allotments, as well as private lands within the Spring Mountain allotment boundary.

Specific Management under the 2002 SEORMP ROD, as Amended

The area is closed to OHV use. Plant collecting requires a permit. VRM class is Class III. Livestock use allocations will continue based on existing permit stipulations and approved AMP's, unless modified under subsequent land use planning. Any proposed changes in livestock grazing, including time and intensity of use, will be evaluated for impacts on the relevant and important values and will be permitted if values will be maintained or enhanced. Existing livestock use allocations will be adjusted where adverse impacts are identified using a variety of methods, including but not limited to, fencing, reduction in livestock numbers, and changes in grazing season. Proposed projects in the area will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced.

Summary of Key RNA and Relevant and Important Values Evaluated for ACEC/RNA Designation

2002 SEORMP ACEC/RNA Designation

The relevant and important values of the ACEC/RNA are the mountain big sagebrush/Idaho fescue, low sagebrush/bluebunch wheatgrass, and riparian community dominated by peachleaf willow and coyote willow

with quaking aspen/whortleleaf snowberry vegetation cells identified by ONHP. There are several quaking aspen patches associated with springs and north-facing talus slopes within the ACEC/RNA.

2015 Greater Sage-grouse ARMPA

The Spring Mountain ACEC/RNA was identified as a key RNA for sagebrush plant communities that are important for Sage-grouse.

Updated Vegetation Communities and Sage-Grouse Habitats

Vegetation communities represented in this key RNA include mountain big sagebrush/Idaho fescue community, mountain big sagebrush/mountain snowberry/Idaho fescue, mountain mahogany/chokecherry scrub (Prunus virginiana), and relatively flat tableland, dominated by low sagebrush/bunchgrass scabland community. Quaking aspen and bitter cherry communities dominate the springs.

Vegetation communities represented in this key RNA that are important to Greater Sage-grouse habitat continue to be provide life-cycle needs (such as nesting, brood rearing, wintering) despite being burned in a wildfire in 2007. Vegetative communities consist of mountain big sagebrush/Idaho fescue community, mountain big sagebrush/whortleleaf snowberry/Idaho fescue, chokecherry scrub (*Prunus virginiana*), and relatively flat tableland, dominated by low sagebrush/bunchgrass scabland community; however, sagebrush species are limited due to effects of wildfire. These communities represent the Cool-Moist Sagebrush, Dry-Shallow Sagebrush, and Riparian community types.

The chokecherry scrub (*Prunus virginiana*) plant community in this key RNA is not suitable habitat for sage-grouse because the growth structure of the dominant species is more tree like, providing no understory cover and providing perch opportunities for predators. This represents the Mountain Shrub community. The entirety of Spring Mountain ACEC/RNA burned in the 2007 Old Maid Fire. While there are some islands of sagebrush that did not burn in the fire, the majority of the ACEC/RNA lost the sagebrush component due to the fire. While some diverse vegetation communities important to Greater Sage-grouse habitat are still present within the key RNA, they are limited to unburned islands and riparian areas. The burned areas are now composed mainly of perennial bunchgrasses. Monitoring shows a strong component of native grasses and forbs present in the ACEC/RNA.

Other Resources

The Spring Mountain key RNA is wholly within the Spring Mountain lands with wilderness characteristics unit and is located in the northern portion of the Spring Mountain unit. The 18,311-acre Spring Mountain unit possesses naturalness, and outstanding opportunities to experience solitude. Elevations range from 4,565 to 5,987 feet within the unit. The unit contains the 5,987-foot tabletop mountain known as Spring Mountain. Existing human imprints in the unit include 10.9 miles of rangeland fence, 11.2 miles of 10 primitive routes,19 developed springs, 2 pipelines totaling 2.7 miles and an associated trough, all of which appears substantially unnoticeable to the average visitor. The BLM decided not to prioritize protection of the wilderness characteristics in the Spring Mountain unit (BLM 2024a, Appendix A, p. A-4).

The visual resource management is Class II.

The key RNA is within PHMA and is part of the Cow Lakes Priority Area of Concentration. It is included within the boundary of Greater Sage-grouse spring nesting, summer brood-rearing, and winter habitat. One site within the key RNA has been evaluated using the Greater Sage-grouse Habitat Assessment Framework (HAF). It had an abundance of perennial grasses but almost no sagebrush. The site was determined to be marginally suitable for spring nesting habitat and unsuitable for winter habitat. There are two pending active

leks approximately 1.2 miles from the key RNA boundary; and 11 active and 4 total pending active leks within 4 miles of the key RNA.

The Spring Mountain key RNA is essential year-round range for pronghorn. It is utilized by deer, elk, and pronghorn throughout the year. ODFW's Oregon Connectivity Assessment and Mapping Project (OCAMP) categorized this area as a Priority Wildlife Connectivity Area (PWCA) – Region. Regions are the top 1% of connectivity priorities and represent the highest-value habitat for facilitating species movement. In addition, this area has a priority Recommended Conservation Action of 'Protect,' the strongest conservation measure for maintaining wildlife connectivity.

Aspen Grove Spring is the only flowing spring within the key RNA. It is developed with a trough for livestock water. Outside the key RNA, the nearest springs include the following developed springs: Old Maid Spring to the southeast, Gap Spring the northwest, and Lunch and Chukar Spring to the northeast. Several undeveloped springs occur in the vicinity as well, most notably the undeveloped Old Maids Basin Spring Complex just south of the key RNA. This spring complex was rated as Functioning-at-risk (FAR) using the Proper Functioning Condition protocol (PFC Assessment Form (Lentic) completed for the Old Maid Basin Spring Complex by Cloud, Dugan, Ketcham, and Wilson, 09/16/21), with the main compromising characteristics being hummocks in spring heads, eroded banks, and a large headcut in the lotic portion. Even though it is rated FAR, the Greater Sage-grouse HAF site-scale evaluation of the spring complex rated it as suitable late brood-rearing habitat based on a high diversity and abundance of sage-grouse preferred forbs, and high perennial herbaceous plant cover mixed with areas of sagebrush and other shrubs in the uplands for shelter.

Rationale for Proposing Alternative that Modifies Key RNA Management

Rationale for Retaining the Key RNA under All Alternatives

The area continues to be in a desirable condition, notwithstanding being burned by wildfire in 2007. The area continues to recover and provides opportunities for research where natural recovery post-fire is occurring.

The entire key RNA burned in 2007, eliminating the majority of the sagebrush within the area. However, the area continues to be in a desirable condition, notwithstanding being burned by wildfire in 2007. The area continues to recover and provides opportunities for research where natural recovery post-fire was allowed to occur. The area remains composed of diverse vegetation community types of native bunch grasses, snowberry, and riparian areas that are important to Greater Sage-grouse. In the long-term, and upon full recovery from the 2007 fire, some occurrence of vegetative communities including Cool-Moist Sagebrush, Shallow-Dry Sagebrush, and Mountain Shrub, and Riparian are expected to be represented. Use by Greater Sage-grouse within the key RNA has not been documented.

Management would continue to protect the relevant and important values of the RNA. Opportunities for nonmanipulative research and baseline data gathering on plant community types relatively unaltered by human activity continue to remain, along with vegetative communities identified as important for greater sage-grouse, due to the remote and rugged nature of the area. Prior to the removal of grazing from this key RNA, there was no indication of negative impacts from livestock grazing to the vegetative communities identified as important for Greater Sage-grouse or the relevant and important values for which the RNA was designated.

Rationale for Reallocating the Area as Available for Livestock Grazing under Proposed RMP Amendment

On-the-ground site specific visits revealed remote and rugged terrain that would be challenging for the construction of new fencing. Fencing is expected to be difficult to construct due to the talus slopes and would also require above-normal (annual) maintenance by BLM due to weather conditions (evidence of natural snowbanks are common) as well as anticipated damage by elk and other big game. The area is reported to have significant use by elk traveling between Oregon and Idaho ranges.

Excluding livestock from the area currently allocated as unavailable for livestock grazing without construction of new physical barriers would require higher levels of BLM and permittee management. Similarly constructing and maintaining new fencing in this area would require time and resources that would reduce BLM's ability to allocate resources to other projects and other areas.

Reallocation would eliminate increased commitments of management investments (time, materials, etc.) for BLM and the livestock operators in the key RNA and allotment. Both parties would have improved opportunities to allocate resources to higher priorities within the allotment such as range improvement projects and maintenance. Reallocation of livestock grazing would reduce socio-economic effects to livestock operators by eliminating the potential reduction of AUMs associated with Alternative 1.

The location of the area currently unavailable for livestock use (and under Alternative 1) impacts trailing routes used for moving livestock between other portions of the Spring Mountain Native Range pasture as well as other pastures within the Spring Mountain allotment.

Allocating the area as available for livestock grazing would eliminate the need for fencing or other management actions that impact feasible livestock movement and distribution due to the limited number of developed water sources in the area.

While some sagebrush communities are still present, the majority of the key RNA is now grassland. Livestock using the key RNA if it were reallocated as available for livestock grazing would concentrate in areas where the best forage is available, which would be the portions of the key RNA with high perennial grass cover. Thus, the livestock would not concentrate on the remaining islands of sage-grouse habitat.

Environmental Consequences

Consequences Common to all Alternatives

Vegetative communities that are important to Greater Sage-grouse habitat would continue to be available for provide baseline data on relatively unaltered plant community types important to Greater Sage-grouse.

Alternatives 1 and 4

Under these alternatives, there would be either the construction of a fence or increased human presence needed to prevent livestock incursion into the key RNA. Either would disrupt wildlife, particularly big game such as elk that are known to occur within the Spring Mountain key RNA and associated Spring Mountain Native pasture.

Vegetative communities important to greater sage-grouse within the area where livestock are removed is expected to have a positive response. Due to the central location of the Key RNA within the pasture, shifts in grazing use to other portions of the pasture may have negative impacts if changes in grazing systems or management practices are not adjusted as a result of excluding livestock from the Key RNA, which is allocated as unavailable for livestock use in its entirety.

Aspen Grove spring would no longer be available as a livestock water source and, if permitted AUMs were not reduced or other adjustments to grazing systems did not occur, displaced livestock would need to find alternative water sources to replace it. The replacement of an existing water development with the construction of a new one would result in an increased level of disturbance in the short-term, including impacts to vegetation and soils, and long-term impacts to livestock management and upland and riparian resources due the water development itself and the resulting modified livestock grazing distribution. Short-term impacts would range between 1.79 and 3.04 acres, and long-term impacts would range between 0.76 and 1.53 acres, depending on the extent of new water development and/or existing water development replacement.

The need for management actions for livestock exclusion would result in disturbance to wildlife, including sage-grouse and large ungulates. The Oregon Department of Fish and Wildlife identified this area as important habitat for wildlife movement (Oregon Connectivity Assessment and Mapping Project. 2023. Oregon Department of Fish and Wildlife, Salem, OR. The addition of a fence or increased presence of livestock operators would hinder or alter wildlife movement although impacts are not expected to be significant if design features that reduce negative effects to wildlife are put in place. Additionally, there is the opportunity for fence related conflicts (e.g. bird collisions and entrapments).

Livestock crossing permits would need to be issued on an annual basis; these permits would be limited to a one-day crossing on identified routes for each requested application (up to an average of four times annually), depending on the annual livestock grazing schedule and rotation. These actions are not expected to cause additional impacts (negative or positive) to vegetation or soils due to the activity occurring primarily on existing roads or trails.

Unless AUMs were reduced, grazing rotations are adjusted, and/or additional infrastructure such as water developments and fences are constructed, livestock displaced from the key RNA would disperse to adjacent unburned sagebrush and abundant riparian areas, thus increasing livestock concentration in good quality sagebrush and riparian habitat. These activities may have impacts to other resource values as well, which would be determined through implementation-level analysis and additional monitoring to determine impacts to the portions of the pasture that remain available for livestock use.

The construction of fencing would decrease the sense of naturalness, a wilderness characteristic. Fence construction or the need for additional active livestock management (e.g., herding) would create short-term impacts to outstanding Opportunities for Solitude during fence construction or longer-term impacts caused by active management to exclude livestock from the key RNA.

Alternatives 2, 5, and 6

Because the entire area would be allocated as available for livestock grazing, there would be no need for fencing, active livestock management (herding), crossing permit authorizations, or water developments for livestock. Impacts to vegetative communities, riparian areas, or wildlife would not occur as infrastructure and/or increased human presence to deter livestock incursions within the Key RNA would not be required. Changes in livestock grazing management to address possible impacts to relative and important values within the Key RNA, if caused by livestock, would continue to be allowed. The wilderness characteristics of naturalness, outstanding opportunities for solitude, and unconfined primitive recreation would not be impaired under this alternative, either short-term or long-term, any more than it had been at the time that this unit was identified as one with wilderness characteristics.

Although research opportunities would remain, a designated area for non-manipulative research (aka control area) would not be established at this time. However, this does not prevent the opportunity to construct a 5-acre or less exclosure to remove livestock and other permitted activities to allow for non-manipulative research site or a control area, as long as the location of the infrastructure meets required specifications of Appendix B and C of the 2015 ARMPA.

These alternatives would allow livestock grazing to resume within the key RNA and would not require management actions to keep livestock from entering the Spring Mountain key RNA. Prior to grazing being removed from this key RNA, there was no indication of negative impacts from livestock grazing to the vegetative communities identified as important for Greater Sage-grouse or the relevant and important values for which the RNA was designated (BLM. Monitoring data. 05/31/2017; BLM. Monitoring data. 07/07/2020). Even with disturbance from fire, and with livestock use present, vegetative condition remained adequate to support studies of long-term natural processes, particularly recovery post-fire (BLM. Monitoring data. 05/31/2017; BLM. Monitoring data. 07/07/2020).

All existing water sources would be available for livestock and an additional water development elsewhere within the Spring Mountain Native pasture would not be necessary, resulting in no new disturbances to soils, vegetation, and associated wildlife habitats.

The wilderness characteristic of naturalness would not be impacted because new fence construction or increased presence of humans would not occur under the Proposed RMP Amendment. Outstanding opportunities for solitude would not be impacted as short-term impacts to solitude caused by fence construction would not occur. Long-term impacts to solitude caused by active management to exclude livestock from key RNA would also not occur. The return of livestock grazing to the area would not impact naturalness to the extent that it would no longer be present as cows were on the landscape when these wilderness characteristics were identified.

Livestock use occurring as a result of reallocating the key RNA as available for livestock grazing would likely be in the areas where the best forage species are available; this is the burned areas where there are abundant perennial bunchgrasses, rather than in the remaining islands of sagebrush where grasses may be present but are much more limited; such use would not be concentrated on the vegetative communities identified as important for greater sage-grouse.

Reallocating livestock grazing to the key RNA would eliminate the need for fencing or additional active livestock management (e.g., herding) to avoid livestock incursion into the key RNA. The reallocation of the area as available for livestock grazing would not impact the wilderness characteristic of naturalness beyond that which was present when this characteristic was identified. Further, naturalness would not be impacted by new fence construction or the additional presence of people. Outstanding opportunities for solitude would remain as short-term impacts to solitude caused by fence construction and long-term impacts to solitude caused by active management to exclude livestock from key RNA would not occur.

Alternative 3

Because livestock grazing would not occur in the vicinity of this key RNA, there would be no need for fencing or active livestock management (herding). Wilderness characteristics of naturalness, opportunities for solitude, or primitive and unconfined recreation would not be impaired under this alternative, nor would there be any short-term disturbances to these characteristics caused by fence construction. Fence-related conflicts would not occur. An ungrazed reference for research would be retained.

Proposed RMP Amendment

The construction of a 5-acre or less exclosure that would remove livestock use and other permitted activities would allow for nonmanipulative research and baseline data gathering within close proximity to the key RNA. This would allow for ungrazed comparison areas for evaluating effects of livestock on those vegetative communities identified as important for greater sage-grouse within the Spring Mountain key RNA. The location, size, and design of the exclosure site would adhere to variations in lek buffers and required designed features as specified in Appendiees B and C of the Oregon 2015 GRSG Approved RMP Amendment. There would be at least short-term impacts from fence construction outside of, but near to, the key RNA which may affect wildlife and wilderness characteristics. However, in the long-term he wilderness characteristics of naturalness, outstanding opportunities for solitude, and unconfined primitive recreation would not be impaired under this alternative any more than they had been at the time that this unit was identified as one with wilderness characteristics.

Reallocating the entire key RNA as available for livestock grazing would allow for the resumption of management practices employed prior to 2023. Prior to the removal of grazing from this key RNA, livestock grazing management prescribed had not adversely impacted the important vegetative communities identified for the Greater Sage-grouse.

Because the entire key RNA would be allocated as available for livestock grazing, there would be no need for fencing, active livestock management (herding), crossing permit authorizations, or water developments for livestock. Impacts to vegetative communities, riparian areas, or wildlife would not occur as infrastructure and/or increased human presence to deter livestock incursions within the Key RNA would not be required. Changes in livestock grazing management to address possible impacts to relative and important values within the Key RNA, if caused by livestock, would continue to be allowed. The wilderness characteristics of naturalness, outstanding opportunities for solitude, and unconfined primitive recreation would not be impaired under this alternative, either short-term or long-term, any more than it had been at the time that this unit was identified as one with wilderness characteristics.

All existing water sources would be available for livestock and an additional water development elsewhere within the Spring Mountain Native pasture would not be necessary, resulting in no new disturbances to soils, vegetation, and associated wildlife habitats.

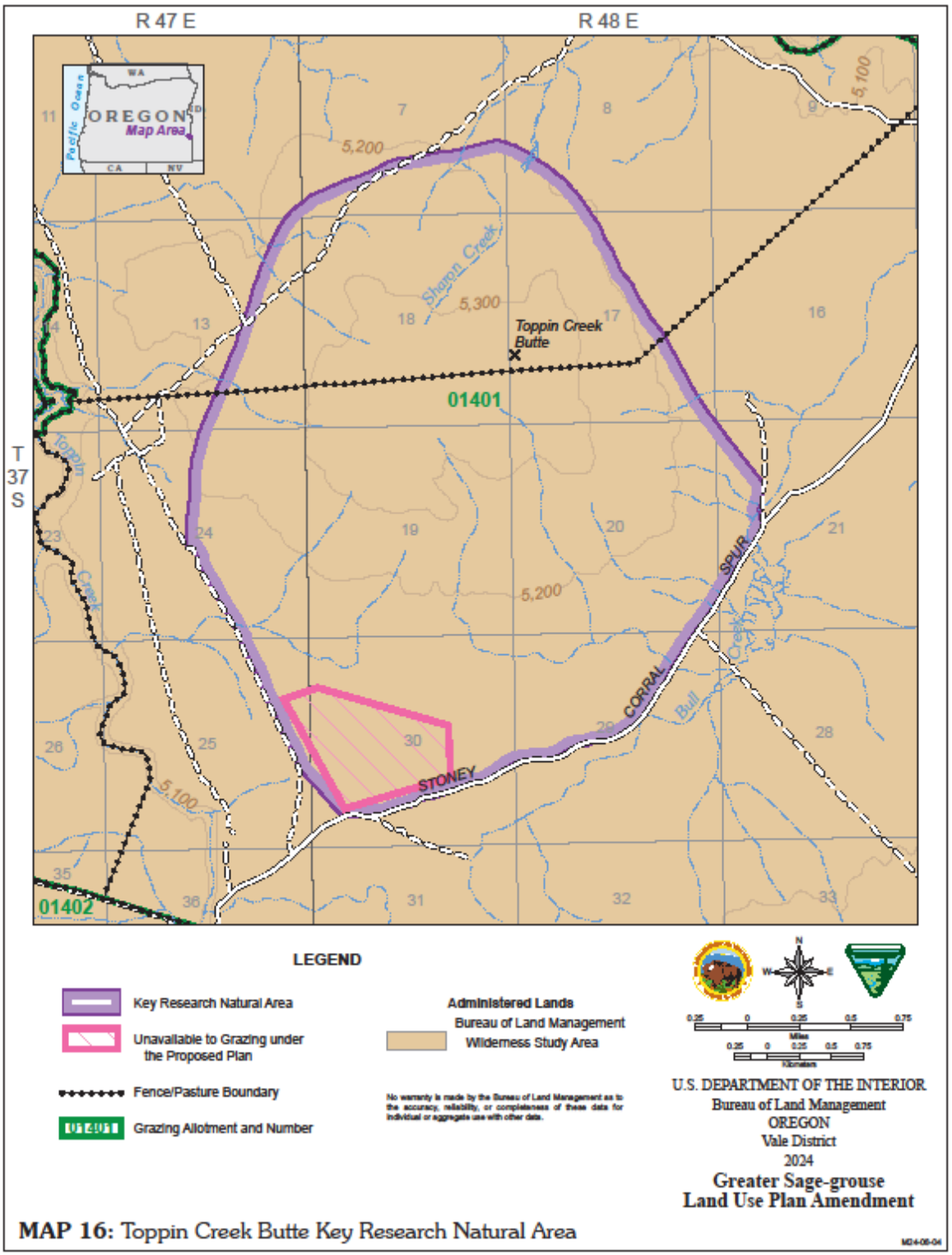
Livestock use occurring as a result of reallocating the key RNA as available for livestock grazing would likely be in the areas where the best forage species are available; this is the burned areas where there are abundant perennial bunchgrasses, rather than in the remaining islands of sagebrush where grasses may be present but are much more limited; such use would not be concentrated on the vegetative communities identified as important for greater sage-grouse.

Toppin Creek Butte (Vale)

Proposed RMP Amendment

BLM proposes no changes to the key RNA boundary, but has reduced the area allocated as unavailable for livestock grazing from 2,865 acres to 203 acres to reduce conflicts with other resources. The smaller exclosure would still maintain the vegetation communities that are important to Greater Sage-grouse habitat.

Map 16. Toppin Creek Butte Key Research Natural Area



Affected Environment

The 3,998-acre Toppin Butte ACEC/RNA is located 30 miles northeast of McDermitt, Nevada, and adjacent to the Idaho state line. The topography includes a gently sloping hill with a rapidly draining soil. Little water has been available for livestock on the Butte, and the topography still limits livestock use on the upper slopes. Two playas at the base of Toppin Butte contain a bare playa vegetation community and a silver sagebrush community. The key RNA is located in portions of Owyhee River Canyon WSA. The southern portion (2,865 acres) of the ACEC/RNA is allocated under the 2015 ARMPA as unavailable for livestock grazing.

Specific Management under the 2002 SEORMP ROD, as Amended

OHV use is limited to designated roads and trails. The area is VRM Class I. Plant collecting requires a permit. Road maintenance will be limited to the existing roadway, and shoulder/barrow ditch construction will be limited to that necessary to control runoff, minimize soil erosion, and ensure public safety and serviceability of the road. Surface-disturbance will be deferred while soils are wet, and any future rehabilitation will be with local source native plant species. Livestock use allocations will continue based on existing permit stipulations and approved AMPs, unless modified under subsequent land use planning. Any proposed changes in livestock grazing, including time and intensity of use, will be evaluated for impacts on the relevant and important values and will be permitted if the values will be maintained or enhanced. Existing livestock use allocations will be adjusted where adverse impacts are identified using a variety of methods, including, but not limited to, fencing, reduction in livestock numbers, and changes in grazing season. Proposed projects in the area will be evaluated for impacts and permitted where relevant and important values will be maintained or enhanced. Noxious weeds will be aggressively controlled using limited methods, such as backpack hand sprayers, focusing on roads and other disturbed areas in and adjacent to the ACEC/RNA.

Summary of Key RNA and Relevant and Important Values Evaluated for ACEC/RNA Designation

2002 SEORMP ACEC/RNA Designation

The relevant and important values of this ACEC/RNA are the low sagebrush/bluebunch wheatgrass community in excellent condition and low sagebrush/Idaho fescue plant community vegetation cells identified by the ONHP.

2015 Greater Sage-grouse ARMPA

The Toppin Creek Butte ACEC/RNA was identified as a key RNA for sagebrush plant communities that are important for Sage-grouse.

Updated Vegetation Communities and Sage-Grouse Habitats

Vegetation communities present in this key RNA include low sagebrush/Idaho fescue, low sagebrush/bluebunch wheatgrass, silver sagebrush/Sandberg's bluegrass plant communities. In addition, bare playa, Wyoming big sagebrush and basin big sagebrush communities are also present in the key RNA though not identified in the 2015 ARMPA.

Vegetation communities represented in this key RNA that are important to Greater Sage-grouse habitat continue to be relatively unaltered. These communities are low sagebrush/Idaho fescue, low sagebrush/bluebunch wheatgrass, silver sagebrush/Sandberg's bluegrass, and Wyoming sagebrush plant communities. These communities represent the Cool-moist/Warm-Dry Sagebrush, Shallow-Dry Sagebrush, and playa communities. The key RNA is within Greater Sage-grouse Priority Habitat Management Area (PHMA)); two pending active leks are within two miles of the key RNA boundary, one of which is located inside the key RNA. The western side of Toppin Creek Butte ACEC/RNA burned in the 2013 Sharon Creek Fire. In the burned area there are islands of sagebrush habitat which did not burn. Monitoring has indicated

invasion of cheatgrass post fire has occurred but is isolated and minimal (2018 Louse Canyon GMA Land Health Assessment and Evaluation).

Other Resources

Toppin Creek Butte key RNA is 3,998 acres and is located wholly within the Owyhee River Canyon WSA. The WSA's outstanding opportunities for solitude are attributed to the isolated, intimate seclusion of canyonlands and the vastness of seemingly undisturbed desert plateau lands and distant mountain ranges. The Main Owyhee River and West Little Owyhee River are designated portions of the National Wild and Scenic River System (NWSRS) and flow through the Owyhee River Canyon WSA. River running opportunities are of exceptionally high quality and considered nationally significant. The scenic natural features and diversity of rugged landforms attract people interested in hunting, fishing, backpacking, sightseeing, outdoor photography, and wildlife viewing.

There is one population of mesamint (*Pogogyne floribunda*), a Bureau sensitive plant, located at the eastern edge of the key RNA. This population straddles Stoney Corral Spur Road.

The key RNA is designated as bighorn sheep occupied habitat.

The visual resource management is Class II (BLM 2002, p. 71).

Rationale for Proposing Alternative that Modifies Key RNA Management

Rationale for Retaining the Key RNA under All Alternatives

The area continues to be in a desirable condition for the vegetative communities identified; management will continue to protect the relevant and important values. Prior to the removal of grazing from this key RNA, there was no indication of negative impacts from livestock grazing to the vegetative communities identified as important for Greater Sage-grouse or the relevant and important values for which the RNA was designated.

Existing management would retain the following vegetation types important to Greater Sage-grouse: Cool-Moist/Warm-Dry Sagebrush, Shallow-Dry Sagebrush, and Playa.

Rationale for Modifying the Area Allocated as Unavailable for Livestock Grazing

Exclosure fence construction in the WSA is an issue that would be addressed with the proposed modification for the area allocated as unavailable for livestock grazing. Developments that would "impair the suitability of WSAs for the preservation as wilderness" cannot be permitted unless they were to meet one of the exception criteria described in BLM Manual 6330, Management of Wilderness Study Areas. "In determining whether a development meets the protecting or enhancing wilderness characteristics exception, the BLM will determine if the structure's benefits to the natural functioning of the ecosystem outweigh the increased presence of human developments and any loss of naturalness, or outstanding recreational opportunities caused by the new development" (BLM 2012, p. 1-17). However, developments that meet an exception criterion must still be carried out in the least impairing manner practical.

The location of the 203-acre exclosure under this alternative is within intact sagebrush communities that were not impacted by wildfire. Making this area unavailable for livestock grazing would reduce the impacts of fencing or increased management presence in the Owyhee River Canyon WSA required to implement the closure. Disturbance in the WSA from fencing would be reduced compared to Alternative 1 with half of this distance occurring along the existing key RNA road boundary.

Environmental Consequences

Consequences Common to all Alternatives

Vegetative communities that are important to Greater Sage-grouse habitat would continue to be available for provide baseline data on relatively unaltered plant community types important to Greater Sage-grouse.

Alternatives 1 and 4

The current active management of livestock to keep them out of the key RNA impacts opportunities for solitude and primitive and unconfined recreation within the Owhyee River Canyon WSA. In the future, should the decision be made to construct fence to keep livestock out of the area allocated as unavailable for livestock grazing, it would require fence construction within a WSA. The fence would be located approximately 60 feet from the mesamint (*Pogogyne floribunda*) site, with the plant site being on the side of the fence that would retain livestock grazing. The proximity of the fence to the plant site could potentially directly impact the plants in the short- and long-term due to livestock walking along the fence line, disturbing the ground. There may be impacts to individual plants, but the population as a whole is expected to persist. The proposed fence location for the Proposed RMP Amendment is approximately 1.5 miles from the plant site and would have no impacts on individual plants or the population in the short- and long-term.

Alternative 2

Because the entire area would be allocated as available for livestock grazing, there would be no need for fencing or active livestock management (herding). The wilderness characteristic of naturalness, outstanding opportunities for solitude, and primitive and unconfined recreation would not be impaired under this alternative either short-term or long-term any more than it had been at the time that this unit was identified as one with wilderness characteristics. Fence-related conflicts would not occur.

Alternative 3

Because livestock grazing would not occur in the vicinity of this key RNA, there would be no need for fencing or active livestock management (herding). The wilderness characteristic of naturalness, outstanding opportunities for solitude, and primitive and unconfined recreation would not be impaired under this alternative either short-term or long-term. Fence-related conflicts would not occur. An ungrazed reference for research would be retained.

Alternatives 5, 6, and Proposed RMP Amendment

The plant communities included in the 203-acre exclosure are the low sagebrush/Idaho fescue, low sagebrush/bluebunch wheatgrass, silver sagebrush/Sandberg's bluegrass plant communities. Prior to the removal of grazing from this key RNA, there was no indication of negative impacts from livestock grazing on these communities (BLM 2018b, p. 25).

These alternatives would reallocate as available for livestock grazing to 2,662 acres in the key RNA and reduce potential new fence length. Reducing the area that would be allocated as unavailable for livestock grazing would reduce the amount of fence needed and that would reduce the possibilities of wildlife-fence collisions.

A fence around the area allocated as unavailable for livestock grazing would be located approximately 1.5 miles from the mesamint (*Pogogyne floribunda*) site, and would have no impacts on individual plants or the population in the short- and long-term.

Livestock management under these alternatives would continue to allow for maintenance of recent conditions, which were found to be in desirable condition and near proper functioning condition under the 2017 Standards for Rangeland Health Assessment and Evaluation (BLM 2018b, p. 72-75).

There would be impacts to the wilderness characteristics of naturalness as well as outstanding opportunities for solitude, and primitive and unconfined recreation, although they would be less than under Alternative 1. Short-term impacts to solitude caused by fence construction and long-term impacts to solitude caused by active management to exclude livestock from key RNA would not be as extensive.

17.5 Literature Citations

BLM. 1987. Oregon State Office Manual Supplement -1623-Supplemental Program Guidance for Land Resources. Rel. 1-267.

BLM. 1992. Three Rivers Resource Management Plan ROD/RMP

BLM. 1999. Standards for Rangeland Health Assessment. Rahilly-Gravelly #0212. USDI, Bureau of Land Management, Lakeview District, Lakeview Resource Area, Lakeview, OR.

BLM. 2000a. Area of Critical Environmental Concern Nomination Analysis Report for the Lakeview Resource Area Resource Management Plan. USDI, BLM, Lakeview Resource Area, Lakeview, OR. Areas of Critical Environmental Concern Nomination Analysis Report (blm.gov)

BLM. 2000b. Rangeland Health Standards Assessment. Coyote-Colvin Allotment (#0517). USDI, BLM, Lakeview Resource Area, Lakeview, OR.

BLM. 2001a. Appendix 1 – ACEC/RNAs. Draft Lakeview Resource Management Plan and Environmental Impact Statement. 3 volumes. USDI, BLM, Lakeview Resource Area, Lakeview, OR. Draft Lakeview Resource Management Plan and Environmental Impact Statement - Volume 2 Appendices (blm.gov)

BLM. 2001b. Proposed Southeastern Oregon Resource Management Plan and Final Environmental Impact Statement. 3 volumes. USDI, BLM, Vale District, Malheur and Jordan Resource Areas, Vale, OR. Southeast Oregon RMP (blm.gov)

BLM. 2002. Southeastern Oregon Resource Management Plan and Record of Decision. USDI, BLM, Malheur and Jordan Resource Areas, Vale, OR. Southeast Oregon RMP/Record of Decision (blm.gov)

BLM. 2003a. Proposed Lakeview Resource Management Plan and Final Environmental Impact Statement. 4 volumes. USDI, BLM, Lakeview Resource Area, Lakeview, OR. EplanningUi (blm.gov)

BLM. 2003b. Lakeview Resource Management Plan and Record of Decision. USDI, BLM, Lakeview Resource Area, Lakeview, OR. Lakeview Resource Management Plan and Record of Decision - Text and Appendices (blm.gov)

BLM 2003c. Rangeland Health Assessment for Lynch-Flynn Allotment (#00520). USDI, Bureau of Land Management, Lakeview District, Lakeview Resource Area, Lakeview, OR.

BLM. 2004. Big Juniper Mountain Rangeland Health Assessment. USDI, Bureau of Land Management, Lakeview District, Lakeview Resource Area, Lakeview, OR.

BLM. 2007. East Fork Trout Creek Research Natural Area/Area of Critical Environmental Concern Management Plan. USDI, Bureau of Land Management, Andrews Resource Area, Burns, OR.

BLM. 2010a. Vegetation Treatments Using Herbicides on BLM Lands in Oregon. Final Environmental Impact Statement. DOI-BLM-ORWA-0000-2008-0001-EIS. USDI, BLM, Oregon State Office, Portland, OR.

BLM. 2010b. 2010 Settlement Agreement. Southeastern Oregon and Lakeview Resource Management Plan Amendments. https://eplanning.blm.gov/public_projects/lup/87435/116985/142662/20100610_57-1_AmendRemand_SettleAgree_web.pdf

BLM. 2012. BLM Manual 6330—Management of BLM Wilderness Study Areas. USDI, Bureau of Land Management, Washington D.C. mediacenter_blmpolicymanual6330.pdf

BLM. 2013a. Rahilly Gravelly Rangeland Health Assessment Update. USDI, Bureau of Land Management, Lakeview District, Lakeview Resource Area, Lakeview, OR.

BLM. 2013b. Lynch-Flynn Rangeland Health Assessment Update. USDI, Bureau of Land Management, Lakeview District, Lakeview Resource Area, Lakeview, OR. Flynn-Lynch Allotment Rangeland Health Assessment Update (blm.gov)

BLM. 2015a. Oregon Greater Sage-grouse Proposed Resource Management Plan Amendment and Final Environmental Impact Statement. USDI, Bureau of Land Management, Oregon/Washington State Office, Portland, OR. EplanningUi (blm.gov)

BLM. 2015b. Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region, Including the Greater Sage-grouse Sub-regions of Idaho and Southwestern Montana, Nevada, and Northeastern California, Oregon, Utah. USDI, BLM, Washington Office, Washington, DC.

BLM. 2015c. Appendix E1: Allotment Management Summaries. USDI, Bureau of Land Management, Lakeview Resource Area. Lakeview, OR. 129 p.

BLM. 2015d. Table 5 – Forage Allocation and Allotment Summary. USDI, Bureau of Land Management, Lakeview Resource Area. Lakeview, OR. 4 p.

BLM. 2015e. Integrated Invasive Plant Management for the Lakeview Resource Area. Revised Environmental Assessment. DOI-BLM-OR-L050-2014-0021-EA. USDI, Bureau of Land Management, Lakeview Resource Area, Lakeview, OR.

BLM. 2015f. Decision Record. Integrated Invasive Plant Management for the Lakeview Resource Area Excluding the Warner Basin Area (DOI-BLM-OR-L050-2014-0021-EA). USDI, Bureau of Land Management, Lakeview Resource Area, Lakeview, OR. 6 p.

BLM. 2016. Standards for Rangeland Health and Guidelines for Livestock Grazing Management for Public Lands in Oregon and Washington. Update for Coyote-Colvin Allotment (#00517). USDI, Bureau of Land Management, Lakeview Resource Area, Lakeview, OR. Coyote Colvin Range Health Assessment (blm.gov)

BLM. 2017. 2017 Standards for Rangeland Health Assessment and Evaluation

BLM. 2018a. Oregon Greater Sage-grouse Proposed RMPA/Final EIS. USDI, Bureau of Land Management, Oregon/Washington State Office, Portland, OR. Oregon Greater Sage-grouse Proposed RMPA/Final EIS (blm.gov).

BLM. 2018b. Louse Canyon Geographic Management Area Assessment and Standards of Rangeland Health Evaluation. USDI, Bureau of Land Management, Malheur Field Office, Vale District, Vale, OR. Louse Canyon GMA Assessment and Standards of Rangeland Health Evaluation (blm.gov)

BLM. 2019a. Oregon Greater Sage-grouse Record of Decision and Approved Resource Management Plan Amendment. USDI, Bureau of Land Management, Oregon/Washington State Office, Portland, OR. Oregon Greater Sage-grouse Record of Decision and Approved Resource Management Plan Amendment.

BLM. 2019b. Grazing Permit Renewal for Coyote-Colvin (00517), Abert Seeding (00522), Shalerock (00435), South Rabbit Hills (00529) and Fitzgerald FFR (00502) Allotments. Environmental Assessment DOI-BLM-ORWA-L050-2016-0014-EA. USDI, BLM, Lakeview Resource Area, Lakeview, OR. Grazing Permit renewal for Coyote-Colvin, Abert Seeding, Shale Rock, South Rabbit Hills, and Fitzgerald FFR Allotments (blm.gov)

BLM. 2023a. Key Research Natural Area (RNA) Scoping Response. USDI, BLM, Malheur Field Office, Vale District, Vale, OR. KeyRNA_ScopingCommentResponses.pdf (blm.gov)

BLM. 2023b. Analysis of Actions to Implement Areas Unavailable to Livestock Grazing under the 2015 Oregon Greater Sage-Grouse Approved Resource Management Plan Amendment in the Dry Creek Bench and Lake Ridge Key Research Natural Areas. USDI, BLM, Malheur Field Office, Vale District, Vale, OR. Group 3 - WSAs - Key RNA Environmental Assessment - Public Comment (blm.gov)

BLM. 2023c. Southeastern Oregon Proposed Resource Management Plan Amendment and Final Environmental Impact Statement. USDI, BLM, Malheur Field Office, Vale District, Vale, OR. BLM. 2024a. Southeastern Oregon Record of Decision and Approved Resource Management Plan Amendment. USDI, BLM, Vale District Office, Vale, OR. EplanningUi (blm.gov)

BLM. 2024b. Key Research Natural Area (RNA) Grazing Exclosure Fences DOI-BLM-ORWA-L050-2024-0011-EA. USDI, BLM, Lakeview Field Office, Lakeview, OR. Key_RNA_Closure_EA_Final Draft_Published_7-31-24.pdf (blm.gov)

Hagen, C. 2011. Greater-Sage-grouse Conservation Assessment and Strategy for Oregon: A Plan to Maintain and Enhance Populations and Habitat. Oregon Department of Fish and Wildlife. https://ir.library.oregonstate.edu/concern/technical_reports/5999n853x

Kentnesse, L. 2017. Conservation Assessment for *Rorippa columbiae* (Columbia Yellowcress). Native Plant Conservation Program, Oregon Department of Agriculture.

Olsen, A., J. Severson, B. Allred, M. Jones, J. Maestas, D. Naugle, K. Yates, and C. Hagen. 2021a. Reversing Tree Encroachment Increases Usable Space for Sage-Grouse during the Breeding Season. Wildlife Society Bulletin 1-10. DOI: 10.1002/web.1214. Reversing Tree Encroachment Increases Usable Space for Sage-Grouse during the Breeding Season (wiley.com)

Olsen, A., J. Severson, J. Maestas, D. Naugle, J. Smith, J. Tack, K. Yates, and C. Hagen. 2021b. Reversing Tree Expansion in Sagebrush Steppe Yields Population-Level Benefit for Imperiled Sage-Grouse. Ecosphere 12(6):1-17. Reversing tree expansion in sagebrush steppe yields population-level benefit for imperiled grouse (wiley.com)

Oregon Natural Heritage Advisory Council. 2010. Oregon Natural Areas Plan. Oregon Biodiversity Information Center, Institute for Natural Resources – Portland, Portland State University, Portland, OR. 198pp.

Runge, C., A. Plantings, A. Larsen, D. Naugle, K. Helmstedt, S. Polasky, J. Donnelly, J. Smith, T. Lark, J. Lawler, S. Martinuzzi, and J. Fargione. 2018. Unintended Habitat Loss on Private Land from Grazing Restrictions on Public Land. Journal of Applied Ecology. 1-11.

Smith, J. H. Tack, L. Berkeley, M. Szczypinsik, and D. Naugle. 2018. Effects of Rotational Grazing Management on Nesting Greater Sage-grouse. Journal of Wildlife Management 82(10:103-112. https://doi.org/10.1002/jwmg.21344.

USDA. 2023. Washington-Oregon (Columbia Basin) Direct Hay Report (October 20, 2023).

US Fish and Wildlife Service. 2013. Greater sage-grouse (Centrocercus urophasianus) Conservation Objectives: Final Report. US Department of the Interior, Fish and Wildlife Service, Denver, Colorado.

US Fish and Wildlife Service. 2015. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List Greater Sage-Grouse (Centrocercus urophasianus) as an Endangered or Threatened Species. Federal Register, Vol. 80, No. 191, October 2, 2015.

Vander Schaaf, D. 1992. Final Report. Natural Area Inventory for the Lakeview Resource Area, Lakeview District, Bureau of Land Management. The Nature Conservancy. Portland, OR.

Appendix 18

Social and Economic Impact Analysis Methodology and State-Specific Impact Analysis

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Appendix 18. Social and Economic Impact Analysis Methodology and State-Specific Impact Analysis

18.1 Introduction

This appendix describes the methods and data that underlie the social and economic impact analysis, the economic impact modeling analysis, and the environmental justice impact discussions. The social and economic impact analysis uses two general approaches. These are quantitative analysis and qualitative analysis. Input-output models such as the Impact Analysis for Planning (IMPLAN) model, an input-output (IO) model, provide a quantitative representation of the final demand and production relationships between individual economic sectors. This quantitative analysis approach is used when adequate information on physical production quantities and the prices and costs for goods and services is available. The first portion of the following discussion describes general aspects of the quantitative, qualitative, and environmental justice impact analysis methodologies. The quantitative methodology discussion describes the inputs required to run the IMPLAN model and how IMPLAN is used to estimate quantitative economic impacts. The resulting estimates from the IMPLAN model, by alternative, are in the Social and Economic Conditions (Including Environmental Justice) section of **Chapter 4**. The remaining sections provide additional detailed data used in the analysis for oil and gas, renewable energy (including geothermal, wind, and solar), and livestock grazing.

18.2 General Aspects of the Methodologies

18.2.1 Quantitative Economic Impact Analysis Using IMPLAN

A quantitative economic impact analysis was conducted for three resource uses: oil and gas development and production, geothermal development and production, and livestock grazing. Due to limitations on availability of data on production and quantity of market activities, analyses for nonenergy leasable minerals, locatable minerals, mineral materials, wind and solar energy, and greater sage grouse conservation were conducted qualitatively (see **Section 18.2.2**, Qualitative Economic and Social Impact Analysis, for discussion on the qualitative methodology used in the social and economic impacts analysis).

The basic approach used in quantitative economic impact analysis is to identify the economic sectors to be directly impacted and estimate the amount of direct economic activity likely to be affected by management decisions. For instance, management actions affecting oil and gas development on federal minerals could affect the Drilling Oil and Gas Wells sector if expenditures made by oil and gas companies to drill and complete new wells changes in response to these management actions. Potential direct impacts could also stem from changes in the amount of oil and gas produced. When direct impacts to economic activity can be quantified, they can be run through an economic input-output model to estimate the secondary economic activity that is generated as the direct impact ripples through the economy, "upstream" to providers of goods and services necessary for production, and "downstream" as income generated from production is spent by the households that receive the income.

The upstream, downstream, and total effects on economic activity are estimated through use of the IMPLAN model, an off-the-shelf input-output model that provides a mathematical accounting of the flow of money, goods, and services through a specified region's economy and yields estimates of gross economic output, jobs, and labor income. The model provides estimates of how economic activity (i.e., economic output,

income, and employment) in one sector of the economy ripples through the broader economy, affecting seemingly unrelated sectors. These ripple effects include both indirect and induced impacts of proposed management actions. Indirect impacts result from changes in economic activity in industries that sell inputs to the industries that may be directly impacted (for example, varying levels of economic output stemming from changes in supply purchases made by firms contracted to drill oil and gas wells). Induced impacts result from changes in household spending as households adjust their spending in response to increases or decreases in labor income supported by industries directly and indirectly affected by management actions (for example, changes in purchases at local stores for personal groceries).

This analysis used IMPLAN Cloud and data from IMPLAN's 2021data release. This means that parameters such as productivity and trade data reflect annual average economic conditions in the analysis areas during 2021. IMPLAN 2021 is the most recent vintage of data currently available in the IMPLAN Cloud platform. Prior to running the model, cost and price data were converted to a consistent dollar year (2023) using sector-specific adjustment factors from the IMPLAN model. Unless stated otherwise, the values in this appendix are expressed in year 2023 dollars.

Two models for each of the 10 states in the planning area were run, separately. The first model analyzed only the impacts on the counties in each state's analysis area, combined for each state. This provides information on the local economic contributions from direct economic changes in the analysis area, but it does not provide data on the economic contributions that result in other neighboring regions in the state from the direct changes in the analysis area. The second model took a multi-regional approach and analyzed the impacts on each state from direct impacts in the analysis area. The trade data available in the current version of IMPLAN (IMPLAN Cloud) make it possible to do multi-regional input-output (MRIO) analysis to track how an impact on any of the IMPLAN sectors in the identified socioeconomic analysis areas affects outputs in any of the sectors in other regions outside of the analysis area. For this analysis, this feature allowed the estimation of how an impact in the counties in the analysis area disperses into the counties in the rest of the state, and how these effects in the rest of the state create additional local effects in the analysis area. As a result, it was possible to estimate not only the jobs and income generation in the analysis area, but to also estimate how the economic activity in the analysis area affected jobs and income in each state as a whole.

The current IMPLAN model has 546 economic sectors, of which 507 are represented in the analysis area counties across all 10 states and 539 are represented across all counties in all states in the planning area (IMPLAN 2021 data).

Economic impacts were estimated and provided as an annual average over a 20-year time period (2023-2042). All dollar figures throughout the economic analysis area in constant 2023 dollars.

18.2.2 Qualitative Economic and Social Impact Analysis

The second methodological approach relies on qualitative discussions to describe potential economic and social impacts when impacts cannot be quantified. In such cases, the analysis describes the type of impact in a base scenario (in this planning effort, Alternative 1) and then assesses the relative changes in terms of increases or decreases in costs, the value of production, or differences in social conditions and changes in way of life for the communities across the analysis areas. This approach is used to describe potential impacts on market values, nonmarket values, and social conditions, which are all interconnected and discussed together by alternative.

Some of the management decisions under this planning action would result in increased costs to operators – the firms or individuals who undertake the activities – or to project proponents. The economic impacts of decisions that increase costs for operators and/or project proponents are many and can be complex. Cost increases may cut into profitability and drive delays to, reductions in, or cessation of operations or projects. However, where operations or projects are not delayed, reduced, or terminated, increased costs also represent increased economic activity. For instance, if changes in ROW avoidance and exclusion areas under an alternative result in a change in solar plant siting and would require a new transmission line having to take a longer route, additional expenditures for materials, equipment, and labor would be made. These increased expenditures would support some amount of additional income and employment. However, increased costs may also represent opportunity costs; that is, the project proponent or society may have benefited more if the additional funds were used in another way. In the socioeconomic analysis in **Chapter 4**, where management actions would potentially increase costs to operators or project proponents, these increased costs are pointed out and discussed qualitatively. Readers should keep in mind that these increased costs reflect an opportunity cost which may negatively impact operators and be perceived as a benefit by others but may not be socially optimal overall.

Some effects associated with land management actions stem from changes in environmental goods and services that are not traded on traditional markets and whose value is not captured in standard measures of economic activity. Since these goods and services exist outside of observable markets, they lack prices that reveal people's willingness-to-pay for the benefits derived from them and are commonly referred to as nonmarket goods. The term "nonmarket values" refers to the benefits individuals derive from nonmarket goods, such as clean air and water, and healthy populations of wildlife. These values include the personal benefits derived from experiences in the natural environment or uses of natural and cultural resources. Nonmarket values also include passive use values (i.e., existence, option, and bequest) which are independent from the direct and indirect use of natural resources. Since these values are difficult to quantify because they cannot be estimated using observable market prices, qualitative discussions are essential to identifying and assessing impacts to nonmarket values in the planning process (see **Chapter 3** for more information on nonmarket values in the planning area).

Qualitative analysis is critical to understanding how management actions may affect social structures and values. While some social impacts stem from economic impacts, such as when changes in mineral payments and tax revenue impact the provisioning of public services and maintenance of infrastructure. Other potential impacts are social and cultural in nature and can affect quality of life, recreation and amenity values, and traditional land uses and associated cultural values. Social impacts stemming from BLM management decisions can vary considerably depending on the characteristics and diversity of the communities of interest that are involved. Additionally, the level of impacts is dependent on the degree to which new and revised management actions alter the course set in previous BLM decisions, and the degree to which local populations are dependent on BLM lands and resources. For a planning effort that covers 10 state analysis areas, analysis of social impacts must necessarily focus on broader discussion of impacts. As a result, in **Chapter 4**, a qualitative review is provided on potential social impacts resulting from changes in public service available for populations, based on anticipated changes to employment levels and tax revenues. These social impacts are discussed alongside the economic changes in employment, output, and tax revenues as well as the impacts on quality of life and non-market values associated with GRSG conservation as well as livestock grazing and wild horse and burros.

Additionally, the social impacts analysis addresses impacts based on the varying points of view of key types of communities of shared interest. **Chapter 3** and **Appendix 13**, Socioeconomics Baseline Report, identify

several broad categories of communities of shared interest that could be impacted by sage-grouse management decisions in the planning area. These categories reflect different linkages people have to public land and reflect distinct sets of attitudes, beliefs, values, opinions, and perceptions about natural resources and the effects of various management policies and actions. It should be noted that individuals and social groups may have multiple interests and often identify with more than one community of shared interest category. This categorization allows for differentiation of social impacts based on broad differences in points of view. The social impacts analysis in **Chapter 4** of the EIS assesses the alternatives against the different points of view in the broad communities of shared interest categories.

As mentioned above, impacts to market, nonmarket, and social conditions are interrelated, so in **Chapter 4**, they are discussed together for each resource use. The methodology and assumptions for each resource use are discussed below, in **Section 18.3**, Methodologies by Resource Use.

18.2.3 Environmental Justice Impact Analysis

Definitions and methods for analysis of potential environmental justice issues are described in **Appendix 13**, Socioeconomic Baseline Report. In short, the socioeconomic study area was screened to identify counties with minority, low-income, or American Indian and Alaska Native populations that qualify as potential environmental justice populations based on guidance for environmental justice analysis from the Council on Environmental Quality and the BLM (CEQ 1997, BLM 2022). These counties and their potential environmental justice populations are noted in **Chapter 3** of the EIS, as well as **Appendix 13**, Socioeconomic Baseline Report. The BLM reviewed public comments and issues of concern that were brought up in 2012 economic workshops and public scoping comments received in 2012, 2019, and for the current planning effort. These issues were considered for carrying forward for impact analysis based on the BLM-management decisions included under the alternatives for this planning effort. Assessment of the likelihood of disproportionate and adverse impacts to these populations was conducted as described in **Chapter 4** of the EIS.

18.3 Methodologies by Resource Use

18.3.1 Oil and Gas

The economic impact of oil and gas reflects drilling, completion, production and tax revenue activities, and changes in economic impacts of oil and gas stem from changes in these activities due to a change in the level of stipulations for the protection of Greater Sage-Grouse under each alternative. Under alternative 3, all areas managed for GRSG would be PHMA and fluid minerals in these areas would be closed to leasing (see **Section 4.9**, Mineral Resources, of this EIS for more details). Closing areas to fluid mineral leasing could result in impacts on level of oil and gas activities and associated jobs, income, and tax revenue supported by local operations. Under alternatives 1, 2, 4, 5, 6, and the Proposed RMP Amendment, all states include language to maintain and enhance sagebrush habitats with the intent of conserving sage-grouse populations; however, there would be fewer areas closed to leasing than under alternative 3 (the stipulations on oil and gas leasing and the areas closed to leasing for these alternatives vary by state and alternative and are described in detail in **Section 4.9**, Mineral Resources).

The estimated number of wells drilled and completed, and production from new wells were projected for a 20-year period (2023 to 2042) for each alternative and state as part of the Reasonably Foreseeable Development Scenario (see **Appendix 12**, Reasonably Foreseeable Development Scenario, which provides a complete description of the assumptions and methodology used in developing these estimates). These projections were used as inputs in IMPLAN to model the economic impacts of oil and gas development under each alternative.

Drilling and completion costs per well were developed from Spears & Associates, Inc.'s Drilling and Completion Services Cost Index.[1] These estimates were developed per state, and the weighted average costs were calculated based on the percentage of well type for each state.

Total regional expenditures from drilling costs are calculated by multiplying the drilling cost per well by the projected average annual number of new wells spud (see **Appendix 12**, Reasonably Foreseeable Development Scenario). The number of new wells spud per year is multiplied by the completion ratio (which is estimated by state based on historical completion rates) to calculate the average annual new wells completed. Total regional expenditures from completion costs are calculated by multiplying the average annual number of new wells completed each year by the completion cost per well. Total regional expenditures from drilling and completion costs were used as an input in IMPLAN to generate total regional output, employment, and earnings from oil and gas development.

Projected annual production for new wells developed from 2023 to 2043 is from the reasonably foreseeable development scenario (see **Appendix 12**, Reasonably Foreseeable Development Scenario). Projected oil and gas production under each alternative represents the forecast under varying levels of stipulations and restrictions on leasable mineral development. These stipulations and restrictions could deter operators from leasing, drilling, and producing oil and gas on BLM-administered lands. Instead, operators could choose to develop oil and gas on non-federal lands, or they could choose to reduce production altogether. For the purposes of this analysis, it is assumed that operators choose to reduce production rather than choose to develop on non-federal lands. This means the reported economic impacts associated with changes in federal mineral development may overstate the potential economic impacts within an analysis area due to the ability of some operators to shift operations to non-federal lands and minerals.

The market value of production per well from 2023 to 2043 was calculated using projected annual oil wellhead and natural gas supply prices, from the 2023 Annual Energy Outlook (AEO) reference case published by the US Energy Information Administration (EIA) (EIA 2023). The EIA forecasts oil and gas prices as an average across eight multi-state regions (EIA 2023). For the purposes of this analysis, the price used for each state was taken from the regional average where the state is located. **Table 18-1** shows the 20-year average price, from 2023 to 2042, for oil and gas for each state in the planning area.

Table 18-1. 20-Year Average Oil and Gas Prices, by State

State	Multi-State Region	Oil Wellhead Price ($/barrel)	Natural Gas Supply Price ($/thousand cubic feet)
California	West Coast	93.31	2.75
Colorado	Rocky Mountain	87.22	2.92
Idaho	Rocky Mountain	87.22	2.92
Montana	Northern Great Plains	87.22	3.79
Nevada	Rocky Mountain	87.22	2.92
North Dakota	Northern Great Plains	87.22	3.79
Oregon	West Coast	93.31	2.75
South Dakota	Northern Great Plains	87.22	3.79
Utah	Rocky Mountain	87.22	2.92
Wyoming	Rocky Mountain	87.22	2.92

Source: US EIA 2023

[1] These estimates for drilling and completion costs can be provided from the BLM upon request.

The pace and timing of mineral development activities is dependent on a variety of factors outside the management decisions of the BLM, some of which cannot be foreseen with reasonable certainty. These include national and international energy demand and prices, enactment of future laws and regulatory policies, global supply disruptions, technological advances, and business strategies of operators. The RFD projects future production based on expected rates of well drilling, estimated completion rates, and current production decline curves. Together these parameters allow for projection of future oil and gas production volumes for use in the economic impact analysis. Future real world economic impacts could vary if actual development or production varies from the projection schedule under the RFD, if prices change, or if there are significant structural changes within the oil and gas sector or the broader economies of these study areas.

The IMPLAN sector 35, drilling oil and gas wells, was used to model an exogenous change in demand for oil and gas well drilling. Sector 20, oil and gas extraction, was used to model a change in oil and gas production.

Changes in oil and gas development could also affect state and county public finances through disbursements of federal mineral leasing revenue, state severance taxes, ad valorem taxes, sales and use taxes, and other local and state taxes and fees. The analysis of potential changes in federal mineral leasing payments is calculated from the projected production revenue and the federal royalty rate enacted in August 2022 (16.67 percent) for alternatives 1, 2, 4, 5, 6, and the Proposed RMP Amendment or the previous federal royalty rate (12.5 percent) for Alternative 3.[2] Revenue from rents and bonus bids depend on other site-specific factors, such as size of operation and proprietary information, so impacts on revenues from rents and bonus bids are discussed qualitatively. The impacts to the revenue from state severance taxes is calculated based on the severance tax rate for each state (see **Chapter 3**, Affected Environment, Social and Economic Conditions for the current severance tax assumptions by state). Revenue from ad valorem taxes and other oil and gas production taxes or fees are calculated based on the assumptions shown in **Table 18-2**. Sales and use taxes vary across states and often counties, so impacts on revenue from sales and use taxes are discussed qualitatively.

Tax and royalty revenues derived from activities on BLM-administered lands and minerals would continue to have fiscal implications for communities within the socioeconomic analysis area, the state, and the Federal Government.

[2] The new rate (16.67 percent) only applies to federal leases issued after the IRA was signed. Many new wells development, and the production associated from these new wells, occur on these leases that were issued prior to August 2022 and the royalties from this production would be assessed based on the old rate of 12.5 percent. Because Alternative 3 would close areas to new leasing, the production from oil and gas projected under Alternative 3 is assumed to occur under existing leases that were issued prior to August 2022..

Table 18-2. State and Local Taxes on Oil and Gas Production

State	Estimated Ad Valorem Property Tax Rate[1]	Other Oil and Gas Production Tax or Fee	Estimated Other Oil and Gas Production Tax or Fee Rate[2]
Colorado	5.00%	Oil and Gas Conservation Fee	0.11%
Idaho	—	Oil and Gas Production Tax	1.50%
Montana	—	Privilege and License Tax	0.27%
Nevada	—	Net Proceeds of Minerals Tax	3.66%
North Dakota	—	Oil Extraction Tax	5.00%
South Dakota	—	—	—
Utah	5.00%	Conservation Fee	0.02%
Wyoming	6.30%	Oil and Gas Conservation Tax	0.05%

Source: BLM 2018; Colorado Fiscal Institute 2018; Covenant Consulting Group 2017; Montana Department of Revenue 2020, 2022; Nevada Department of Taxation 2022; State of Utah 2014.
— = Not applicable to the state.
[1]Ad Valorem property tax revenue is calculated as the percent of annual production revenue for Utah and Wyoming, and for Colorado, it is calculated as the percent of assessed property value, which is calculated as 87.5 percent of annual production revenue.
[2]Other oil and gas production tax or fee revenues are calculated as the percent of annual production revenue.

18.3.2 Locatable Minerals

The qualitative analysis of impacts on social and economic conditions due to potential changes in locatable minerals focuses on the impacts of proposed conservation measures to protect Greater Sage-Grouse under the alternatives. Under alternative 3, all PHMA would be recommended withdrawal from mineral entry (see **Section 4.9**, Mineral Resources, of this EIS for more details). Recommending areas for closure to the mining laws for locatable exploration or development does not restrict any activities and therefore, such recommendation does not have any impacts. However, the BLM could ask the Secretary of the Interior to propose and make a withdrawal of the land from location and entry under the Mining Law of 1872 pursuant to Section 204(a) of FLMPA following subsequent NEPA analysis. Proposing and making a withdrawal cannot be done as part of the land use planning process. Should the Secretary propose a withdrawal, the proposal would require environmental and other analysis under NEPA and other applicable authorities before the minerals could be withdrawn. For purposes of this planning initiative, the alternatives analysis includes a description of the types of environmental effects that could occur should the Secretary propose and make a mineral withdrawal in the future (e.g., reduced potential for behavioral disturbance and habitat loss/alterations). If the Secretary ultimately decided to withdraw the land, under Alternative 3, such a withdrawal would likely result in impacts on the level of mineral extraction and associated jobs, income, and tax revenue supported by local mining operations. Under alternatives 1 (in all states) and 2 (in Montana only), actions would be taken to maintain and enhance sagebrush habitats with the intent of conserving sage-grouse populations; however, there would be fewer areas recommended for withdrawal than under alternative 3 (the areas recommended for withdrawal for these alternatives vary by state and alternative and are described in detail in **Section 4.9**, Mineral Resources). Under alternatives 2 (in all states except Montana), 4, 5, 6, and the Proposed RMP Amendment (in all states), no areas would be recommended for withdrawal.

18.3.3 Mineral Materials

The qualitative analysis of impacts on mineral materials are based on discussions of how changes in the acres available or unavailable for mineral material disposal, under each alternative, would impact mineral material extraction and costs associated with extraction, access to the resources, and transportation of minerals after they are extracted. Under alternative 3, all areas managed for GRSG would be PHMA and mineral materials would be closed to disposal in all PHMA (see **Section 4.9**, Mineral Resources, of this EIS for more details). Under alternatives 1, 2, 4, 5, 6, and the Proposed RMP Amendment , actions would be taken to maintain and enhance sagebrush habitats with the intent of conserving sage-grouse populations; however, there would be fewer areas closed to disposal than under alternative 3 (the areas closed to disposal for these alternatives vary by state and alternative and are described in detail in **Section 4.9**, Mineral Resources). Social impacts to communities due to availability of materials in free-use permits are also explored.

18.3.4 Renewable Energy (Geothermal, Wind, and Solar)

Geothermal

Economic impacts from changes geothermal exploration and development due to a change in the level of stipulations for the protection of Greater Sage-Grouse, under each alternative, are a function of construction and operation expenditures for geothermal electricity development, including drilling wells (exploratory, production, and injection), constructing power plants, and operating facilities. Under alternative 3, all areas managed for GRSG would be PHMA and these areas would be closed to all geothermal leasing (see **Section 4.9**, Mineral Resources, of this EIS for more details). Closing areas to geothermal leasing could result in impacts on level of future geothermal activities and associated jobs, income, and tax revenue supported by local operations. Under alternatives 1, 2, 4, 5, 6, and the Proposed RMP Amendment , all states include language to maintain and enhance sagebrush habitats with the intent of conserving sage-grouse populations; however, there would be fewer areas closed to leasing than under alternative 3 (the stipulations on geothermal leasing and the areas closed to leasing for these alternatives vary by state and alternative and are described in detail in **Section 4.9**, Mineral Resources). In the Reasonably Foreseeable Development Scenarios for geothermal development, the BLM analyzed future leasing and development of federal geothermal resources within the decision area over the next 20 years for each alternative. The outputs from the scenarios in the Reasonably Foreseeable Development Scenarios on projected capacity and number of geothermal plants was used to model economic impacts from economic activity (see **Appendix 12**, Reasonably Foreseeable Development Scenarios for more details on how these projections were calculated).

To estimate economic activity associated with geothermal development, BLM used the National Renewable Energy Laboratory's Jobs and Economic Development Impact (JEDI) model (National Renewable Energy Laboratory 2016) to calculate the gross regional economic output, employment, and labor income associated with a representative power plant. The assumptions used 20 MW nameplate capacity for the analyses in Colorado, Idaho, Oregon, and Wyoming, 30 MW nameplate capacity for the analysis in Utah, and 28.8 MW nameplate capacity for the analysis in Nevada (based on the average plant capacity of existing geothermal plants in the planning area). BLM used standard assumptions from the National Renewable Energy Laboratory for the inputs, where data was not available. The economic impacts from the JEDI model were multiplied by the number of geothermal power plants projected, as described in **Appendix 12**, Reasonably Foreseeable Development Scenarios.

The pace and timing of geothermal development activities is dependent on a variety of factors outside the management decisions of the BLM, some of which cannot be foreseen with reasonable certainty. These include demand for electricity, availability of transmission infrastructure capacity, geothermal energy prices relative to the prices for electricity from other sources, cost of energy generation technologies, technological

advances, and business strategies of operators. The RFD projects future production based on expected rates of well drilling, estimated completion rates, and current production decline curves. Together these parameters allow for projection of future oil and gas production volumes for use in the economic impact analysis. Future real world economic impacts could vary if actual development or production varies from the projection schedule under the RFD, if prices change, or if there are significant structural changes within the oil and gas sector or the broader economies of these study areas.

Wind and Solar Energy

The qualitative analysis of impacts on wind and solar energy from BLM-management decisions are based on how the number of acres designated as ROW exclusion or ROW avoidance areas, under each alternative, would impact wind and solar energy development and costs associated with development and transmission of wind and solar energy. Under alternative 3, all PHMA would be managed as ROW exclusion (outside of designated corridors; see **Section 4.8**, Lands and Realty (Including Wind and Solar), of this EIS for more details). Under alternatives 1, 2, 4, 5, 6, and the Proposed RMP Amendment , actions would be taken to maintain and enhance sagebrush habitats with the intent of conserving sage-grouse populations; however, there would be fewer areas managed as ROW exclusion than under alternative 3 (the areas managed as ROW avoidance and exclusion under these alternatives vary by state and alternative and are described in detail in **Section 4.8**, Lands and Realty (Including Wind and Solar)).

The pace and timing of wind and solar energy development activities are dependent on a variety of factors outside the management decisions of the BLM. These include demand for electricity, availability of transmission infrastructure capacity, renewable energy prices relative to prices for electricity from other energy sources, costs of energy generation technologies, technological advances, and business strategies of operators. Due to uncertainties in these factors as well as data limitations, potential economic and social impacts stemming from wind and solar energy affected by BLM-management decisions will be discussed qualitatively.

18.3.5 Livestock Grazing

Economic impacts from changes to livestock grazing are a function of the amount of forage utilization and the market value of livestock whose feed requirements are partially met through grazing on BLM managed allotments. Forage utilization is measured in animal unit months (AUMs), with one AUM defined as the amount of forage needed to feed a cow or five sheep for one month.

Two types of AUM measures are tracked: active AUMs, which measure the amount of forage from land available for grazing, and billed AUMs, which measure the amount of forage that the BLM bills for in a Grazing Fee Year. For the purposes of the analysis in **Chapter 4**, impacts were estimated based on the 5-year average (2018-2022) of billed AUMs, which is the closest available proxy for actual forage use. Because billed use may exceed actual grazing use, the economic analyses may overstate the actual economic impacts of grazing to some degree; however, the comparison across alternatives is still representative of the impacts from BLM-management decisions.

The number of billed AUMS on allotments with greater than 15 percent PHMA land was determined by overlaying GIS data layers. The 5-year average total billed AUMs as well as the billed AUMs on allotments with greater than 15 percent PHMA land by livestock type and state were reported in **Appendix 13**, Socioeconomic Baseline Report. **Table 18-3** shows the estimated projected number of billed AUMs by alternative for each state, broken out by livestock type and total. The total billed AUMs and billed AUMs by

Table 18-3. Number of Estimated AUMs by Livestock Type, State, and Alternative[1]

State	Alternative	Total Billed AUMs	Billed AUMs by Livestock Type	
			Cattle	Sheep
California	Alternatives 1, 2, 4, and 5	121,325	115,259	6,066
	Alternative 3	0	0	0
Colorado	Alternatives 1, 2, 4, and 5	126,183	104,227	21,956
	Alternative 3	0	0	0
Idaho	Alternatives 1, 2, 4, and 5	741,979	696,719	45,261
	Alternative 3	0	0	0
Montana	Alternatives 1, 2, 4, and 5	885,551	866,954	18,597
	Alternative 3	0	0	0
Nevada	Alternatives 1, 2, 4, and 5	1,092,825	1,019,606	73,219
	Alternative 3	0	0	0
North Dakota	Alternatives 1, 2, 4, and 5	3,871	3,863	8
	Alternative 3	0	0	0
Oregon	Alternatives 1, 2, 4, and 5	678,191	674,122	4,069
	Alternative 3	0	0	0
South Dakota	Alternatives 1, 2, 4, and 5	35,588	31,638	3,950
	Alternative 3	0	0	0
Utah	Alternatives 1, 2, 4, and 5	258,438	201,840	56,598
	Alternative 3	0	0	0
Wyoming	Alternatives 1, 2, 4, and 5	1,334,637	1,190,497	144,141
	Alternative 3	0	0	0

Source: BLM 2023

— = Data not available

[1]Data reported is for allotments where PHMA accounted for 15 percent or more of the acreage.

livestock type for Alternatives 1, 2, 4, and 5 was assumed to be consistent with the 5-year average billed AUMs. Under Alternative 3, all of the allotments where PHMA accounts for 15 percent or more of the acreage would be completely closed to grazing, so the billed AUMs would be reduced to zero.

The economic value of livestock whose annual feed requirements are partially met by grazing on BLM lands is estimated based on the market value of cattle and sheep. Values for cattle and sheep are estimated separately, and other grazing animals are considered of negligible commercial value. The direct value of production per AUM was estimated based on regional livestock production value data over 5 years and ratios in the livestock economics literature. **Table 18-4** shows the value of production per cow, AUMs per cow, and adjusted value of production per AUM. The value for cattle is $37.00 per AUM and the value for sheep is $59.56 per AUM.

The analysis focused on the economic impacts associated with cattle and sheep because those are the predominate types of livestock permitted to graze on BLM lands, however, BLM grazing permits may be issued for other classes of livestock. For the purposes of this analysis, one AUM for buffalo is assumed to be equivalent to one AUM for cattle and one AUM for goats is equivalent to one AUM for sheep. Forage utilization by horses was excluded from the analysis because it was assumed that most of this forage utilization for horses occurs as support for a ranching operation grazing other livestock and would thus be an input cost for producing cattle and sheep. The IMPLAN sectors, 11, beef cattle ranching and farming, including feedlots and dual-purpose ranching and farming, and 14, animal production, except cattle and poultry and eggs were used to model an exogenous change in demand for cattle and sheep grazing on BLM lands, respectively.

Table 18-4. Value of Livestock

Year	Value of Livestock Production (Nominal $)[1,2]		AUMs per Animal[3]		Adjusted Value of Livestock Production per AUM (2021$)[4]	
	Cow	Sheep/Ewe	Cow	Sheep/Ewe	Cow	Sheep/Ewe
2015	1015.79	214	16	3.2	49.76	54.50
2016	704.62	202	16	3.2	41.41	60.96
2017	710.20	203	16	3.2	40.66	59.44
2018	589.29	204	16	3.2	35.00	61.47
2019	558.00	203	16	3.2	33.15	61.43
2020	565.77	—	16	—	35.66	—
2021	606.07	—	16	—	37.88	—
2022	698.80	—	16	—	43.30	—
5 Year Average	**603.59**	**205.20**	**16**	**3.2**	**37.00**	**59.56**

Source: [1]USDA Economic Research Service 2023; [2]USDA National Agricultural Statistics Service 2021; [3]The AUMs per animal is the number of months of forage one animal needs to grow to market weight, and was estimated from the estimated number of months to get an animal to market weight minus the estimated number of months the animal spends in a feedlot (Pennsylvania Beef Council 2024; US Agency for International Development; US Department of Agriculture 2013)
[4] Nominal values were converted to 2021 dollar values using IMPLAN deflators (IMPLAN 2021 Data).
— = Data not available

The economic impacts were evaluated at both the analysis areas and state level for each state. The multi-regional input-output analysis feature of IMPLAN was used to evaluate the economic impacts at the state level from changes made in the analysis areas.

Forage utilization estimates in this analysis, and thus the economic impact estimates, only represent livestock grazing in allotments where PHMA accounts for at least 15 percent of total allotment acreage. They do not represent the total impact of livestock grazing in each state or county. Because of this, a percentage decrease between the action alternatives and Alternative 1 would be less on a total impact from livestock grazing basis than in the figures in **Chapter 4**, which are for livestock grazing in GRSG HMAs only.

18.4 State-Specific Impacts on Social and Economic Conditions (Including Environmental Justice)

18.4.1 Introduction

Rangewide impacts from BLM decisions on economic and social conditions and nonmarket values are discussed in **Section 4.8**, Social and Economic Conditions (Including Environmental Justice), of the EIS; however, due to variations in BLM decision for certain states, some impacts vary by geographic region. In the subsections below are detailed discussions on the state-specific impacts on economic and social conditions for each state that differs from the rangewide impacts.

18.4.2 Alternative 1

Fluid Minerals (Oil and Gas) Management

Table 18-5 shows the direct, indirect, induced, and total impacts on economic contributions from projected oil and gas activity. In the state-specific sub headers, a discussion on quantitative impacts shown in **Table 18-5** are provided as well as a qualitative discussion on the market and nonmarket impacts from potential changes in oil and gas operations in each state with reasonably foreseeable future development of oil and gas.[3]

[3] California and Oregon did not have reasonably foreseeable future oil and gas development in the planning area, so they are not included in the discussion.

Table 18-5. Average Annual Economic Contributions from Oil and Gas, Under Alternative I

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Colorado (Low Scenario)	Direct	6,574	6,574	790,898,405	790,898,405	3,979,134,548	3,979,134,548
	Indirect	7,090	9,671	473,848,226	776,442,707	1,408,076,009	2,011,832,079
	Induced	4,411	6,020	222,619,299	321,309,153	726,211,232	1,032,129,727
	Total	18,075	22,265	1,487,365,930	1,888,650,265	6,113,421,790	7,023,096,354
Colorado (High Scenario)	Direct	12,791	12,791	1,539,179,946	1,539,179,946	7,738,174,737	7,738,174,737
	Indirect	13,786	18,801	921,044,007	1,508,906,703	2,737,727,285	3,911,507,852
	Induced	8,581	11,708	433,092,289	624,894,000	1,412,797,333	2,007,343,698
	Total	35,158	43,301	2,893,316,242	3,672,980,648	11,888,699,355	13,657,026,287
Idaho	Direct	6	6	360,003	360,003	1,873,754	1,873,754
	Indirect	4	5	245,779	285,872	843,411	989,487
	Induced	2	2	99,312	113,394	327,260	373,549
	Total	13	14	705,095	759,269	3,044,425	3,236,789
Montana	Direct	1,922	1,922	284,762,972	284,762,972	1,318,085,631	1,318,085,631
	Indirect	1,563	1,725	105,741,719	118,169,771	327,422,634	359,077,656
	Induced	1,561	1,651	77,407,961	81,913,449	248,078,502	262,290,130
	Total	5,046	5,299	467,912,653	484,846,192	1,893,586,767	1,939,453,416
Nevada	Direct	18	18	249,165	249,165	6,374,761	6,374,761
	Indirect	17	18	1,554,685	1,580,942	4,001,386	4,162,182
	Induced	6	6	329,181	352,408	1,069,843	1,144,350
	Total	41	42	2,133,031	2,182,516	11,445,990	11,681,292
North Dakota	Direct	275	275	31,990,856	31,990,856	406,307,567	406,307,567
	Indirect	172	180	10,249,846	10,897,896	44,494,011	46,938,673
	Induced	105	119	4,331,162	5,067,030	15,914,717	18,161,000
	Total	551	573	46,571,864	47,955,782	466,716,295	471,407,239
South Dakota	Direct	89	89	7,090,932	7,090,932	34,541,446	34,541,446
	Indirect	120	134	5,990,214	6,990,786	22,253,716	25,892,162
	Induced	29	41	1,000,002	1,653,841	4,411,230	6,438,783
	Total	238	264	14,081,147	15,735,559	61,206,393	66,872,391
Utah	Direct	2,368	2,368	162,438,183	162,438,183	1,619,804,067	1,619,804,067
	Indirect	2,022	3,284	115,705,860	226,994,302	382,678,849	600,222,762
	Induced	814	1,407	31,513,987	64,193,883	122,797,623	230,483,019
	Total	5,204	7,059	309,658,031	453,626,368	2,125,280,538	2,450,509,848

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Wyoming	Direct	11,727	11,727	1,149,445,274	1,149,445,274	11,250,865,363	11,250,865,363
	Indirect	8,889	8,907	638,335,304	639,668,064	2,054,425,775	2,058,559,520
	Induced	5,679	5,683	230,589,632	230,859,416	885,839,233	886,707,080
	Total	26,295	26,318	2,018,370,210	2,019,972,754	14,191,130,372	14,196,131,963
Total Planning Area (Low Colorado Scenario)	Direct	22,980	22,980	2,427,235,790	2,427,235,790	18,616,987,138	18,616,987,138
	Indirect	19,877	23,923	1,351,671,634	1,781,030,341	4,244,195,792	5,107,674,520
	Induced	12,606	14,930	567,890,538	705,462,574	2,004,649,641	2,437,727,636
	Total	55,464	61,833	4,346,797,961	4,913,728,705	24,865,832,571	26,162,389,294
Total Planning Area (High Colorado Scenario)	Direct	29,197	29,197	3,175,517,331	3,175,517,331	22,376,027,327	22,376,027,327
	Indirect	26,573	33,054	1,798,867,415	2,513,494,337	5,573,847,067	7,007,350,293
	Induced	16,777	20,618	778,363,527	1,009,047,421	2,691,235,741	3,412,941,607
	Total	72,547	82,870	5,752,748,273	6,698,059,088	30,641,110,135	32,796,319,226

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.
Note: There were no oil and gas developments projected for California and Oregon under all alternatives.

Colorado

On annual average, oil and gas production revenue and well development expenditures in the Colorado analysis area is expected to result in a range of about 22,000 to 43,000 total jobs (from 7,000 to 13,000 direct jobs in the drilling oil and gas wells sector and the oil and gas extraction sector), $1.9 billion to $3.7 billion in total labor income (from $791 million to $1.5 billion in direct labor income), and about $7.0 billion to $13.7 billion in economic output (from $4.0 billion to $7.7 billion in direct economic output) throughout the state. Most of the impacts on employment and economic output from oil and gas production revenue and well development expenditures would occur in the analysis area, accounting for about 87.0 percent of the total economic output.

Under Alternative 1, the total royalty revenue generated from oil and gas production in Colorado could range from about $453 million to $878 million. The Colorado severance tax revenue is expected to range from about $31.8 million to $61.7 million, under Alternative 1, and the oil and gas conservation fee could generate a range of $3.0 million to $5.8 million. Assuming an average tax rate of 5 percent across counties in the analysis area, oil and gas production could generate a range of about $119 million to $230 million in county revenues from ad valorem taxes. These revenues that are disbursed to counties would continue to support local public services.

Idaho

On annual average, oil and gas production revenue and well development expenditures in the Idaho analysis area is expected to result in about 14 total jobs (about 6 direct jobs in the drilling oil and gas wells sector and the oil and gas extraction sector), $759,000 in total labor income (about $360,000 in direct labor income), and about $3.2 million in economic output (about $1.9 million in direct economic output) throughout the state. Most of the impacts on employment and economic output from oil and gas production revenue and well development expenditures would occur in the analysis area, accounting for about 94.1 percent of the total economic output.

Under Alternative 1, fluid mineral leasing would continue to be managed as NSO in Idaho IHMA and as CSU in GHMA. In IHMA, impacts on nonmarket and social conditions would be the same as described in *Rangewide Environmental Consequences* under the *Fluid Minerals (Oil and Gas) Management* subsection of **Section 4.8.2**, Alternative 1, of the EIS; however, within GHMA, if there is an increase in mineral development and activities, there would likely continue to be impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality, as described in **Section 4.8.1,** Nature and Type of Effects, of the EIS.

Montana

On annual average, oil and gas production revenue and well development expenditures in the Montana analysis area is expected to result in about 5,000 total jobs (about 2,000 direct jobs in the drilling oil and gas wells sector and the oil and gas extraction sector), $485 million in total labor income (about $285 million in direct labor income), and about $1.9 billion in economic output (about $1.3 billion in direct economic output) throughout the state. Most of the impacts on employment and economic output from oil and gas production revenue and well development expenditures would occur in the analysis area, accounting for about 97.6 percent of the total economic output.

Under Alternative 1, the total royalty revenue generated from oil and gas production in Montana would be about $112 million. The Montana severance tax revenue is expected to be about $62.6 million, under

Alternative 1, and the state is expected to generate about $1.8 million from the privilege and license tax. These revenues that are disbursed to counties would continue to support local public services.

Nevada

On annual average, oil and gas production revenue and well development expenditures in the Nevada analysis area is expected to result in about 42 total jobs (about 18 direct jobs in the drilling oil and gas wells sector and the oil and gas extraction sector), $2.2 million in total labor income (about $249,000 in direct labor income), and about $11.7 million in economic output (about $6.4 million in direct economic output) throughout the state. Most of the impacts on employment and economic output from oil and gas production revenue and well development expenditures would occur in the analysis area, accounting for about 98.0 percent of the total economic output.

Under Alternative 1, the total royalty revenue generated from oil and gas production in Nevada would be about $520,000. The Nevada severance tax revenue is expected to be about $5,000, under Alternative 1. Additionally, oil and gas production could generate about $114,000 across the analysis area in revenue from the Net Proceeds of Minerals Tax. These revenues that are disbursed to counties would continue to support local public services.

Under Alternative 1, Nevada GHMA would continue to be managed as open to fluid mineral leasing, subject to CSU stipulations. If there are increased mineral development and activities in GHMA, there would likely continue to be impacts on nonmarket and social conditions due to changes in access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality, as described in **Section 4.8.1**, Nature and Type of Effects, of the EIS.

North Dakota

On annual average, oil and gas production revenue and well development expenditures in the North Dakota analysis area is expected to result in about 573 total jobs (about 275 direct jobs in the drilling oil and gas wells sector and the oil and gas extraction sector), $48 million in total labor income (about $32 million in direct labor income), and about $471 million in economic output (about $406 million in direct economic output) throughout the state. Most of the impacts on employment and economic output from oil and gas production revenue and well development expenditures would occur in the analysis area, accounting for about 99.0 percent of the total economic output.

Under Alternative 1, the total royalty revenue generated from oil and gas production in North Dakota would be about $51.6 million. The North Dakota severance tax revenue is expected to be about $14.7 million, under Alternative 1. Additionally, oil and gas production could generate about $15.5 million across the analysis area in oil extraction tax revenues. These revenues that are disbursed to counties would continue to support local public services.

South Dakota

On annual average, oil and gas production revenue and well development expenditures in the South Dakota analysis area is expected to result in about 264 total jobs (about 89 direct jobs in the drilling oil and gas wells sector and the oil and gas extraction sector), $15.7 million in total labor income (about $7.1 million in direct labor income), and about $67 million in economic output (about $35 million in direct economic output) throughout the state. Most of the impacts on employment and economic output from oil and gas production revenue and well development expenditures would occur in the analysis area, accounting for about 91.5 percent of the total economic output.

Under Alternative 1, the total royalty revenue generated from oil and gas production in South Dakota would be about $2.4 million. The South Dakota severance tax revenue is expected to be about $644,000, under Alternative 1. These revenues that are disbursed to counties would continue to support local public services.

Utah

On annual average, oil and gas production revenue and well development expenditures in the Utah analysis area is expected to result in about 7,000 total jobs (about 2,000 direct jobs in the drilling oil and gas wells sector and the oil and gas extraction sector), $454 million in total labor income (about $162 million in direct labor income), and about $2.5 billion in economic output (about $1.6 billion in direct economic output) throughout the state. Most of the impacts on employment and economic output from oil and gas production revenue and well development expenditures would occur in the analysis area, accounting for about 86.7 percent of the total economic output.

Under Alternative 1, the total royalty revenue generated from oil and gas production in Utah would be about $186 million. The Utah severance tax revenue is expected to be about $55.7 million, under Alternative 1, and the conservation fee is expected to generate about $223,000. Additionally, oil and gas production could generate about $55.6 million across the analysis area in county revenues from ad valorem taxes. These revenues that are disbursed to counties would continue to support local public services.

Under Alternative 1, Utah GHMA would continue to be managed as NSO near leks or CSU based on allocations in the plans that predate the 2015 amendment. In areas managed as NSO, impacts on nonmarket and social conditions would be the same as described in *Rangewide Environmental Consequences;* however, in areas managed as CSU, if there is an increase in mineral development and activities, there would likely continue to be impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality, as described in **Section 4.8.1**, Nature and Type of Effects, of the EIS.

Wyoming

On annual average, oil and gas production revenue and well development expenditures in the Wyoming analysis area is expected to result in about 26,000 total jobs (about 12,000 direct jobs in the drilling oil and gas wells sector and the oil and gas extraction sector), $2.0 billion in total labor income (about $1.1 billion in direct labor income), and about $14.2 billion in economic output (about $11.3 billion in direct economic output) throughout the state. Most of the impacts on employment and economic output from oil and gas production revenue and well development expenditures would occur in the analysis area, accounting for about 99.96 percent of the total economic output.

Under Alternative 1, the total royalty revenue generated from oil and gas production in Wyoming would be about $1.5 billion. The Wyoming severance tax revenue is expected to be about $557 million, and the oil and gas conservation tax could generate about $4.6 million, under Alternative 1. Additionally, oil and gas production could generate about $585 million across the analysis area in county revenues from ad valorem taxes. These revenues that are disbursed to counties would continue to support local public services.

Under Alternative 1, in Wyoming, GHMA would be managed as NSO within 0.25 miles of leks, and seasonal limitations within 2 miles of leks, while PHMA would continue to be managed as NSO within 0.6 miles of leks and as CSU or with timing limitations outside. In areas managed as NSO, impacts on nonmarket and social conditions would be the same as described in *Rangewide Environmental Consequences;* however, in areas managed as CSU, if there is an increase in mineral development or activities, there would likely continue to be impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and

reduced visitor and viewer enjoyment from changes in air quality, as described in **Section 4.8.1,** Nature and Type of Effects, of the EIS.

Renewable Energy (Geothermal, Wind, and Solar) Management

Table 18-6 shows the direct, indirect, induced, and total impacts on economic contributions from projected geothermal activity. In the state-specific sub headers, a discussion on quantitative impacts shown in **Table 18-6** are provided as well as a qualitative discussion on the market and nonmarket impacts from potential changes in geothermal in each state with reasonably foreseeable future development of geothermal.[4]

Table 18-6. Average Annual Economic Contributions from Geothermal, Under Alternative 1

State	Type of Impact	Employment	Labor Income	Economic Output
California and Nevada Combined	Direct	276	17,088,024	24,364,445
	Indirect	191	14,858,872	70,756,086
	Induced	73	4,035,862	11,151,537
	Total	540	35,982,758	106,272,068
Colorado	Direct	8	536,971	761,363
	Indirect	4	333,762	1,356,788
	Induced	3	186,572	540,294
	Total	16	1,057,306	2,658,444
Idaho	Direct	22	1,020,547	1,413,689
	Indirect	10	561,620	2,833,188
	Induced	5	212,864	683,476
	Total	36	1,795,032	4,930,353
Oregon	Direct	6	297,479	402,124
	Indirect	3	188,906	846,182
	Induced	2	90,611	260,967
	Total	11	576,996	1,509,272
Utah	Direct	12	742,958	1,059,324
	Indirect	6	397,232	1,868,982
	Induced	4	209,788	671,228
	Total	22	1,349,977	3,599,534
Wyoming	Direct	6	288,314	388,376
	Indirect	2	113,518	796,725
	Induced	1	30,436	101,568
	Total	9	432,268	1,286,669
Total Planning Area	Direct	330	19,974,293	28,389,321
	Indirect	216	16,453,910	78,457,951
	Induced	88	4,766,133	13,409,070
	Total	634	41,194,337	120,256,340

Source: National Renewable Energy Laboratory 2016

Note: There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.

[4] There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.

California and Nevada

On annual average, geothermal development in the states of California and Nevada is expected to support about 540 total jobs (about 276 direct jobs), $36.0 million in total labor income (about $17.1 million in direct labor income), and about $106 million in economic output (about $24.4 million in direct economic output).

Colorado

On annual average, geothermal development in the state is expected to support about 16 total jobs (about 8 direct jobs), $1.1 million in total labor income (about $537,000 in direct labor income), and about $2.7 million in economic output (about $761,000 in direct economic output).

Idaho

On annual average, geothermal development in the state is expected to support about 36 total jobs (about 22 direct jobs), $1.8 million in total labor income (about $1.0 million in direct labor income), and about $4.9 million in economic output (about $1.4 million in direct economic output).

Under Alternative 1, in GHMA where lands would continue to be open for wind and solar development and in IHMA that would continue to be managed as avoidance for solar and wind development and only excluded for utility scale projects, there would continue to be impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality from changes in surface disturbance due to potential wind and solar development, as described in **Section 4.8.1**, Nature and Type of Effects, of the EIS.

Nevada

Under Alternative 1, in GHMA that would continue to be managed as avoidance for wind projects or in PHMA that would be open for non-utility-scale solar and wind projects, there would continue to be impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality from changes in surface disturbance due to potential wind and solar development, as described in **Section 4.8.1,** Nature and Type of Effects, of the EIS.

Oregon

On annual average, geothermal development in the state is expected to support about 11 total jobs (about 6 direct jobs), $577,000 in total labor income (about $297,000 in direct labor income), and about $1.5 million in economic output (about $402,000 in direct economic output).

Under Alternative 1, in PHMA that would continue to be managed as avoidance for solar and wind development and only excluded for utility scale projects, there would continue to be impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality from changes in surface disturbance due to potential wind and solar development, as described in **Section 4.8.1,** Nature and Type of Effects, of the EIS.

Utah

On annual average, geothermal development in the state is expected to support about 22 total jobs (about 12 direct jobs), $1.3 million in total labor income (about $743,000 in direct labor income), and about $3.6 million in economic output (about $1.1 million in direct economic output).

Under Alternative 1, in GHMA that would continue to be open to solar and wind projects and in PHMA that would continue to be open to wind projects within 5 miles of leks, there would continue to be impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor

and viewer enjoyment from changes in air quality from changes in surface disturbance due to potential wind and solar development, as described in **Section 4.8.1,** Nature and Type of Effects, of the EIS.

Wyoming

On annual average, geothermal development in the state is expected to support about 9 total jobs (about 6 direct jobs), $432,000 million in total labor income (about $288,000 in direct labor income), and about $1.3 million in economic output (about $388,000 in direct economic output).

Under Alternative 1, in PHMA where it would still be open to solar and wind development, there would continue to be impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality from changes in surface disturbance due to potential wind and solar development, as described in **Section 4.8.1**, Nature and Type of Effects, of the EIS.

Livestock Grazing Management

Table 18-7 shows the direct, indirect, induced, and total impacts on economic contributions from livestock grazing in allotments where PHMA accounted for at least 15 percent of the acreage. In the state-specific sub headers, a discussion on quantitative impacts shown in **Table 18-7** are provided.

Table 18-7. Average Annual Economic Contributions from Livestock Grazing in Allotments where PHMA Accounted for 15 Percent or More of the Acreage, Under Alternative 1

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
California	Direct	7	7	2,146,636	2,146,636	4,625,897	4,625,897
	Indirect	6	8	696,936	898,981	1,815,961	2,545,591
	Induced	6	7	261,689	340,831	995,028	1,219,542
	Total	19	22	3,105,261	3,386,449	7,436,887	8,391,031
Colorado	Direct	50	50	1,844,864	1,844,864	5,164,123	5,164,123
	Indirect	19	22	694,800	841,506	2,390,963	3,006,278
	Induced	9	10	455,946	514,078	1,491,065	1,671,211
	Total	78	82	2,995,610	3,200,447	9,046,152	9,841,613
Idaho	Direct	77	77	13,312,954	13,312,954	28,474,475	28,474,475
	Indirect	71	75	5,978,587	6,198,240	16,904,455	17,943,103
	Induced	66	68	3,158,689	3,294,103	10,417,492	10,862,683
	Total	214	221	22,450,229	22,805,297	55,796,422	57,280,261
Montana	Direct	186	186	10,506,213	10,506,213	33,185,106	33,185,106
	Indirect	109	122	6,251,713	6,858,824	20,744,631	22,504,995
	Induced	69	73	3,419,901	3,613,023	10,966,233	11,575,632
	Total	364	381	20,177,827	20,978,060	64,895,970	67,265,732
Nevada	Direct	82	82	13,703,178	13,703,178	42,086,589	42,086,589
	Indirect	85	88	5,973,781	6,146,434	20,950,722	22,479,206
	Induced	63	65	3,616,403	3,717,918	11,765,675	12,091,385
	Total	230	236	23,293,363	23,567,530	74,802,986	76,657,180
North Dakota	Direct	1	1	39,141	39,141	143,402	143,402
	Indirect	0	0	16,853	18,114	61,594	66,765
	Induced	0	0	6,328	6,822	23,344	24,852
	Total	1	1	62,321	64,077	228,340	235,019

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Oregon	Direct	78	78	6,451,505	6,451,505	25,184,996	25,184,996
	Indirect	73	79	4,601,991	5,095,613	15,223,657	16,982,271
	Induced	46	49	2,412,991	2,592,299	7,323,332	7,844,739
	Total	197	206	13,466,487	14,139,416	47,731,985	50,012,006
South Dakota	Direct	5	5	185,898	185,898	1,405,882	1,405,882
	Indirect	4	4	157,013	176,985	794,297	888,717
	Induced	1	1	30,346	39,578	134,827	163,478
	Total	10	10	373,256	402,461	2,335,006	2,458,076
Utah	Direct	54	54	4,634,026	4,634,026	10,839,099	10,839,099
	Indirect	16	18	803,047	892,704	2,901,262	3,399,715
	Induced	17	18	646,897	692,011	2,527,803	2,676,460
	Total	87	90	6,083,969	6,218,740	16,268,163	16,915,273
Wyoming	Direct	301	301	14,742,131	14,742,131	52,633,690	52,633,690
	Indirect	172	176	7,079,345	7,304,934	26,109,990	27,047,064
	Induced	74	74	2,998,096	3,012,816	11,552,266	11,599,690
	Total	547	552	24,819,572	25,059,882	90,295,946	91,280,444
Total Planning Area	Direct	841	841	67,566,546	67,566,546	203,743,259	203,743,259
	Indirect	555	592	32,254,066	34,432,335	107,897,532	116,863,705
	Induced	351	365	17,007,286	17,823,479	57,197,065	59,729,672
	Total	1,747	1,801	116,827,895	119,822,359	368,837,857	380,336,635

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

California

BLM decisions on GRSG HMAs, under Alternative 1, are not expected to change economic contributions from livestock grazing from current conditions. On annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the California analysis area is expected to support about 22 total jobs (about 7 direct jobs in the animal production and ranching sectors), $3.4 million in total labor income (about $2.1 million in direct labor income), and about $8.4 million in economic output (about $4.6 million in direct economic output) throughout the state. Most of the impacts on employment and economic output from livestock grazing would occur in the analysis area, accounting for about 88.6 percent of the total economic output.

Colorado

On annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the Colorado analysis area is expected to support about 82 total jobs (about 50 direct jobs in the animal production and ranching sectors), $3.2 million in total labor income (about $1.8 million in direct labor income), and about $9.8 million in economic output (about $5.1 million in direct economic output) throughout the state. Most of the impacts on employment and economic output from livestock grazing on these allotments would occur in the analysis area, accounting for about 91.9 percent of the total economic output.

Idaho

On annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the Idaho analysis area is expected to support about 221 total jobs (about 77 direct jobs in the animal production and ranching sectors), $22.8 million in total labor income (about $13.3 million in direct

labor income), and about $57.3 million in economic output (about $28.5 million in direct economic output) throughout the state. Most of the impacts on employment and economic output from livestock grazing on these allotments would occur in the analysis area, accounting for about 97.4 percent of the total economic output.

Montana

On annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the Montana analysis area is expected to support about 381 total jobs (about 186 direct jobs in the animal production and ranching sectors), $21.0 million in total labor income (about $10.5 million in direct labor income), and about $67.3 million in economic output (about $33.2 million in direct economic output) throughout the state. Most of the impacts on employment and economic output from livestock grazing on these allotments would occur in the analysis area, accounting for about 96.5 percent of the total economic output.

Nevada

On annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the Nevada analysis area is expected to support about 236 total jobs (about 82 direct jobs in the animal production and ranching sectors), $23.6 million in total labor income (about $13.7 million in direct labor income), and about $76.7 million in economic output (about $42.1 million in direct economic output) throughout the state. Most of the impacts on employment and economic output from livestock grazing on these allotments would occur in the analysis area, accounting for about 97.6 percent of the total economic output.

North Dakota

On annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the North Dakota analysis area is expected to support about 1 total jobs (about 1 direct jobs in the animal production and ranching sectors), $64,000 in total labor income (about $39,000 in direct labor income), and about $235,000 in economic output (about $143,000 in direct economic output) throughout the state. Most of the impacts on employment and economic output from livestock grazing on these allotments would occur in the analysis area, accounting for about 97.2 percent of the total economic output.

Oregon

On annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the Oregon analysis area is expected to support about 206 total jobs (about 78 direct jobs in the animal production and ranching sectors), $14.1 million in total labor income (about $6.5 million in direct labor income), and about $50.0 million in economic output (about $25.2 million in direct economic output) throughout the state. Most of the impacts on employment and economic output from livestock grazing on these allotments would occur in the analysis area, accounting for about 95.4 percent of the total economic output.

South Dakota

On annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the South Dakota analysis area is expected to support about 10 total jobs (about 5 direct jobs in the animal production and ranching sectors), $402,000 in total labor income (about $186,000 in direct labor income), and about $2.5 million in economic output (about $1.4 million in direct economic output) throughout the state. Most of the impacts on employment and economic output from livestock grazing on

these allotments would occur in the analysis area, accounting for about 95.0 percent of the total economic output.

Utah

On annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the Utah analysis area is expected to support about 90 total jobs (about 54 direct jobs in the animal production and ranching sectors), $6.2 million in total labor income (about $4.6 million in direct labor income), and about $16.9 million in economic output (about $10.8 million in direct economic output) throughout the state. Most of the impacts on employment and economic output from livestock grazing on these allotments would occur in the analysis area, accounting for about 96.2 percent of the total economic output.

Wyoming

On annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the Wyoming analysis area is expected to support about 552 total jobs (about 301 direct jobs in the animal production and ranching sectors), $25.1 million in total labor income (about $14.7 million in direct labor income), and about $91.3 million in economic output (about $52.6 million in direct economic output) throughout the state. Most of the impacts on employment and economic output from livestock grazing on these allotments would occur in the analysis area, accounting for about 98.9 percent of the total economic output.

Environmental Justice

Below is a detailed discussion of adverse and disproportionate impacts on environmental justice populations by state that contained identified environmental justice populations.[5]

California

BLM decisions, under Alternative 1, that impact low-income environmental justice populations would likely have disproportionate and adverse impacts on environmental justice populations in the California analysis area, since both counties in analysis area were identified as meeting the criteria for containing low-income populations. These impacts include impacts on access to subsistence resources.

Colorado

BLM decisions, under Alternative 1, that impact low-income and American Indian and Alaska Native environmental justice populations would likely have disproportionate and adverse impacts on environmental justice populations in the Colorado analysis area, since seven of counties in analysis area were identified as meeting the criteria for containing low-income populations and two of the counties were identified as meeting the threshold for American Indian and Alaska Native populations. These impacts include impacts on access to cultural and subsistence resources.

Idaho

The Idaho analysis area had 25 counties that met criteria for minority, low-income, and American Indian and Alaska Native environmental justice populations. All of the BLM decisions, under Alternative 1, that impact environmental justice populations would likely have disproportionate and adverse impacts on environmental justice populations in the Idaho analysis area.

[5] There were no counties in the North Dakota analysis area that met the threshold for environmental justice populations, so North Dakota is not included in the state-by-state discussion.

Under Alternative 1, in GHMA, fluid mineral leasing would continue to be managed as CSU and lands would continue to be open to wind and solar development and in IHMA, only utility-scale wind and solar projects would be excluded. If there would be an increase in mineral and ROW development and activities in GHMA and IHMA, there would likely continue to be impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality. These impacts could lead to disproportionate and adverse impacts on environmental justice populations, depending on where the environmental justice populations are located within each county in relation to the change in air quality.

Montana

The Montana analysis area had 18 counties that met criteria for minority, low-income, and American Indian and Alaska Native environmental justice populations. All of the BLM decisions, under Alternative 1, that impact environmental justice populations would likely have disproportionate and adverse impacts on environmental justice populations in the Montana analysis area.

Nevada

The entire Nevada analysis area (a total of 10 counties) met criteria for minority, low-income, and American Indian and Alaska Native environmental justice populations. All of the BLM decisions, under Alternative 1, that impact environmental justice populations would likely have disproportionate and adverse impacts on environmental justice populations in the Nevada analysis area.

Under Alternative 1, within GHMA, where fluid mineral leasing would continue to be managed as CSU and lands would continue to be managed as avoidance for wind projects and in PHMA, where only utility-scale wind and solar projects would be excluded. If there is an increase in mineral development and activities, there would likely continue to be impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality. These impacts could lead to disproportionate and adverse impacts on environmental justice populations, depending on where the environmental justice populations are located within each county in relation to the change in air quality.

Oregon

The Oregon analysis area had 7 counties that met criteria for minority, low-income, and American Indian and Alaska Native environmental justice populations. All of the BLM decisions, under Alternative 1, that impact environmental justice populations would likely have disproportionate and adverse impacts on environmental justice populations in the Oregon analysis area.

Under Alternative 1, in PHMA, where only utility-scale wind and solar projects would be excluded, there would likely continue to be impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality. These impacts could lead to disproportionate and adverse impacts on environmental justice populations, depending on where the environmental justice populations are located within each county in relation to the change in air quality.

South Dakota

BLM decisions, under Alternative 1, that impact low-income environmental justice populations would likely have disproportionate and adverse impacts on environmental justice populations in Butte County, South Dakota, since the county was identified as meeting the criteria for containing low-income populations. These impacts include impacts on access to subsistence resources.

Utah

BLM decisions, under Alternative 1, that impact low-income and American Indian and Alaska Native environmental justice populations would likely have disproportionate and adverse impacts on environmental justice populations in the Utah analysis area since 18 counties in analysis area were identified as meeting the criteria for containing low-income or American Indian and Alaska Native populations.

Under Alternative 1, in GHMA, where fluid mineral leasing would continue to be managed as NSO near leks or CSU based on allocations in the plans that predate the 2015 amendment and lands would continue to be open to solar and wind projects and in PHMA, where lands would continue to be open to wind projects within 5 miles of leks, if there is an increase in development, there would likely continue to be impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality. These impacts could lead to disproportionate and adverse impacts on environmental justice populations, depending on where the environmental justice populations are located within each county in relation to the change in air quality.

Wyoming

The Wyoming analysis area had 15 counties that met criteria for minority, low-income, and American Indian and Alaska Native environmental justice populations. All of the BLM decisions, under Alternative 1, that impact environmental justice populations would likely have disproportionate and adverse impacts on environmental justice populations in the Wyoming analysis area.

Under Alternative 1, within GHMA, where fluid mineral leasing would continue to be managed as NSO within 0.25 miles of leks with seasonal limitations within 2 miles of leks, and within PHMA, where fluid mineral leasing would continue to be managed as NSO within 0.6 miles of leks and as CSU or with timing limitations outside and where it would still be open to solar and wind development, if there is an increase in development and activities, there would likely continue to be impacts on access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality due to less restrictions than other areas. These impacts could lead to disproportionate and adverse impacts on environmental justice populations, depending on where the environmental justice populations are located within each county in relation to the change in air quality. In areas open to fluid mineral leasing with CSU stipulations or timing limitations, if there is an increase in mineral development and activities, potential for impacts on air quality would continue to exist.

18.4.3 Alternative 2

Fluid Minerals (Oil and Gas) Management

Table 18-8 shows the direct, indirect, induced, and total impacts on economic contributions from projected oil and gas activity. In the state-specific sub headers, a discussion on quantitative impacts shown in **Table 18-8** are provided as well as a qualitative discussion on the market and nonmarket impacts from potential changes in oil and gas operations in each state with reasonably foreseeable future development of oil and gas and with differing impacts from the rangewide impacts, as discussed in **Section 4.8** of the EIS.[6]

[6] California and Oregon did not have reasonably foreseeable future oil and gas development in the planning area, so they are not included in the discussion.

Table 18-8. Average Annual Economic Contributions from Oil and Gas, Under Alternative 2

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Colorado (Low Scenario)	Direct	6,669	6,669	802,283,755	802,283,755	4,036,412,178	4,036,412,178
	Indirect	7,192	9,810	480,668,731	787,619,135	1,428,344,184	2,040,792,766
	Induced	4,474	6,107	225,823,905	325,934,514	736,665,045	1,046,987,593
	Total	18,335	22,585	1,508,776,391	1,915,837,404	6,201,421,407	7,124,192,537
Colorado (High Scenario)	Direct	12,885	12,885	1,550,426,755	1,550,426,755	7,794,700,978	7,794,700,978
	Indirect	13,887	18,939	927,770,796	1,519,925,891	2,757,724,392	3,940,077,897
	Induced	8,644	11,794	436,256,457	629,458,854	1,423,119,210	2,022,007,419
	Total	35,415	43,617	2,914,454,009	3,699,811,501	11,975,544,580	13,756,786,294
Idaho	Direct	8	8	480,004	480,004	2,498,339	2,498,339
	Indirect	6	7	327,706	381,162	1,124,547	1,319,316
	Induced	3	3	132,416	151,192	436,347	498,065
	Total	17	18	940,127	1,012,359	4,059,233	4,315,719
Montana	Direct	1,922	1,922	284,762,972	284,762,972	1,318,085,631	1,318,085,631
	Indirect	1,563	1,725	105,741,719	118,169,771	327,422,634	359,077,656
	Induced	1,561	1,651	77,407,961	81,913,449	248,078,502	262,290,130
	Total	5,046	5,299	467,912,653	484,846,192	1,893,586,767	1,939,453,416
Nevada	Direct	18	18	249,165	249,165	6,374,761	6,374,761
	Indirect	17	18	1,554,685	1,580,942	4,001,386	4,162,182
	Induced	6	6	329,181	352,408	1,069,843	1,144,350
	Total	41	42	2,133,031	2,182,516	11,445,990	11,681,292
North Dakota	Direct	275	275	31,990,856	31,990,856	406,307,567	406,307,567
	Indirect	172	180	10,249,846	10,897,896	44,494,011	46,938,673
	Induced	105	119	4,331,162	5,067,030	15,914,717	18,161,000
	Total	551	573	46,571,864	47,955,782	466,716,295	471,407,239
South Dakota	Direct	89	89	7,090,932	7,090,932	34,541,446	34,541,446
	Indirect	120	134	5,990,214	6,990,786	22,253,716	25,892,162
	Induced	29	41	1,000,002	1,653,841	4,411,230	6,438,783
	Total	238	264	14,081,147	15,735,559	61,206,393	66,872,391
Utah	Direct	2,368	2,368	162,438,183	162,438,183	1,619,804,067	1,619,804,067
	Indirect	2,022	3,284	115,705,860	226,994,302	382,678,849	600,222,762
	Induced	814	1,407	31,513,987	64,193,883	122,797,623	230,483,019
	Total	5,204	7,059	309,658,031	453,626,368	2,125,280,538	2,450,509,848

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Wyoming	Direct	11,727	11,727	1,149,445,274	1,149,445,274	11,250,865,363	11,250,865,363
	Indirect	8,889	8,907	638,335,304	639,668,064	2,054,425,775	2,058,559,520
	Induced	5,679	5,683	230,589,632	230,859,416	885,839,233	886,707,080
	Total	26,295	26,318	2,018,370,210	2,019,972,754	14,191,130,372	14,196,131,963
Total Planning Area (Low Colorado Scenario)	Direct	23,077	23,077	2,438,741,141	2,438,741,141	18,674,889,353	18,674,889,353
	Indirect	19,981	24,064	1,358,574,065	1,792,302,059	4,264,745,103	5,136,965,036
	Induced	12,671	15,017	571,128,248	710,125,734	2,015,212,540	2,452,710,018
	Total	55,728	62,158	4,368,443,454	4,941,168,934	24,954,846,996	26,264,564,407
Total Planning Area (High Colorado Scenario)	Direct	29,293	29,293	3,186,884,142	3,186,884,142	22,433,178,152	22,433,178,152
	Indirect	26,676	33,193	1,805,676,130	2,524,608,816	5,594,125,311	7,036,250,167
	Induced	16,840	20,705	781,560,800	1,013,650,073	2,701,666,706	3,427,729,844
	Total	72,808	83,191	5,774,121,072	6,725,143,031	30,728,970,169	32,897,158,163

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.
Note: There were no oil and gas developments projected for California and Oregon under all alternatives.

Colorado

Under Alternative 2, on annual average, oil and gas production revenue and well development expenditures and well development in the Colorado analysis area is expected to support about 320 more total jobs (about 95 additional direct jobs), about $27million more in total labor (about $11 million in additional direct labor income), and about $100 million in economic output (about $57 million in additional direct economic output) on annual average across the state relative to Alternative 1.

The increase in projected oil and gas activity could result in a small increase in tax revenues compared with Alternative 1. Under Alternative 2, the total royalty revenue generated from oil and gas production in Colorado could range from $459 million to $884 million, which is about $6.4 million to $6.5 million more than under Alternative 1. The Colorado severance tax revenue could range from $32.3 million to $62.2 million, which is almost $500,000 more than under Alternative 1. The oil and gas conservation fee could generate a range of $3.0 million to $5.8 million, slightly more than under Alternative 1. Additionally, oil and gas production could generate a range of $121 million to $232 million in county revenues from ad valorem taxes, which is about $1.7 million more than under Alternative 1). The increase in oil and gas activity would likely lead to an increase in revenue from rents, bonus bids, and sales and use tax, compared with Alternative 1. These revenues are disbursed to the counties and would continue to support local public services, such as education.

The potential increase in oil and gas activity is not likely to result in large impacts from BLM decisions on lifestyles and culture for those in mineral development communities of interest.

Under Alternative 2, PHMAs in Colorado would be designated as NSO for fluid mineral development. Compared with Alternative 1, changing GHMA from closed to fluid mineral leasing within 1 mile of leks and NSO within 2 miles of leks under Alternative 1 to NSO within 1 mile of leks under this alternative would likely result in an increase in air emissions because the amount of federal mineral estate available for leasing and development would be greater under this alternative. This could lead to less access to clean air, health and safety from changes in air quality and GHG emissions, and reduced visitor and viewer enjoyment from changes in air quality.

Idaho

Under Alternative 2, on annual average, oil and gas production revenue and well development expenditures in the Idaho analysis area is expected to support about 5 total additional jobs (about 2 additional direct jobs), $253,000 in additional total labor income (about $120,000 in additional direct labor income), and about $1.1 million in additional economic output (about $625,000 in additional direct economic output), across the state, compared to development under Alternative 1.

The small increase in projected oil and gas activity In Idaho could result in a small increase in tax revenues compared with Alternative 1, which would be disbursed to counties and would continue to support local public services, such as education.

The potential increase in oil and gas activity is not likely to result in large impacts from BLM-management decisions on lifestyles and culture for those in mineral development communities of interest.

Renewable Energy (Geothermal, Wind, and Solar) Management

Table 18-9 shows the direct, indirect, induced, and total impacts on economic contributions from projected geothermal activity. In the state-specific sub headers, a discussion on quantitative impacts shown in **Table 18-9** are provided as well as a qualitative discussion on the market and nonmarket impacts from potential changes in geothermal in each state with reasonably foreseeable future development of geothermal and with differing impacts from the rangewide impacts, as discussed in **Section 4.8** of the EIS.[7]

Table 18-9. Average Annual Economic Contributions from Geothermal, Under Alternative 2

State	Type of Impact	Employment	Labor Income	Economic Output
California and Nevada Combined	Direct	276	17,088,024	24,364,445
	Indirect	191	14,858,872	70,756,086
	Induced	73	4,035,862	11,151,537
	Total	540	35,982,758	106,272,068
Colorado	Direct	8	536,971	761,363
	Indirect	4	333,762	1,356,788
	Induced	3	186,572	540,294
	Total	16	1,057,306	2,658,444
Idaho	Direct	22	1,020,547	1,413,689
	Indirect	10	561,620	2,833,188
	Induced	5	212,864	683,476
	Total	36	1,795,032	4,930,353
Oregon	Direct	6	297,479	402,124
	Indirect	3	188,906	846,182
	Induced	2	90,611	260,967
	Total	11	576,996	1,509,272
Utah	Direct	12	742,958	1,059,324
	Indirect	6	397,232	1,868,982
	Induced	4	209,788	671,228
	Total	22	1,349,977	3,599,534
Wyoming	Direct	6	288,314	388,376
	Indirect	2	113,518	796,725
	Induced	1	30,436	101,568
	Total	9	432,268	1,286,669
Total Planning Area	Direct	330	19,974,293	28,389,321
	Indirect	216	16,453,910	78,457,951
	Induced	88	4,766,133	13,409,070
	Total	634	41,194,337	120,256,340

Source: National Renewable Energy Laboratory 2016

Note: There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.

Nevada

Under Alternative 2, there would be an exception criterion avoidance for ROWs and to the closure to wind and solar development in Nevada PHMA and to wind development in Nevada GHMA. Compared with Alternative 1, this could increase the potential for impacts on nonmarket and social conditions due to

[7] There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.

changes in air quality and GHG emissions because there would be a higher chance of development. However, the exception criteria would likely avoid impacts.

Utah

Under Alternative 2, areas outside PHMAs that are within 5 miles of leks in Utah would be avoidance for wind development. This could increase the potential for impacts on nonmarket and social conditions due to changes in air quality and GHG emissions compared with Alternative 1. This is because there would be a higher chance of development in an avoidance area as opposed to an exclusion area that includes an exception criterion to closure.

Livestock Grazing Management

Table 18-10 shows the direct, indirect, induced, and total impacts on economic contributions from livestock grazing in allotments where PHMA accounted for at least 15 percent of the acreage. A discussion on impacts is provided at the rangewide-level in **Section 4.8** of the EIS.

Table 18-10. Average Annual Economic Contributions from Livestock Grazing in Allotments where PHMA Accounted for 15 Percent or More of the Acreage, Under Alternative 2

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
California	Direct	7	7	2,146,636	2,146,636	4,625,897	4,625,897
	Indirect	6	8	696,936	898,981	1,815,961	2,545,591
	Induced	6	7	261,689	340,831	995,028	1,219,542
	Total	19	22	3,105,261	3,386,449	7,436,887	8,391,031
Colorado	Direct	50	50	1,844,864	1,844,864	5,164,123	5,164,123
	Indirect	19	22	694,800	841,506	2,390,963	3,006,278
	Induced	9	10	455,946	514,078	1,491,065	1,671,211
	Total	78	82	2,995,610	3,200,447	9,046,152	9,841,613
Idaho	Direct	77	77	13,312,954	13,312,954	28,474,475	28,474,475
	Indirect	71	75	5,978,587	6,198,240	16,904,455	17,943,103
	Induced	66	68	3,158,689	3,294,103	10,417,492	10,862,683
	Total	214	221	22,450,229	22,805,297	55,796,422	57,280,261
Montana	Direct	186	186	10,506,213	10,506,213	33,185,106	33,185,106
	Indirect	109	122	6,251,713	6,858,824	20,744,631	22,504,995
	Induced	69	73	3,419,901	3,613,023	10,966,233	11,575,632
	Total	364	381	20,177,827	20,978,060	64,895,970	67,265,732
Nevada	Direct	82	82	13,703,178	13,703,178	42,086,589	42,086,589
	Indirect	85	88	5,973,781	6,146,434	20,950,722	22,479,206
	Induced	63	65	3,616,403	3,717,918	11,765,675	12,091,385
	Total	230	236	23,293,363	23,567,530	74,802,986	76,657,180
North Dakota	Direct	1	1	39,141	39,141	143,402	143,402
	Indirect	0	0	16,853	18,114	61,594	66,765
	Induced	0	0	6,328	6,822	23,344	24,852
	Total	1	1	62,321	64,077	228,340	235,019
Oregon	Direct	78	78	6,451,505	6,451,505	25,184,996	25,184,996
	Indirect	73	79	4,601,991	5,095,613	15,223,657	16,982,271
	Induced	46	49	2,412,991	2,592,299	7,323,332	7,844,739
	Total	197	206	13,466,487	14,139,416	47,731,985	50,012,006

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
South Dakota	Direct	5	5	185,898	185,898	1,405,882	1,405,882
	Indirect	4	4	157,013	176,985	794,297	888,717
	Induced	1	1	30,346	39,578	134,827	163,478
	Total	10	10	373,256	402,461	2,335,006	2,458,076
Utah	Direct	54	54	4,634,026	4,634,026	10,839,099	10,839,099
	Indirect	16	18	803,047	892,704	2,901,262	3,399,715
	Induced	17	18	646,897	692,011	2,527,803	2,676,460
	Total	87	90	6,083,969	6,218,740	16,268,163	16,915,273
Wyoming	Direct	301	301	14,742,131	14,742,131	52,633,690	52,633,690
	Indirect	172	176	7,079,345	7,304,934	26,109,990	27,047,064
	Induced	74	74	2,998,096	3,012,816	11,552,266	11,599,690
	Total	547	552	24,819,572	25,059,882	90,295,946	91,280,444
Total Planning Area	Direct	841	841	67,566,546	67,566,546	203,743,259	203,743,259
	Indirect	555	592	32,254,066	34,432,335	107,897,532	116,863,705
	Induced	351	365	17,007,286	17,823,479	57,197,065	59,729,672
	Total	1,747	1,801	116,827,895	119,822,359	368,837,857	380,336,635

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

Environmental Justice

Below is a detailed discussion of adverse and disproportionate impacts on environmental justice populations by state that contained identified environmental justice populations and with potential impacts that differ from the rangewide impacts, as discussed in **Section 4.8** of the EIS.[8]

Colorado

Impacts on environmental justice populations from potential impacts on cultural resources would be the same as described for Alternative 1, except in Colorado PHMAs, which would have no closed areas, and Colorado GHMAs, which would have NSO in place of closed areas. The exposure of areas in Colorado to fluid mineral leasing could increase the risk of potential impacts to cultural resources and decrease opportunities for American Indian and Alaska Native populations to maintain traditional cultural practices and values in areas where fluid mineral leasing occurs, although site specific NEPA analysis will be conducted to assess alternatives to avoid, minimize and/or compensate for identified impacts. This could have disproportionate and adverse impacts on environmental justice populations in the Colorado, especially on the American Indian and Alaska Native environmental justice populations located in Moffat County and Rio Blanco County (where American Indian and Alaska Native environmental justice populations were identified) as well as on American Indian and Alaska Native environmental justice populations that live outside of the analysis area that use the planning area for spiritual, cultural, and traditional uses. Future site-specific implementation analysis would be needed to determine the level and intensity of impacts.

Under Alternative 2, BLM-management decisions on fluid mineral development would increase potential impacts on nonmarket and social conditions due to changes in GHG emissions and air quality, compared with Alternative 1, which would disproportionately impact environmental justice populations throughout

[8] There were no counties in the North Dakota analysis area that met the threshold for environmental justice populations, so North Dakota is not included in the state-by-state discussion.

the Colorado analysis area. The extent to which environmental justice populations are impacted would depend on site-specific factors.

Idaho

In Idaho, removing SFAs and allowing consideration of new free use permits for salable minerals would reduce protections for GRSG and habitat, which could have negative impacts on cultural resources and decreased opportunities for American Indian and Alaska Native populations to maintain traditional cultural practices and values, such as observing lekking behavior. This could have disproportionate and adverse impacts on environmental justice populations in the Idaho, especially on the American Indian and Alaska Native environmental justice populations located in Adams, Bingham, Cassia, Clark, Custer, Elmore, Jefferson, Lemhi, Lincoln, Minidoka, Owyhee, Payette, Power, and Washington counties (where American Indian and Alaska Native environmental justice populations were identified) as well as on American Indian and Alaska Native environmental justice populations that live outside of the analysis area that use the planning area for spiritual, cultural, and traditional uses. Future site-specific implementation analysis would be needed to determine the level and intensity of impacts.

Under Alternative 2, allowing consideration of new free use permits for salable minerals in Idaho IHMA, would increase the potential for associated impacts on nonmarket and social conditions due to changes in air quality and GHG emissions compared with Alternative 1. This is because there would be a greater chance for more acres of salable mineral activities to occur in these areas. However, the impacts might be small due to the small amount of extraction.

Nevada

In Nevada, removing SFAs would reduce protections for GRSG and habitat, which could have negative impacts on cultural resources and decreased opportunities for American Indian and Alaska Native populations to maintain traditional cultural practices and values, such as observing lekking behavior. This could have disproportionate and adverse impacts on environmental justice populations in all counties in the Nevada analysis area as well as on American Indian and Alaska Native environmental justice populations that live outside of the analysis area that use the planning area for spiritual, cultural, and traditional uses. Future site-specific implementation analysis would be needed to determine the level and intensity of impacts.

Under Alternative 2, BLM-management decisions in Nevada would increase the potential for associated impacts on nonmarket and social conditions due to changes in air quality and GHG emissions from the potential for more nonenergy leasable mineral and salable mineral activities to occur.

Utah

In Utah, removing SFAs would reduce protections for GRSG and habitat, which could have negative impacts on cultural resources and decreased opportunities for American Indian and Alaska Native populations to maintain traditional cultural practices and values, such as observing lekking behavior. This could have disproportionate and adverse impacts on environmental justice populations in the Utah, especially on the American Indian and Alaska Native environmental justice populations located in Daggett, Duchesne, Emery, Garfield, Grand, Iron, Juab, Kane, Rich, and Uintah counties (where American Indian and Alaska Native environmental justice populations were identified) as well as on American Indian and Alaska Native environmental justice populations that live outside of the analysis area that use the planning area for spiritual, cultural, and traditional uses. Future site-specific implementation analysis would be needed to determine the level and intensity of impacts.

Under Alternative 2, areas outside PHMAs that are within 5 miles of leks in Utah would be avoidance for wind development. This could increase the potential for impacts on nonmarket and social conditions due to changes in air quality and GHG emissions compared with Alternative 1. This is because there would be a higher chance of development in an avoidance area as opposed to an exclusion area that includes an exception criterion to closure. This could have a disproportionate impact on environmental justice populations in analysis area counties in Utah.

Wyoming

In Wyoming, removing SFAs would reduce protections for GRSG and habitat, which could have negative impacts on cultural resources and decreased opportunities for American Indian and Alaska Native populations to maintain traditional cultural practices and values, such as observing lekking behavior. This could have disproportionate and adverse impacts on environmental justice populations in the Wyoming, especially on the American Indian and Alaska Native environmental justice populations located in Fremont County and Weston County, as well as on American Indian and Alaska Native environmental justice populations that live outside of the analysis area that use the planning area for spiritual, cultural, and traditional uses. There are protections in place for cultural resources within existing RMPs that would mitigate impacts on environmental justice populations. Future site-specific implementation analysis would be needed to determine the level and intensity of impacts.

18.4.4 Alternative 3

Fluid Minerals (Oil and Gas) Management

Table 18-11 shows the direct, indirect, induced, and total impacts on economic contributions from projected oil and gas activity. In the state-specific sub headers, a discussion on quantitative impacts shown in **Table 18-11** are provided as well as a qualitative discussion on the market and nonmarket impacts from potential changes in oil and gas operations in each state with reasonably foreseeable future development of oil and gas.[9]

[9] California and Oregon did not have reasonably foreseeable future oil and gas development in the planning area, so they are not included in the discussion.

Table 18-11. Average Annual Economic Contributions from Oil and Gas, Under Alternative 3

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Colorado (Low Scenario)	Direct	6,263	6,263	755,042,456	755,042,456	3,769,457,803	3,769,457,803
	Indirect	6,710	9,103	446,597,038	726,374,125	1,331,090,703	1,889,268,560
	Induced	4,195	5,685	211,750,319	303,124,126	690,742,964	973,984,029
	Total	17,169	21,052	1,413,389,813	1,784,540,707	5,791,291,470	6,632,710,393
Colorado (High Scenario)	Direct	9,122	9,122	1,099,726,614	1,099,726,614	5,488,012,722	5,488,012,722
	Indirect	9,768	13,251	650,031,765	1,057,138,792	1,937,740,979	2,750,295,798
	Induced	6,109	8,278	308,357,016	441,345,785	1,005,879,186	1,418,118,570
	Total	24,999	30,651	2,058,115,395	2,598,211,191	8,431,632,887	9,656,427,089
Idaho	Direct	5	5	312,003	312,003	1,623,920	1,623,920
	Indirect	4	4	213,009	247,755	730,956	857,555
	Induced	2	2	86,071	98,275	283,626	323,742
	Total	11	12	611,082	658,033	2,638,502	2,805,218
Montana	Direct	1,373	1,373	208,532,284	208,532,284	981,019,294	981,019,294
	Indirect	1,148	1,289	78,451,760	89,461,172	240,701,264	266,572,096
	Induced	1,140	1,215	56,520,836	60,271,768	181,144,175	192,975,835
	Total	3,661	3,877	343,504,881	358,265,225	1,402,864,733	1,440,567,225
Nevada	Direct	5	5	75,848	75,848	1,872,389	1,872,389
	Indirect	5	5	455,757	463,564	1,176,678	1,224,327
	Induced	2	2	96,998	103,864	315,246	337,269
	Total	12	12	628,603	643,276	3,364,313	3,433,985
North Dakota	Direct	233	233	27,075,375	27,075,375	343,845,594	343,845,594
	Indirect	145	152	8,675,140	9,223,747	37,657,396	39,726,925
	Induced	89	100	3,665,718	4,288,558	13,469,565	15,370,822
	Total	467	485	39,416,233	40,587,679	394,972,555	398,943,340
South Dakota	Direct	85	85	6,798,604	6,798,604	32,968,114	32,968,114
	Indirect	114	127	5,717,942	6,658,487	21,195,774	24,619,476
	Induced	28	40	955,881	1,577,407	4,216,565	6,143,908
	Total	227	252	13,472,426	15,034,497	58,380,452	63,731,498
Utah	Direct	2,122	2,122	145,452,892	145,452,892	1,453,148,321	1,453,148,321
	Indirect	1,813	2,948	103,766,870	203,833,762	343,164,682	538,804,986
	Induced	729	1,262	28,240,142	57,623,630	110,040,697	206,863,910
	Total	4,664	6,332	277,459,904	406,910,285	1,906,353,700	2,198,817,217

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Wyoming	Direct	5,662	5,662	537,821,720	537,821,720	5,948,302,548	5,948,302,548
	Indirect	4,324	4,330	323,338,652	323,733,856	1,019,540,905	1,020,766,687
	Induced	2,716	2,717	110,271,847	110,351,847	423,630,524	423,887,867
	Total	12,702	12,708	971,432,220	971,907,423	7,391,473,976	7,392,957,101
Total Planning Area (Low Colorado Scenario)	Direct	15,748	15,748	1,681,111,182	1,681,111,182	12,532,237,982	12,532,237,982
	Indirect	14,263	17,958	967,216,167	1,359,996,470	2,995,258,358	3,781,840,612
	Induced	8,901	11,024	411,587,814	537,439,474	1,423,843,361	1,819,887,382
	Total	38,912	44,730	3,059,915,162	3,578,547,126	16,951,339,701	18,133,965,977
Total Planning Area (High Colorado Scenario)	Direct	18,607	18,607	2,025,795,340	2,025,795,340	14,250,792,901	14,250,792,901
	Indirect	17,322	22,106	1,170,650,894	1,690,761,137	3,601,908,634	4,642,867,850
	Induced	10,815	13,616	508,194,510	675,661,134	1,738,979,583	2,264,021,923
	Total	46,743	54,329	3,704,640,744	4,392,217,610	19,591,681,118	21,157,682,673

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.
Note: There were no oil and gas developments projected for California and Oregon under all alternatives.

Colorado

Under Alternative 3, on annual average, oil and gas production revenue and well development expenditures in the Colorado analysis area is expected to result in about 1,000 to 13,000 fewer total jobs (about 300 to 3,600 fewer direct jobs), about $104 million to $1.1 billion less in total labor income (about $36 million to $439 million less in direct labor income), and about $390 million to $4.0 billion less in economic output (about $210 million to $2.3 billion less in direct economic output) across the state compared to development under Alternative 1.

The decrease in projected oil and gas activity, under Alternative 3, would result in reductions in tax revenues, compared with Alternative 1. Under Alternative 3, the total royalty revenue generated from oil and gas production in Colorado could range from $312 million to $454 million, which is about $140 million to $424 million less than under Alternative 1. The Colorado severance tax revenue could range from $29.3 million to $42.6 million, which is about $2.5 million to $19.2 million less than under Alternative 1. The oil and gas conservation fee could generate a range of $2.7 million to $4.0 million, which is about $240,000 to $1.8 million less than under Alternative 1. Additionally, oil and gas production could generate a range of $109 million to $159 million in county revenues from ad valorem taxes, which is about $9.5 million to $71.5 million less than under Alternative 1). The reduction in oil and gas activity, in Colorado, would likely lead to a decrease in revenue from rents, bonus bids, and sales and use tax, compared with Alternative 1. The reductions in tax revenues could put strain on local governments' budgets and could impact public services that are offered to the communities.

There could be impacts from BLM decisions on lifestyles and culture for those in mineral development communities of interest, especially for those individuals who rely on oil and gas extraction for employment. These impacts would have a large effect on communities throughout the analysis area in Colorado due to the reliance on the mineral industry and oil and gas development on federal estate for the local economies.

Idaho

Under Alternative 3, on annual average, oil and gas production revenue and well development expenditures in the Idaho analysis area is expected to result in about 2 fewer total jobs (about 1 fewer direct jobs), $101,000 less in total labor income (about $48,000 less in direct labor income), and about $432,000 less in economic output (about $250,000 less in direct economic output) across the state compared to development under Alternative 1.

The small decrease in projected oil and gas activity in Idaho could result in reductions in tax revenues compared with Alternative 1, which could impact public services that are offered to the communities.

The potential decrease in oil and gas activity could result in impacts from BLM decisions on lifestyles and culture for those in mineral development communities of interest.

Montana

Under Alternative 3, on annual average, oil and gas production revenue and well development expenditures in the Montana analysis area is expected to result in about 1,400 fewer total jobs (about 550 fewer direct jobs), $127 million less in total labor income (about $76 million less in direct labor income), and about $499 million less in economic output (about $337 million less in direct economic output) across the state compared to development under Alternative 1.

The decrease in projected oil and gas activity, under Alternative 3, would result in reductions in tax revenues, compared with Alternative 1. Under Alternative 3, the total royalty revenue generated from oil and gas

production in Montana would be about $75.7 million, which is about $36.8 million less than under Alternative 1. The Montana severance tax revenue is expected to be about $56.0 million, which is about $6.6 million less than under Alternative 1. Additionally, oil and gas production could generate about $1.6 million in the privilege and license tax revenue, which is about $186,000 less than under Alternative 1. The reduction in oil and gas activity, in Montana, would likely lead to a decrease in revenue from rents, bonus bids, and sales and use tax, compared with Alternative 1. The reductions in tax revenues could put strain on local governments' budgets and could impact public services that are offered to the communities.

Additionally, there could be impacts from BLM decisions on lifestyles and culture for those in mineral development communities of interest, especially for those individuals who rely on oil and gas extraction for employment. These impacts would have a larger effect on communities in southeastern and northeastern Montana, where the local economies have relied on mineral industry and oil and gas development on federal estate.

Nevada

Under Alternative 3, on annual average, oil and gas production revenue and well development expenditures in the Nevada analysis area is expected to result in about 29 fewer total jobs (about 13 fewer direct jobs), $1.5 million less in total labor income (about $173,000 less in direct labor income), and about $8.2 million less in economic output (about $4.5 million less in direct economic output) across the state compared to development under Alternative 1.

The decrease in projected oil and gas activity, under Alternative 3, could result in reductions in tax revenues, compared with Alternative 1. Under Alternative 3, the total royalty revenue generated from oil and gas production in Nevada would be about $111,000, which is about $409,000 less than under Alternative 1. The Nevada severance tax revenue is expected to be about $2,000, which is about $4,000 less than under Alternative 1. Additionally, oil and gas production could generate about $33,000 across the analysis area in revenue from the Net Proceeds of Minerals Tax, which is about $82,000 less than under Alternative 1. The reduction in oil and gas activity, in Nevada, would likely lead to a decrease in revenue from rents, bonus bids, and sales and use tax, compared with Alternative 1. The reductions in tax revenues could put strain on local governments' budgets and could impact public services that are offered to the communities.

There could be impacts from BLM-management decisions on lifestyles and culture for those in mineral development communities of interest, especially for those individuals who rely on oil and gas extraction for employment. These impacts would have a larger effect on communities in southern Nevada, where the local economies have relied on extractive minerals and oil and gas development on federal estate.

North Dakota

Under Alternative 3, on annual average, oil and gas production revenue and well development expenditures in the North Dakota analysis area is expected to result in about 88 fewer total jobs (about 42 fewer direct jobs), $7.4 million less in total labor income (about $4.9 million less in direct labor income), and about $72 million less in economic output (about $62 million less in direct economic output) across the state compared to development under Alternative 1.

The decrease in projected oil and gas activity, under Alternative 3, would result in reductions in tax revenues, compared to Alternative 1. Under Alternative 3, the total royalty revenue generated from oil and gas production in North Dakota would be about $32.7 million, which is about $18.8 million less than under Alternative 1. The North Dakota severance tax revenue is expected to be about $12.4 million, which is about $2.3 million less than under Alternative 1. Oil and gas production could generate about $13.1 million

across the analysis area oil extraction tax revenues, which is about $2.4 million less than under Alternative 1. The reduction in oil and gas activity, in North Dakota, would likely lead to a decrease in revenue from rents, bonus bids, and sales and use tax, compared with Alternative 1. The reductions in tax revenues could put strain on local governments' budgets and could impact public services that are offered to the communities.

There could be impacts from BLM decisions on lifestyles and culture for those in mineral development communities of interest, especially for those individuals who rely on oil and gas extraction for employment. These impacts would have a larger effect on communities in southwestern North Dakota, where the local economies have relied on extractive minerals and oil and gas development on federal estate.

South Dakota

Under Alternative 3, on annual average, oil and gas production revenue and well development expenditures in the South Dakota analysis area is expected to result in about 12 fewer total jobs (about 4 fewer direct jobs), $701,000 less in total labor income (about $292,000 less in direct labor income), and about $3.1 million less in economic output (about $1.6 million less in direct economic output) across the state compared to development under Alternative 1.

The decrease in projected oil and gas activity in South Dakota could result in reductions in tax revenues compared with Alternative 1. Under Alternative 3, the total royalty revenue generated from oil and gas production in South Dakota would be about $1.8 million, which is about $616,000 less than under Alternative 1. The South Dakota severance tax revenue is expected to be about $637,000, which is about $7,000 less than under Alternative 1. The reduction in oil and gas activity, in South Dakota, would likely lead to a decrease in revenue from rents, bonus bids, and sales and use tax, compared with Alternative 1. The reductions in tax revenues could impact public services that are offered to the communities.

The potential decrease in oil and gas activity could result in impacts from BLM-management decisions on lifestyles and culture for those in mineral development communities of interest.

Utah

Under Alternative 3, on annual average, oil and gas production revenue and well development expenditures in the Utah analysis area is expected to result in about 700 fewer total jobs (about 200 fewer direct jobs), $47 million less in total labor income (about $17 million less in direct labor income), and about $252 million less in economic output (about $167 million less in direct economic output) across the state compared to development under Alternative 1.

The decrease in projected oil and gas activity, under Alternative 3, would result in reductions in tax revenues, compared with Alternative 1. Under Alternative 3, the total royalty revenue generated from oil and gas production in Utah would be about $125 million, which is about $60.4 million less than under Alternative 1. The Utah severance tax revenue is expected to be about $50.0 million, which is about $5.6 million less than under Alternative 1. The conservation fee is expected to generate about $200,000, which is about $22,000 less than under Alternative 1. Additionally, oil and gas production could generate about $50.0 million across the analysis area in county revenues from ad valorem taxes, which is about $5.6 less than under Alternative 1. The reduction in oil and gas activity, in Utah, would likely lead to a decrease in revenue from rents, bonus bids, and sales and use tax, compared with Alternative 1. The reductions in tax revenues could put strain on local governments' budgets and could impact public services that are offered to the communities.

Additionally, there could be impacts from BLM decisions on lifestyles and culture for those in mineral development communities of interest, especially for those individuals who rely on oil and gas extraction for employment. These impacts would have a larger effect on communities in central and northeastern Utah, where the local economies have relied on mineral industry and oil and gas development on federal estate.

Wyoming

Under Alternative 3, on annual average, oil and gas production revenue and well development expenditures in the Wyoming analysis area is expected to result in about 14,000 fewer total jobs (about 6,000 fewer direct jobs), $1.0 billion less in total labor income (about $612 million less in direct labor income), and about $6.8 billion less in economic output (about $5.3 billion less in direct economic output) across the state compared to development under Alternative 1.

The decrease in projected oil and gas activity, under Alternative 3, would result in reductions in tax revenues, compared with Alternative 1. Under Alternative 3, the total royalty revenue generated from oil and gas production in Wyoming would be about $671 million, which is about $877 million less than under Alternative 1. The Wyoming severance tax revenue is expected to be about $322 million, which is about $235 million less than under Alternative 1. The oil and gas conservation tax is expected to generate about $2.7 million, which is about $2.0 million less than under Alternative 1. Additionally, oil and gas production could generate about $338 million across the analysis area in county revenues from ad valorem taxes, which is about $247 million less than under Alternative 1. The reduction in oil and gas activity, in Wyoming, would likely lead to a decrease in revenue from rents, bonus bids, and sales and use tax, compared with Alternative 1. The reductions in tax revenues could put strain on local governments' budgets and could impact public services that are offered to the communities.

There could be impacts from BLM decisions on lifestyles and culture for those in mineral development communities of interest, especially for those individuals who rely on oil and gas extraction for employment. These impacts would have a large effect on communities throughout the analysis area in Wyoming, due to the reliance on extractive minerals and oil and gas development on federal estate for the local economies.

Renewable Energy (Geothermal, Wind, and Solar) Management

Table 18-12 shows the direct, indirect, induced, and total impacts on economic contributions from projected geothermal activity. In the state-specific sub headers, a discussion on quantitative impacts shown in **Table 18-12** are provided as well as a qualitative discussion on the market and nonmarket impacts from potential changes in geothermal in each state with reasonably foreseeable future development of geothermal.[10]

[10] There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.

Table 18-12. Average Annual Economic Contributions from Geothermal, Under Alternative 3

State	Type of Impact	Employment	Labor Income	Economic Output
California and Nevada Combined	Direct	276	17,088,024	24,364,445
	Indirect	191	14,858,872	70,756,086
	Induced	73	4,035,862	11,151,537
	Total	540	35,982,758	106,272,068
Colorado	Direct	0	0	0
	Indirect	0	0	0
	Induced	0	0	0
	Total	0	0	0
Idaho	Direct	11	514,407	711,614
	Indirect	5	281,427	1,421,504
	Induced	2	106,915	343,289
	Total	18	902,749	2,476,407
Oregon	Direct	0	0	0
	Indirect	0	0	0
	Induced	0	0	0
	Total	0	0	0
Utah	Direct	0	0	0
	Indirect	0	0	0
	Induced	0	0	0
	Total	0	0	0
Wyoming	Direct	0	0	0
	Indirect	0	0	0
	Induced	0	0	0
	Total	0	0	0
Total Planning Area	Direct	287	17,602,431	25,076,059
	Indirect	196	15,140,299	72,177,590
	Induced	75	4,142,777	11,494,826
	Total	558	36,885,507	108,748,475

Source: National Renewable Energy Laboratory 2016
Note: There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.

California and Nevada

The number of geothermal plants developed in California and Nevada would be the same as under Alternative 1 because the amount of acreage under existing leases within GRSG HMAs is sufficient to meet the projected growth in geothermal production capacity (see **Appendix 12**, Reasonably Foreseeable Development Scenario), so the impacts on jobs, labor, income, economic output from geothermal development would also be the same as described under Alternative 1.

Colorado

Under Alternative 3, on annual average, geothermal development in the state is expected to result in about 16 fewer total jobs (about 8 fewer direct jobs), $1.1 million less in total labor income (about $537,000 less in direct labor income), and about $2.7 million less in economic output (about $761,000 less in direct economic output), compared with Alternative 1.

Idaho

Under Alternative 3, on annual average, geothermal development in the state is expected to result in about 18 fewer total jobs (about 11 fewer direct jobs), $892,000 less in total labor income (about $506,000 less in direct labor income), and about $2.5 million less in economic output (about $702,000 less in direct economic output), compared with Alternative 1. The reduction in geothermal activities, under Alternative 3 would likely lead to a slight reduction in tax revenue collected by the state for geothermal production and disbursed to the counties. This reduction in tax revenue would reduce the quality and level of public services that are funded by the geothermal production tax.

If there is a reduction in wind and solar energy activities, under Alternative 3, due to BLM-management decision, such as a reduction in development and production, there would likely result in a decrease in tax revenue collected by the state and distributed to the counties, which could result in a decrease in quality and quantity of public services in the analysis area.

Oregon

Under Alternative 3, on annual average, geothermal development in the state is expected to result in about 11 fewer total jobs (about 6 fewer direct jobs), $577,000 less in total labor income (about $297,000 less in direct labor income), and about $1.5 million less in economic output (about $402,000 less in direct economic output), compared with Alternative 1. However, existing leases could still be used for geothermal development, so if any of these leases are developed, the impacts on economic contributions would change.

North Dakota

If there is a reduction in wind energy activities, under Alternative 3, due to BLM-management decision, such as a reduction in development and production, there would likely result in a decrease in tax revenue collected by the state and distributed to the counties, which could result in a decrease in quality and quantity of public services in the analysis area.

South Dakota

If there is a reduction in wind and solar energy activities, under Alternative 3, due to BLM decision, such as a reduction in development and production, there would likely result in a decrease in tax revenue collected by the state and distributed to the counties, which could result in a decrease in quality and quantity of public services in the analysis area.

Utah

Under Alternative 3, on annual average, geothermal development in the state is expected to result in about 22 fewer total jobs (about 12 fewer direct jobs), $1.3 million less in total labor income (about $743,000 less in direct labor income), and about $3.6 million less in economic output (about $1.1 million less in direct economic output), compared with Alternative 1. However, existing leases could still be used for geothermal development. If any of these leases are developed, the impacts on economic contributions would change, but development is less likely, under Alternative 3.

Wyoming

Under Alternative 3, on annual average, geothermal development in the state is expected to result in about 9 fewer total jobs (about 6 fewer direct jobs), $432,000 less in total labor income (about $288,000 less in direct labor income), and about $1.3 million less in economic output (about $388,000 less in direct economic output), compared with Alternative 1.

If there is a reduction in wind energy activities, under Alternative 3, due to BLM-management decision, such as a reduction in development and production, there would likely result in a decrease in tax revenue collected by the state and distributed to the counties, which could result in a decrease in quality and quantity of public services in the analysis area.

Livestock Grazing Management

Table 18-13 shows the direct, indirect, induced, and total impacts on economic contributions from livestock grazing in allotments where PHMA accounted for at least 15 percent of the acreage. In the state-specific sub headers, a discussion on quantitative impacts shown in **Table 18-13** are provided.

Table 18-13. Average Annual Economic Contributions from Livestock Grazing in Allotments where PHMA Accounted for 15 Percent or More of the Acreage, Under Alternative 3

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
California	Direct	0	0	0	0	0	0
	Indirect	0	0	0	0	0	0
	Induced	0	0	0	0	0	0
	Total	0	0	0	0	0	0
Colorado	Direct	0	0	0	0	0	0
	Indirect	0	0	0	0	0	0
	Induced	0	0	0	0	0	0
	Total	0	0	0	0	0	0
Idaho	Direct	0	0	0	0	0	0
	Indirect	0	0	0	0	0	0
	Induced	0	0	0	0	0	0
	Total	0	0	0	0	0	0
Montana	Direct	0	0	0	0	0	0
	Indirect	0	0	0	0	0	0
	Induced	0	0	0	0	0	0
	Total	0	0	0	0	0	0
Nevada	Direct	0	0	0	0	0	0
	Indirect	0	0	0	0	0	0
	Induced	0	0	0	0	0	0
	Total	0	0	0	0	0	0
North Dakota	Direct	0	0	0	0	0	0
	Indirect	0	0	0	0	0	0
	Induced	0	0	0	0	0	0
	Total	0	0	0	0	0	0
Oregon	Direct	0	0	0	0	0	0
	Indirect	0	0	0	0	0	0
	Induced	0	0	0	0	0	0
	Total	0	0	0	0	0	0
South Dakota	Direct	0	0	0	0	0	0
	Indirect	0	0	0	0	0	0
	Induced	0	0	0	0	0	0
	Total	0	0	0	0	0	0

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Utah	Direct	0	0	0	0	0	0
	Indirect	0	0	0	0	0	0
	Induced	0	0	0	0	0	0
	Total	0	0	0	0	0	0
Wyoming	Direct	0	0	0	0	0	0
	Indirect	0	0	0	0	0	0
	Induced	0	0	0	0	0	0
	Total	0	0	0	0	0	0
Total Planning Area	Direct	0	0	0	0	0	0
	Indirect	0	0	0	0	0	0
	Induced	0	0	0	0	0	0
	Total	0	0	0	0	0	0

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

California

Under Alternative 3, on annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the California analysis area is expected to result in about 22 fewer total jobs (about 7 fewer direct jobs), $3.4 million less in total labor income (about $2.1 million less in direct labor income), and about $8.4 million less in economic output (about $4.6 million less in direct economic output) across the state compared with Alternative 1. These impacts on economic conditions would likely disproportionately impact those communities in the analysis area with small family ranches that rely on federal lands for forage for their farming and ranching operations. Impacts on nonmarket and social conditions would likely be similar to those described in the *Rangewide Environmental Consequences* subsection under **Section 4.12.4**, Alternative 3.

Colorado

Under Alternative 3, on annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the Colorado analysis area is expected to result in about 82 fewer total jobs (about 50 fewer direct jobs), $3.2 million less in total labor income (about $1.8 million less in direct labor income), and about $9.8 million less in economic output (about $5.2 million less in direct economic output) across the state compared with Alternative 1. These impacts on economic conditions would likely disproportionately impact those communities in the analysis area with small family ranches that rely on federal lands for forage for their farming and ranching operations. Impacts on nonmarket and social conditions would likely be similar to those described in the *Rangewide Environmental Consequences* subsection under **Section 4.12.4**, Alternative 3.

Idaho

Under Alternative 3, on annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the Idaho analysis area is expected to result in about 221 fewer total jobs (about 77 fewer direct jobs), $22.8 million less in total labor income (about $13.3 million less in direct labor income), and about $57.3 million less in economic output (about $28.5 million less in direct economic output) across the state compared with Alternative 1. These impacts on economic conditions would likely be substantial, especially for those communities in the analysis area with small family ranches that rely on federal lands for forage for their farming and ranching operations. Impacts on nonmarket and social conditions would likely

be similar to those described in the *Rangewide Environmental Consequences* subsection under **Section 4.12.4**, Alternative 3.

Montana

Under Alternative 3, on annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the Montana analysis area is expected to result in about 381 fewer total jobs (about 186 fewer direct jobs), $21.0 million less in total labor income (about $10.5 million less in direct labor income), and about $67.3 million less in economic output (about $33.2 million less in direct economic output) across the state compared with Alternative 1. These impacts on economic conditions would likely be substantial, especially for those communities in the analysis area with small family ranches that rely on federal lands for forage for their farming and ranching operations. Impacts on nonmarket and social conditions would likely be similar to those described in the *Rangewide Environmental Consequences* subsection under **Section 4.12.4**, Alternative 3.

Nevada

Under Alternative 3, on annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the Nevada analysis area is expected to result in about 236 fewer total jobs (82 fewer direct jobs), $23.6 million less in total labor income (about $13.7 million less in direct labor income), and about $76.7 million less in economic output (about $42.1 million less in direct economic output) across the state compared with Alternative 1. These impacts on economic conditions would likely be substantial, especially for those communities in the analysis area with small family ranches that rely on federal lands for forage for their farming and ranching operations. Impacts on nonmarket and social conditions would likely be similar to those described in the *Rangewide Environmental Consequences* subsection under **Section 4.12.4**, Alternative 3.

North Dakota

Under Alternative 3, on annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the North Dakota analysis area is expected to result in about 1 fewer total jobs (1 fewer direct jobs), $64,000 less in total labor income (about $39,000 less in direct labor income), and about $235,000 less in economic output (about $143,000 less in direct economic output) throughout the state, compared with Alternative 1. Impacts on nonmarket and social conditions would likely be similar to those described in the *Rangewide Environmental Consequences* subsection under **Section 4.12.4**, Alternative 3, although to a lesser degree.

Oregon

Under Alternative 3, on annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the Oregon analysis area is expected to result in about 206 fewer total jobs (78 fewer direct jobs), $14.1 million less in total labor income (about $6.5 million less in direct labor income), and about $50.0 million less in economic output (about $25.2 million less in direct economic output) across the state compared with Alternative 1. These impacts on economic conditions would likely be substantial, especially for those communities in the analysis area with small family ranches that rely on federal lands for forage for their farming and ranching operations. Impacts on nonmarket and social conditions would likely be similar to those described in the *Rangewide Environmental Consequences* subsection under **Section 4.12.4**, Alternative 3.

South Dakota

Under Alternative 3, on annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the South Dakota analysis area is expected to result in about 10 fewer total jobs (about 5 fewer direct jobs), $402,000 less in total labor income (about $186,000 less in direct labor income), and about $2.5 million less in economic output (about $1.4 million less in direct economic output) across the analysis area, compared with Alternative 1. These impacts on economic conditions would likely disproportionately impact those communities in the analysis area with small family ranches that rely on federal lands for forage for their farming and ranching operations. Impacts on nonmarket and social conditions would likely be similar to those described in the *Rangewide Environmental Consequences* subsection under **Section 4.12.4**, Alternative 3.

Utah

Under Alternative 3, on annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the Utah analysis area is expected to result in about 90 fewer total jobs (54 fewer direct jobs), $6.2 million less in total labor income (about $4.6 million less in direct labor income), and about $16.9 million less in economic output (about $10.8 million less in direct economic output) across the analysis area, compared with Alternative 1. These impacts on economic conditions would likely disproportionately impact those communities in the analysis area with small family ranches that rely on federal lands for forage for their farming and ranching operations. Impacts on nonmarket and social conditions would likely be similar to those described in the *Rangewide Environmental Consequences* subsection under **Section 4.12.4**, Alternative 3.

Wyoming

Under Alternative 3, on annual average, livestock grazing on allotments where PHMA accounted for at least 15 percent of the acreage in the Wyoming analysis area is expected to result in about 552 fewer total jobs (about 301 fewer direct jobs), $25.1 million less in total labor income (about $14.7 million less in direct labor income), and about $91.3 million less in economic output (about $52.6 million less in direct economic output) across the analysis area, compared with Alternative 1. These impacts on economic conditions would likely be substantial, especially for those communities in the analysis area with small family ranches that rely on federal lands for forage for their farming and ranching operations. Impacts on nonmarket and social conditions would likely be similar to those described in the *Rangewide Environmental Consequences* subsection under **Section 4.12.4**, Alternative 3.

18.4.5 Alternative 4

Fluid Minerals (Oil and Gas) Management

Table 18-14 shows the direct, indirect, induced, and total impacts on economic contributions from projected oil and gas activity. In the state-specific sub headers, a discussion on quantitative impacts shown in **Table 18-14** are provided as well as a qualitative discussion on the market and nonmarket impacts from potential changes in oil and gas operations in each state with reasonably foreseeable future development of oil and gas and with differing impacts from the rangewide impacts, as discussed in **Section 4.8** of the EIS.[11]

[11] California and Oregon did not have reasonably foreseeable future oil and gas development in the planning area, so they are not included in the discussion.

Table 18-14. Average Annual Economic Contributions from Oil and Gas, Under Alternative 4

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Colorado (Low Scenario)	Direct	6,948	6,948	835,579,681	835,579,681	4,210,876,842	4,210,876,842
	Indirect	7,504	10,248	501,986,077	823,906,926	1,490,742,665	2,133,156,312
	Induced	4,664	6,375	235,380,145	340,348,186	767,841,591	1,093,220,978
	Total	19,116	23,572	1,572,945,903	1,999,834,792	6,469,461,097	7,437,254,132
Colorado (High Scenario)	Direct	13,366	13,366	1,607,628,515	1,607,628,515	8,094,956,453	8,094,956,453
	Indirect	14,424	19,695	964,497,723	1,582,653,768	2,865,161,143	4,099,691,974
	Induced	8,969	12,257	452,687,909	654,332,656	1,476,725,857	2,101,783,237
	Total	36,759	45,318	3,024,814,147	3,844,614,938	12,436,843,453	14,296,431,664
Idaho	Direct	10	10	600,005	600,005	3,122,924	3,122,924
	Indirect	7	8	409,632	476,453	1,405,684	1,649,144
	Induced	3	4	165,521	188,990	545,434	622,581
	Total	21	23	1,175,158	1,265,448	5,074,042	5,394,649
Montana	Direct	1,922	1,922	284,762,972	284,762,972	1,318,085,631	1,318,085,631
	Indirect	1,563	1,725	105,741,719	118,169,771	327,422,634	359,077,656
	Induced	1,561	1,651	77,407,961	81,913,449	248,078,502	262,290,130
	Total	5,046	5,299	467,912,653	484,846,192	1,893,586,767	1,939,453,416
Nevada	Direct	18	18	249,165	249,165	6,374,761	6,374,761
	Indirect	17	18	1,554,685	1,580,942	4,001,386	4,162,182
	Induced	6	6	329,181	352,408	1,069,843	1,144,350
	Total	41	42	2,133,031	2,182,516	11,445,990	11,681,292
North Dakota	Direct	275	275	31,990,856	31,990,856	406,307,567	406,307,567
	Indirect	172	180	10,249,846	10,897,896	44,494,011	46,938,673
	Induced	105	119	4,331,162	5,067,030	15,914,717	18,161,000
	Total	551	573	46,571,864	47,955,782	466,716,295	471,407,239
South Dakota	Direct	89	89	7,090,932	7,090,932	34,541,446	34,541,446
	Indirect	120	134	5,990,214	6,990,786	22,253,716	25,892,162
	Induced	29	41	1,000,002	1,653,841	4,411,230	6,438,783
	Total	238	264	14,081,147	15,735,559	61,206,393	66,872,391
Utah	Direct	2,368	2,368	162,438,183	162,438,183	1,619,804,067	1,619,804,067
	Indirect	2,022	3,284	115,705,860	226,994,302	382,678,849	600,222,762
	Induced	814	1,407	31,513,987	64,193,883	122,797,623	230,483,019
	Total	5,204	7,059	309,658,031	453,626,368	2,125,280,538	2,450,509,848

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Wyoming	Direct	8,563	8,563	830,351,311	830,351,311	8,484,142,024	8,484,142,024
	Indirect	6,508	6,519	473,985,967	474,829,686	1,514,484,786	1,517,101,700
	Induced	4,133	4,136	167,816,877	167,987,667	644,693,548	645,242,948
	Total	19,203	19,217	1,472,154,155	1,473,168,664	10,643,320,357	10,646,486,671
Total Planning Area (Low Colorado Scenario)	Direct	20,194	20,194	2,153,063,106	2,153,063,106	16,083,255,261	16,083,255,261
	Indirect	17,913	22,116	1,215,624,001	1,663,846,763	3,787,483,732	4,688,200,590
	Induced	11,315	13,739	517,944,837	661,705,453	1,805,352,487	2,257,603,788
	Total	49,421	56,049	3,886,631,943	4,478,615,322	21,676,091,480	23,029,059,639
Total Planning Area (High Colorado Scenario)	Direct	26,611	26,611	2,925,111,940	2,925,111,940	19,967,334,873	19,967,334,873
	Indirect	24,833	31,563	1,678,135,648	2,422,593,605	5,161,902,209	6,654,736,252
	Induced	15,620	19,621	735,252,601	975,689,923	2,514,236,754	3,266,166,046
	Total	67,064	77,795	5,338,500,188	6,323,395,467	27,643,473,836	29,888,237,171

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.
Note: There were no oil and gas developments projected for California and Oregon under all alternatives.

Colorado

On annual average, oil and gas production revenue and well development expenditures in the Colorado analysis area is expected to result in 1,300 to 2,000 additional total jobs (about 374 to 574 additional direct jobs), about $111 million to $172 million in additional total labor income (about $45 million to $68 million in additional direct labor income), and about $414 million to $639 million in additional economic output, compared with Alternative 1 (about $232 million to $357 million in additional direct economic output) throughout the state.

Under Alternative 4, the total royalty revenue generated from oil and gas production in Colorado could range from $482 million to $924 million, which is about $29.3 million to $45.8 million more than under Alternative 1. The Colorado severance tax revenue could range from $33.9 million to $64.9 million, which is about $2.1 million to $3.2 million more than under Alternative 1. The oil and gas conservation fee could generate a range of $3.2 million to $6.1 million, which is about 193,000 to 302,000 more than under Alternative 1. Additionally, oil and gas production could generate a range of $126 million to $242 million in county revenues from ad valorem taxes, which is about $7.7 million to $12.0 million more than under Alternative 1. The increase in oil and gas activity, in Colorado, would likely lead to an increase in revenue from rents, bonus bids, and sales and use tax, compared with Alternative 1. This increase in revenues that are disbursed to counties could bolster public finances which may be used to support additional public services, compared with Alternative 1. Additionally, there could be more support and preservation of nonmarket values associated lifestyles and culture for those in mineral development communities of interest and those who value preservation of historical mining communities.

In Colorado more acreage would be available for fluid mineral leasing than under Alternative 1, since closures within one mile of leks in GHMA would no longer apply. This could allow for more development-related impacts on nonmarket and social conditions associated with changes in air quality and GHG emissions, compared with Alternative 1.

Idaho

On annual average, oil and gas production revenue and well development expenditures in the Idaho analysis area is expected to result in about 9 total additional jobs (about 4 additional direct jobs), $506,000 in additional total labor income (about $240,000 in additional direct labor income), and about $2.2 million in additional economic output (about $1.2 million in additional direct economic output) throughout the state, compared with Alternative 1.

The small increase in projected oil and gas activity In Idaho could result in a small increase in tax revenues compared with Alternative 1, which would be disbursed to counties and would continue to support local public services, such as education.

The potential increase in oil and gas activity is not likely to result in large impacts from BLM decisions on lifestyles and culture for those in mineral development communities of interest.

Wyoming

Under Alternative 4, NSO stipulations would be applied to all land in PHMA and within 0.25 miles of leks in GHMA. This would reduce the acreage available for fluid mineral leasing, compared to Alternative 1. On annual average, oil and gas production revenue and well development expenditures in the Wyoming analysis area are expected to result in about 7,000 fewer total jobs (about 3,000 fewer direct jobs), $547 million less in total labor income (about $319 million less in direct labor income), and about $3.5 billion less in economic

output (about $2.8 billion less in direct economic output) across the state compared to development under Alternative 1.

The decrease in projected oil and gas activity, under Alternative 4, would result in reductions in tax revenues, compared with Alternative 1. The total royalty revenue generated from oil and gas production in Wyoming would be about $1.2 billion, which is about $341 million less than under Alternative 1. The Wyoming severance tax revenue is expected to be about $434 million, which is about $123 million less than under Alternative 1. The oil and gas conservation tax is expected to generate about $3.6 million, which is about $1.0 million less than under Alternative 1. Oil and gas production could generate about $456 million across the analysis area in county revenues from ad valorem taxes, which is about $129 million less than under Alternative 1. The decrease in oil and gas activity, in Wyoming, would likely lead to a reduction in revenue from rents, bonus bids, and sales and use tax, compared with Alternative 1. The reductions in tax revenues could put strain on local governments' budgets and could impact public services that are offered to the communities, including education.

There could be impacts on lifestyles and culture for those in mineral development communities of interest, especially for those individuals who rely on oil and gas extraction for employment.

The reduction in the acreage available for fluid mineral leasing could reduce the development-related impacts on nonmarket and social conditions associate with changes in air quality and GHG emissions, compared with Alternative 1.

Renewable Energy (Geothermal, Wind, and Solar) Management

Table 18-15 shows the direct, indirect, induced, and total impacts on economic contributions from projected geothermal activity. A discussion on impacts are provided at the rangewide-level in **Section 4.8** of the EIS.

Table 18-15. Average Annual Economic Contributions from Geothermal, Under Alternative 4

State	Type of Impact	Employment	Labor Income	Economic Output
California and Nevada Combined	Direct	276	17,088,024	24,364,445
	Indirect	191	14,858,872	70,756,086
	Induced	73	4,035,862	11,151,537
	Total	540	35,982,758	106,272,068
Colorado	Direct	8	536,971	761,363
	Indirect	4	333,762	1,356,788
	Induced	3	186,572	540,294
	Total	16	1,057,306	2,658,444
Idaho	Direct	22	1,020,547	1,413,689
	Indirect	10	561,620	2,833,188
	Induced	5	212,864	683,476
	Total	36	1,795,032	4,930,353
Oregon	Direct	6	297,479	402,124
	Indirect	3	188,906	846,182
	Induced	2	90,611	260,967
	Total	11	576,996	1,509,272

State	Type of Impact	Employment	Labor Income	Economic Output
Utah	Direct	12	742,958	1,059,324
	Indirect	6	397,232	1,868,982
	Induced	4	209,788	671,228
	Total	22	1,349,977	3,599,534
Wyoming	Direct	6	288,314	388,376
	Indirect	2	113,518	796,725
	Induced	1	30,436	101,568
	Total	9	432,268	1,286,669
Total Planning Area	Direct	330	19,974,293	28,389,321
	Indirect	216	16,453,910	78,457,951
	Induced	88	4,766,133	13,409,070
	Total	634	41,194,337	120,256,340

Source: National Renewable Energy Laboratory 2016
Note: There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.

Livestock Grazing Management

Table 18-16 shows the direct, indirect, induced, and total impacts on economic contributions from livestock grazing in allotments where PHMA accounted for at least 15 percent of the acreage. A discussion on impacts is provided at the rangewide-level in **Section 4.8** of the EIS.

Table 18-16. Average Annual Economic Contributions from Livestock Grazing in Allotments where PHMA Accounted for 15 Percent or More of the Acreage, Under Alternative 4

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
California	Direct	7	7	2,146,636	2,146,636	4,625,897	4,625,897
	Indirect	6	8	696,936	898,981	1,815,961	2,545,591
	Induced	6	7	261,689	340,831	995,028	1,219,542
	Total	19	22	3,105,261	3,386,449	7,436,887	8,391,031
Colorado	Direct	50	50	1,844,864	1,844,864	5,164,123	5,164,123
	Indirect	19	22	694,800	841,506	2,390,963	3,006,278
	Induced	9	10	455,946	514,078	1,491,065	1,671,211
	Total	78	82	2,995,610	3,200,447	9,046,152	9,841,613
Idaho	Direct	77	77	13,312,954	13,312,954	28,474,475	28,474,475
	Indirect	71	75	5,978,587	6,198,240	16,904,455	17,943,103
	Induced	66	68	3,158,689	3,294,103	10,417,492	10,862,683
	Total	214	221	22,450,229	22,805,297	55,796,422	57,280,261
Montana	Direct	186	186	10,506,213	10,506,213	33,185,106	33,185,106
	Indirect	109	122	6,251,713	6,858,824	20,744,631	22,504,995
	Induced	69	73	3,419,901	3,613,023	10,966,233	11,575,632
	Total	364	381	20,177,827	20,978,060	64,895,970	67,265,732
Nevada	Direct	82	82	13,703,178	13,703,178	42,086,589	42,086,589
	Indirect	85	88	5,973,781	6,146,434	20,950,722	22,479,206
	Induced	63	65	3,616,403	3,717,918	11,765,675	12,091,385
	Total	230	236	23,293,363	23,567,530	74,802,986	76,657,180

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
North Dakota	Direct	1	1	39,141	39,141	143,402	143,402
	Indirect	0	0	16,853	18,114	61,594	66,765
	Induced	0	0	6,328	6,822	23,344	24,852
	Total	1	1	62,321	64,077	228,340	235,019
Oregon	Direct	78	78	6,451,505	6,451,505	25,184,996	25,184,996
	Indirect	73	79	4,601,991	5,095,613	15,223,657	16,982,271
	Induced	46	49	2,412,991	2,592,299	7,323,332	7,844,739
	Total	197	206	13,466,487	14,139,416	47,731,985	50,012,006
South Dakota	Direct	5	5	185,898	185,898	1,405,882	1,405,882
	Indirect	4	4	157,013	176,985	794,297	888,717
	Induced	1	1	30,346	39,578	134,827	163,478
	Total	10	10	373,256	402,461	2,335,006	2,458,076
Utah	Direct	54	54	4,634,026	4,634,026	10,839,099	10,839,099
	Indirect	16	18	803,047	892,704	2,901,262	3,399,715
	Induced	17	18	646,897	692,011	2,527,803	2,676,460
	Total	87	90	6,083,969	6,218,740	16,268,163	16,915,273
Wyoming	Direct	301	301	14,742,131	14,742,131	52,633,690	52,633,690
	Indirect	172	176	7,079,345	7,304,934	26,109,990	27,047,064
	Induced	74	74	2,998,096	3,012,816	11,552,266	11,599,690
	Total	547	552	24,819,572	25,059,882	90,295,946	91,280,444
Total Planning Area	Direct	841	841	67,566,546	67,566,546	203,743,259	203,743,259
	Indirect	555	592	32,254,066	34,432,335	107,897,532	116,863,705
	Induced	351	365	17,007,286	17,823,479	57,197,065	59,729,672
	Total	1,747	1,801	116,827,895	119,822,359	368,837,857	380,336,635

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

18.4.6 Alternative 5

Fluid Minerals (Oil and Gas) Management

Table 18-17 shows the direct, indirect, induced, and total impacts on economic contributions from projected oil and gas activity. In the state-specific sub headers, a discussion on quantitative impacts shown in **Table 18-17** are provided as well as a qualitative discussion on the market and nonmarket impacts from potential changes in oil and gas operations in each state with reasonably foreseeable future development of oil and gas and with differing impacts from the rangewide impacts, as discussed in **Section 4.8** of the EIS.[12]

[12] California and Oregon did not have reasonably foreseeable future oil and gas development in the planning area, so they are not included in the discussion.

Table 18-17. Average Annual Economic Contributions from Oil and Gas, Under Alternative 5

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Colorado (Low Scenario)	Direct	6,948	6,948	835,579,681	835,579,681	4,210,876,842	4,210,876,842
	Indirect	7,504	10,248	501,986,077	823,906,926	1,490,742,665	2,133,156,312
	Induced	4,664	6,375	235,380,145	340,348,186	767,841,591	1,093,220,978
	Total	19,116	23,572	1,572,945,903	1,999,834,792	6,469,461,097	7,437,254,132
Colorado (High Scenario)	Direct	13,366	13,366	1,607,628,515	1,607,628,515	8,094,956,453	8,094,956,453
	Indirect	14,424	19,695	964,497,723	1,582,653,768	2,865,161,143	4,099,691,974
	Induced	8,969	12,257	452,687,909	654,332,656	1,476,725,857	2,101,783,237
	Total	36,759	45,318	3,024,814,147	3,844,614,938	12,436,843,453	14,296,431,664
Idaho	Direct	10	10	576,005	576,005	2,998,007	2,998,007
	Indirect	7	8	393,247	457,395	1,349,457	1,583,179
	Induced	3	4	158,900	181,431	523,616	597,678
	Total	20	22	1,128,152	1,214,830	4,871,080	5,178,863
Montana	Direct	1,922	1,922	284,762,972	284,762,972	1,318,085,631	1,318,085,631
	Indirect	1,563	1,725	105,741,719	118,169,771	327,422,634	359,077,656
	Induced	1,561	1,651	77,407,961	81,913,449	248,078,502	262,290,130
	Total	5,046	5,299	467,912,653	484,846,192	1,893,586,767	1,939,453,416
Nevada	Direct	18	18	249,165	249,165	6,374,761	6,374,761
	Indirect	17	18	1,554,685	1,580,942	4,001,386	4,162,182
	Induced	6	6	329,181	352,408	1,069,843	1,144,350
	Total	41	42	2,133,031	2,182,516	11,445,990	11,681,292
North Dakota	Direct	275	275	31,990,856	31,990,856	406,307,567	406,307,567
	Indirect	172	180	10,249,846	10,897,896	44,494,011	46,938,673
	Induced	105	119	4,331,162	5,067,030	15,914,717	18,161,000
	Total	551	573	46,571,864	47,955,782	466,716,295	471,407,239
South Dakota	Direct	89	89	7,090,932	7,090,932	34,541,446	34,541,446
	Indirect	120	134	5,990,214	6,990,786	22,253,716	25,892,162
	Induced	29	41	1,000,002	1,653,841	4,411,230	6,438,783
	Total	238	264	14,081,147	15,735,559	61,206,393	66,872,391
Utah	Direct	2,368	2,368	162,438,183	162,438,183	1,619,804,067	1,619,804,067
	Indirect	2,022	3,284	115,705,860	226,994,302	382,678,849	600,222,762
	Induced	814	1,407	31,513,987	64,193,883	122,797,623	230,483,019
	Total	5,204	7,059	309,658,031	453,626,368	2,125,280,538	2,450,509,848

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Wyoming	Direct	11,198	11,198	1,096,050,568	1,096,050,568	10,787,200,027	10,787,200,027
	Indirect	8,491	8,507	610,809,003	612,060,166	1,964,016,319	1,967,896,977
	Induced	5,420	5,424	220,083,280	220,336,547	845,478,379	846,293,093
	Total	25,108	25,129	1,926,942,851	1,928,447,281	13,596,694,725	13,601,390,097
Total Planning Area (Low Colorado Scenario)	Direct	22,828	22,828	2,418,738,362	2,418,738,362	18,386,188,347	18,386,188,347
	Indirect	19,896	24,104	1,352,430,652	1,801,058,185	4,236,959,037	5,138,929,902
	Induced	12,602	15,028	570,204,619	714,046,774	2,006,115,502	2,458,629,029
	Total	55,326	61,960	4,341,373,633	4,933,843,320	24,629,262,886	25,983,747,279
Total Planning Area (High Colorado Scenario)	Direct	29,246	29,246	3,190,787,196	3,190,787,196	22,270,267,959	22,270,267,959
	Indirect	26,816	33,551	1,814,942,298	2,559,805,027	5,611,377,515	7,105,465,564
	Induced	16,907	20,910	787,512,383	1,028,031,244	2,714,999,768	3,467,191,288
	Total	72,969	83,706	5,793,241,877	6,778,623,466	30,596,645,242	32,842,924,810

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.
Note: There were no oil and gas developments projected for California and Oregon under all alternatives.

Colorado

The economic and social impacts of changes in oil and gas development in the Colorado analysis area due to the BLM decisions would be the same as under Alternative 4.

Idaho

On annual average, oil and gas production revenue and well development expenditures in the Idaho analysis area is expected to result in about 8 total additional jobs (about 4 additional direct jobs), $456,000 in additional total labor income (about $216,000 in additional direct labor income), and about $1.9 million in additional economic output (about $1.1 million in additional direct economic output) throughout the state, compared with Alternative 1.

The small increase in projected oil and gas activity In Idaho could result in a small increase in tax revenues compared with Alternative 1, which would be disbursed to counties and would continue to support local public services, such as education.

The potential increase in oil and gas activity is not likely to result in large impacts from BLM-management decisions on lifestyles and culture for those in mineral development communities of interest.

Wyoming

On annual average, oil and gas production revenue and well development expenditures in the Wyoming analysis area is expected to result in about 1,000 fewer total jobs (about 530 fewer direct jobs), about $92 million less in total labor income (about $53 million less in direct labor income), and about $595 million less in economic output (about $464 million less in direct economic output), compared with Alternative 1 throughout the state.

The decrease in projected oil and gas activity, under Alternative 5, would result in reductions in tax revenues, compared with Alternative 1. Under Alternative 5, the total royalty revenue generated from oil and gas production in Wyoming would be about $1.5 billion, which is about $57 million less than under Alternative 1. The Wyoming severance tax revenue is expected to be about $537 million, which is about $21 million less than under Alternative 1. The oil and gas conservation tax could generate about $4.5 million, which would be about $172,000 less than under Alternative 1. Oil and gas production could generate about $563 million across the analysis area in county revenues from ad valorem taxes, which is about $22 million less than under Alternative 1. The decrease in oil and gas activity, in Wyoming, under Alternative 5, would likely lead to a reduction in revenue from rents, bonus bids, and sales and use tax, compared with Alternative 1. The reductions in tax revenues could put strain on local governments' budgets and could impact public services that are offered to the communities, including education.

There could be impacts from BLM decisions on lifestyles and culture for those in mineral development communities of interest, especially for those individuals who rely on oil and gas extraction for employment.

The reduction in the acreage available for fluid mineral leasing could reduce the development-related impacts on nonmarket and social conditions associate with changes in air and GHG emissions, compared with Alternative 1.

Renewable Energy (Geothermal, Wind, and Solar) Management

Table 18-18 shows the direct, indirect, induced, and total impacts on economic contributions from projected geothermal activity. A discussion on impacts is provided at the rangewide-level in **Section 4.8** of the EIS.

Table 18-18. Average Annual Economic Contributions from Geothermal, Under Alternative 5

State	Type of Impact	Employment	Labor Income	Economic Output
California and Nevada Combined	Direct	276	17,088,024	24,364,445
	Indirect	191	14,858,872	70,756,086
	Induced	73	4,035,862	11,151,537
	Total	540	35,982,758	106,272,068
Colorado	Direct	8	536,971	761,363
	Indirect	4	333,762	1,356,788
	Induced	3	186,572	540,294
	Total	16	1,057,306	2,658,444
Idaho	Direct	22	1,020,547	1,413,689
	Indirect	10	561,620	2,833,188
	Induced	5	212,864	683,476
	Total	36	1,795,032	4,930,353
Oregon	Direct	6	297,479	402,124
	Indirect	3	188,906	846,182
	Induced	2	90,611	260,967
	Total	11	576,996	1,509,272
Utah	Direct	12	742,958	1,059,324
	Indirect	6	397,232	1,868,982
	Induced	4	209,788	671,228
	Total	22	1,349,977	3,599,534
Wyoming	Direct	6	288,314	388,376
	Indirect	2	113,518	796,725
	Induced	1	30,436	101,568
	Total	9	432,268	1,286,669
Total Planning Area	Direct	330	19,974,293	28,389,321
	Indirect	216	16,453,910	78,457,951
	Induced	88	4,766,133	13,409,070
	Total	634	41,194,337	120,256,340

Source: National Renewable Energy Laboratory 2016
Note: There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.

Livestock Grazing Management

Table 18-19 shows the direct, indirect, induced, and total impacts on economic contributions from livestock grazing in allotments where PHMA accounted for at least 15 percent of the acreage. A discussion on impacts is provided at the rangewide-level in **Section 4.8** of the EIS.

Table 18-19. Average Annual Economic Contributions from Livestock Grazing in Allotments where PHMA Accounted for 15 Percent or More of the Acreage, Under Alternative 5

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
California	Direct	7	7	2,146,636	2,146,636	4,625,897	4,625,897
	Indirect	6	8	696,936	898,981	1,815,961	2,545,591
	Induced	6	7	261,689	340,831	995,028	1,219,542
	Total	19	22	3,105,261	3,386,449	7,436,887	8,391,031

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Colorado	Direct	50	50	1,844,864	1,844,864	5,164,123	5,164,123
	Indirect	19	22	694,800	841,506	2,390,963	3,006,278
	Induced	9	10	455,946	514,078	1,491,065	1,671,211
	Total	78	82	2,995,610	3,200,447	9,046,152	9,841,613
Idaho	Direct	77	77	13,312,954	13,312,954	28,474,475	28,474,475
	Indirect	71	75	5,978,587	6,198,240	16,904,455	17,943,103
	Induced	66	68	3,158,689	3,294,103	10,417,492	10,862,683
	Total	214	221	22,450,229	22,805,297	55,796,422	57,280,261
Montana	Direct	186	186	10,506,213	10,506,213	33,185,106	33,185,106
	Indirect	109	122	6,251,713	6,858,824	20,744,631	22,504,995
	Induced	69	73	3,419,901	3,613,023	10,966,233	11,575,632
	Total	364	381	20,177,827	20,978,060	64,895,970	67,265,732
Nevada	Direct	82	82	13,703,178	13,703,178	42,086,589	42,086,589
	Indirect	85	88	5,973,781	6,146,434	20,950,722	22,479,206
	Induced	63	65	3,616,403	3,717,918	11,765,675	12,091,385
	Total	230	236	23,293,363	23,567,530	74,802,986	76,657,180
North Dakota	Direct	1	1	39,141	39,141	143,402	143,402
	Indirect	0	0	16,853	18,114	61,594	66,765
	Induced	0	0	6,328	6,822	23,344	24,852
	Total	1	1	62,321	64,077	228,340	235,019
Oregon	Direct	78	78	6,451,505	6,451,505	25,184,996	25,184,996
	Indirect	73	79	4,601,991	5,095,613	15,223,657	16,982,271
	Induced	46	49	2,412,991	2,592,299	7,323,332	7,844,739
	Total	197	206	13,466,487	14,139,416	47,731,985	50,012,006
South Dakota	Direct	5	5	185,898	185,898	1,405,882	1,405,882
	Indirect	4	4	157,013	176,985	794,297	888,717
	Induced	1	1	30,346	39,578	134,827	163,478
	Total	10	10	373,256	402,461	2,335,006	2,458,076
Utah	Direct	54	54	4,634,026	4,634,026	10,839,099	10,839,099
	Indirect	16	18	803,047	892,704	2,901,262	3,399,715
	Induced	17	18	646,897	692,011	2,527,803	2,676,460
	Total	87	90	6,083,969	6,218,740	16,268,163	16,915,273
Wyoming	Direct	301	301	14,742,131	14,742,131	52,633,690	52,633,690
	Indirect	172	176	7,079,345	7,304,934	26,109,990	27,047,064
	Induced	74	74	2,998,096	3,012,816	11,552,266	11,599,690
	Total	547	552	24,819,572	25,059,882	90,295,946	91,280,444
Total Planning Area	Direct	841	841	67,566,546	67,566,546	203,743,259	203,743,259
	Indirect	555	592	32,254,066	34,432,335	107,897,532	116,863,705
	Induced	351	365	17,007,286	17,823,479	57,197,065	59,729,672
	Total	1,747	1,801	116,827,895	119,822,359	368,837,857	380,336,635

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

18.4.7 Alternative 6

Fluid Minerals (Oil and Gas) Management

Table 18-20 shows the direct, indirect, induced, and total impacts on economic contributions from projected oil and gas activity. In the state-specific sub headers for Wyoming, below, a discussion on quantitative impacts shown in **Table 18-20** are provided as well as a qualitative discussion on the market and nonmarket impacts from potential changes in oil and gas operations.

Table 18-20. Average Annual Economic Contributions from Oil and Gas, Under Alternative 6

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Colorado (Low Scenario)	Direct	6,948	6,948	835,579,681	835,579,681	4,210,876,842	4,210,876,842
	Indirect	7,504	10,248	501,986,077	823,906,926	1,490,742,665	2,133,156,312
	Induced	4,664	6,375	235,380,145	340,348,186	767,841,591	1,093,220,978
	Total	19,116	23,572	1,572,945,903	1,999,834,792	6,469,461,097	7,437,254,132
Colorado (High Scenario)	Direct	13,366	13,366	1,607,628,515	1,607,628,515	8,094,956,453	8,094,956,453
	Indirect	14,424	19,695	964,497,723	1,582,653,768	2,865,161,143	4,099,691,974
	Induced	8,969	12,257	452,687,909	654,332,656	1,476,725,857	2,101,783,237
	Total	36,759	45,318	3,024,814,147	3,844,614,938	12,436,843,453	14,296,431,664
Idaho	Direct	10	10	576,005	576,005	2,998,007	2,998,007
	Indirect	7	8	393,247	457,395	1,349,457	1,583,179
	Induced	3	4	158,900	181,431	523,616	597,678
	Total	20	22	1,128,152	1,214,830	4,871,080	5,178,863
Montana	Direct	1,922	1,922	284,762,972	284,762,972	1,318,085,631	1,318,085,631
	Indirect	1,563	1,725	105,741,719	118,169,771	327,422,634	359,077,656
	Induced	1,561	1,651	77,407,961	81,913,449	248,078,502	262,290,130
	Total	5,046	5,299	467,912,653	484,846,192	1,893,586,767	1,939,453,416
Nevada	Direct	18	18	249,165	249,165	6,374,761	6,374,761
	Indirect	17	18	1,554,685	1,580,942	4,001,386	4,162,182
	Induced	6	6	329,181	352,408	1,069,843	1,144,350
	Total	41	42	2,133,031	2,182,516	11,445,990	11,681,292
North Dakota	Direct	275	275	31,990,856	31,990,856	406,307,567	406,307,567
	Indirect	172	180	10,249,846	10,897,896	44,494,011	46,938,673
	Induced	105	119	4,331,162	5,067,030	15,914,717	18,161,000
	Total	551	573	46,571,864	47,955,782	466,716,295	471,407,239
South Dakota	Direct	89	89	7,090,932	7,090,932	34,541,446	34,541,446
	Indirect	120	134	5,990,214	6,990,786	22,253,716	25,892,162
	Induced	29	41	1,000,002	1,653,841	4,411,230	6,438,783
	Total	238	264	14,081,147	15,735,559	61,206,393	66,872,391
Utah	Direct	2,368	2,368	162,438,183	162,438,183	1,619,804,067	1,619,804,067
	Indirect	2,022	3,284	115,705,860	226,994,302	382,678,849	600,222,762
	Induced	814	1,407	31,513,987	64,193,883	122,797,623	230,483,019
	Total	5,204	7,059	309,658,031	453,626,368	2,125,280,538	2,450,509,848

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Wyoming	Direct	11,089	11,089	1,085,144,628	1,085,144,628	10,691,456,750	10,691,456,750
	Indirect	8,409	8,425	605,149,258	606,384,102	1,945,461,542	1,949,291,584
	Induced	5,367	5,371	217,933,729	218,183,692	837,220,724	838,024,811
	Total	24,865	24,886	1,908,227,615	1,909,712,421	13,474,139,017	13,478,773,144
Total Planning Area (Low Colorado Scenario)	Direct	22,720	22,720	2,407,832,421	2,407,832,421	18,290,445,070	18,290,445,070
	Indirect	19,814	24,022	1,346,770,907	1,795,382,120	4,218,404,261	5,120,324,509
	Induced	12,549	14,975	568,055,068	711,893,919	1,997,857,846	2,450,360,747
	Total	55,083	61,717	4,322,658,396	4,915,108,461	24,506,707,178	25,861,130,327
Total Planning Area (High Colorado Scenario)	Direct	29,137	29,137	3,179,881,256	3,179,881,256	22,174,524,682	22,174,524,682
	Indirect	26,734	33,469	1,809,282,553	2,554,128,962	5,592,822,739	7,086,860,170
	Induced	16,854	20,857	785,362,832	1,025,878,389	2,706,742,113	3,458,923,006
	Total	72,726	83,463	5,774,526,641	6,759,888,606	30,474,089,534	32,720,307,858

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.
Note: There were no oil and gas developments projected for California and Oregon under all alternatives.

Wyoming

Management of ACECs as open to leasing subject to NSO stipulations with an exception/modification to allow occupancy if there are drainage concerns from adjacent development and if it can be demonstrated that no direct or indirect impacts on GRSG will occur could lead to a reduction in the number of wells drilled and completed as well as oil and gas production from these wells in Wyoming, compared with Alternative 1.

On annual average, oil and gas production revenue and well development expenditures in the Wyoming analysis area is expected to result in about 1,000 fewer total jobs (about 640 fewer direct jobs), about $110 million less in total labor income (about $64 million less in direct labor income), and about $717 million less in economic output (about $559 million less in direct economic output), than under Alternative 1, throughout the state (see **Table 18-9** in **Appendix 18**).

The decrease in projected oil and gas activity, under Alternative 6, would result in reductions in tax revenues, compared with Alternative 1. The total royalty revenue generated from oil and gas production in Wyoming would be about $1.5 billion, which is about $69 million less than under Alternative 1. The Wyoming severance tax revenue is expected to be about $532 million, which is about $25 million less than under Alternative 1. The oil and gas conservation tax is expected to generate about $4.4 million, which is about $208,000 less than under Alternative 1. Oil and gas production could generate about $559 million across the analysis area in county revenues from ad valorem taxes, which is about $26 million less than under Alternative 1. Additionally, a reduction in oil and gas activity, in Wyoming, under Alternative 6, could lead to a decrease in revenue from rents, bonus bids, and sales and use taxes, compared with Alternative 1. The reductions in tax revenues could put strain on local governments' budgets and could impact public services that are offered to the communities, including education. There could be impacts from BLM decisions on lifestyles and culture for those in mineral development communities of interest, especially for those individuals who rely on oil and gas extraction for employment.

The reduction in the acreage available for fluid mineral leasing could reduce the development-related impacts on nonmarket and social conditions associate with changes in air and GHG emissions, compared with Alternative 1.

Renewable Energy (Geothermal, Wind, and Solar) Management

Table 18-21 shows the direct, indirect, induced, and total impacts on economic contributions from projected geothermal activity. A discussion on impacts are provided at the rangewide-level in **Section 4.8** of the EIS.

Table 18-21. Average Annual Economic Contributions from Geothermal, Under Alternative 6

State	Type of Impact	Employment	Labor Income	Economic Output
California and Nevada Combined	Direct	276	17,088,024	24,364,445
	Indirect	191	14,858,872	70,756,086
	Induced	73	4,035,862	11,151,537
	Total	540	35,982,758	106,272,068
Colorado	Direct	8	536,971	761,363
	Indirect	4	333,762	1,356,788
	Induced	3	186,572	540,294
	Total	16	1,057,306	2,658,444

State	Type of Impact	Employment	Labor Income	Economic Output
Idaho	Direct	22	1,020,547	1,413,689
	Indirect	10	561,620	2,833,188
	Induced	5	212,864	683,476
	Total	36	1,795,032	4,930,353
Oregon	Direct	6	297,479	402,124
	Indirect	3	188,906	846,182
	Induced	2	90,611	260,967
	Total	11	576,996	1,509,272
Utah	Direct	12	742,958	1,059,324
	Indirect	6	397,232	1,868,982
	Induced	4	209,788	671,228
	Total	22	1,349,977	3,599,534
Wyoming	Direct	6	288,314	388,376
	Indirect	2	113,518	796,725
	Induced	1	30,436	101,568
	Total	9	432,268	1,286,669
Total Planning Area	Direct	330	19,974,293	28,389,321
	Indirect	216	16,453,910	78,457,951
	Induced	88	4,766,133	13,409,070
	Total	634	41,194,337	120,256,340

Source: National Renewable Energy Laboratory 2016
Note: There were no geothermal power plant developments projected for Montana, North Dakota, and South Dakota due to limited geothermal potential in the analysis areas under all alternatives.

Livestock Grazing Management

Table 18-22 shows the direct, indirect, induced, and total impacts on economic contributions from livestock grazing in allotments where PHMA accounted for at least 15 percent of the acreage. A discussion on impacts is provided at the rangewide-level in **Section 4.8** of the EIS.

Table 18-22. Average Annual Economic Contributions from Livestock Grazing in Allotments where PHMA Accounted for 15 Percent or More of the Acreage, Under Alternative 6

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
California	Direct	7	7	2,146,636	2,146,636	4,625,897	4,625,897
	Indirect	6	8	696,936	898,981	1,815,961	2,545,591
	Induced	6	7	261,689	340,831	995,028	1,219,542
	Total	19	22	3,105,261	3,386,449	7,436,887	8,391,031
Colorado	Direct	50	50	1,844,864	1,844,864	5,164,123	5,164,123
	Indirect	19	22	694,800	841,506	2,390,963	3,006,278
	Induced	9	10	455,946	514,078	1,491,065	1,671,211
	Total	78	82	2,995,610	3,200,447	9,046,152	9,841,613
Idaho	Direct	77	77	13,312,954	13,312,954	28,474,475	28,474,475
	Indirect	71	75	5,978,587	6,198,240	16,904,455	17,943,103
	Induced	66	68	3,158,689	3,294,103	10,417,492	10,862,683
	Total	214	221	22,450,229	22,805,297	55,796,422	57,280,261

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Montana	Direct	186	186	10,506,213	10,506,213	33,185,106	33,185,106
	Indirect	109	122	6,251,713	6,858,824	20,744,631	22,504,995
	Induced	69	73	3,419,901	3,613,023	10,966,233	11,575,632
	Total	364	381	20,177,827	20,978,060	64,895,970	67,265,732
Nevada	Direct	82	82	13,703,178	13,703,178	42,086,589	42,086,589
	Indirect	85	88	5,973,781	6,146,434	20,950,722	22,479,206
	Induced	63	65	3,616,403	3,717,918	11,765,675	12,091,385
	Total	230	236	23,293,363	23,567,530	74,802,986	76,657,180
North Dakota	Direct	1	1	39,141	39,141	143,402	143,402
	Indirect	0	0	16,853	18,114	61,594	66,765
	Induced	0	0	6,328	6,822	23,344	24,852
	Total	1	1	62,321	64,077	228,340	235,019
Oregon	Direct	78	78	6,451,505	6,451,505	25,184,996	25,184,996
	Indirect	73	79	4,601,991	5,095,613	15,223,657	16,982,271
	Induced	46	49	2,412,991	2,592,299	7,323,332	7,844,739
	Total	197	206	13,466,487	14,139,416	47,731,985	50,012,006
South Dakota	Direct	5	5	185,898	185,898	1,405,882	1,405,882
	Indirect	4	4	157,013	176,985	794,297	888,717
	Induced	1	1	30,346	39,578	134,827	163,478
	Total	10	10	373,256	402,461	2,335,006	2,458,076
Utah	Direct	54	54	4,634,026	4,634,026	10,839,099	10,839,099
	Indirect	16	18	803,047	892,704	2,901,262	3,399,715
	Induced	17	18	646,897	692,011	2,527,803	2,676,460
	Total	87	90	6,083,969	6,218,740	16,268,163	16,915,273
Wyoming	Direct	301	301	14,742,131	14,742,131	52,633,690	52,633,690
	Indirect	172	176	7,079,345	7,304,934	26,109,990	27,047,064
	Induced	74	74	2,998,096	3,012,816	11,552,266	11,599,690
	Total	547	552	24,819,572	25,059,882	90,295,946	91,280,444
Total Planning Area	Direct	841	841	67,566,546	67,566,546	203,743,259	203,743,259
	Indirect	555	592	32,254,066	34,432,335	107,897,532	116,863,705
	Induced	351	365	17,007,286	17,823,479	57,197,065	59,729,672
	Total	1,747	1,801	116,827,895	119,822,359	368,837,857	380,336,635

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.

18.4.8 Proposed RMP Amendment

Fluid Minerals (Oil and Gas) Management

Table 18-23 shows the direct, indirect, induced, and total impacts on economic contributions from projected oil and gas activity. In the state-specific sub headers for Wyoming, below, a discussion is provided on the market and nonmarket impacts from potential changes in oil and gas operations.

Table 18-23. Average Annual Economic Contributions from Oil and Gas, Under the Proposed RMP Amendment

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Colorado (Low Scenario)	Direct	6,948	6,948	835,579,681	835,579,681	4,210,876,842	4,210,876,842
	Indirect	7,504	10,248	501,986,077	823,906,926	1,490,742,665	2,133,156,312
	Induced	4,664	6,375	235,380,145	340,348,186	767,841,591	1,093,220,978
	Total	19,116	23,572	1,572,945,903	1,999,834,792	6,469,461,097	7,437,254,132
Colorado (High Scenario)	Direct	13,366	13,366	1,607,628,515	1,607,628,515	8,094,956,453	8,094,956,453
	Indirect	14,424	19,695	964,497,723	1,582,653,768	2,865,161,143	4,099,691,974
	Induced	8,969	12,257	452,687,909	654,332,656	1,476,725,857	2,101,783,237
	Total	36,759	45,318	3,024,814,147	3,844,614,938	12,436,843,453	14,296,431,664
Idaho	Direct	10	10	576,005	576,005	2,998,007	2,998,007
	Indirect	7	8	393,247	457,395	1,349,457	1,583,179
	Induced	3	4	158,900	181,431	523,616	597,678
	Total	20	22	1,128,152	1,214,830	4,871,080	5,178,863
Montana	Direct	1,922	1,922	284,762,972	284,762,972	1,318,085,631	1,318,085,631
	Indirect	1,563	1,725	105,741,719	118,169,771	327,422,634	359,077,656
	Induced	1,561	1,651	77,407,961	81,913,449	248,078,502	262,290,130
	Total	5,046	5,299	467,912,653	484,846,192	1,893,586,767	1,939,453,416
Nevada	Direct	18	18	249,165	249,165	6,374,761	6,374,761
	Indirect	17	18	1,554,685	1,580,942	4,001,386	4,162,182
	Induced	6	6	329,181	352,408	1,069,843	1,144,350
	Total	41	42	2,133,031	2,182,516	11,445,990	11,681,292
North Dakota	Direct	275	275	31,990,856	31,990,856	406,307,567	406,307,567
	Indirect	172	180	10,249,846	10,897,896	44,494,011	46,938,673
	Induced	105	119	4,331,162	5,067,030	15,914,717	18,161,000
	Total	551	573	46,571,864	47,955,782	466,716,295	471,407,239
South Dakota	Direct	89	89	7,090,932	7,090,932	34,541,446	34,541,446
	Indirect	120	134	5,990,214	6,990,786	22,253,716	25,892,162
	Induced	29	41	1,000,002	1,653,841	4,411,230	6,438,783
	Total	238	264	14,081,147	15,735,559	61,206,393	66,872,391
Utah	Direct	2,368	2,368	162,438,183	162,438,183	1,619,804,067	1,619,804,067
	Indirect	2,022	3,284	115,705,860	226,994,302	382,678,849	600,222,762
	Induced	814	1,407	31,513,987	64,193,883	122,797,623	230,483,019
	Total	5,204	7,059	309,658,031	453,626,368	2,125,280,538	2,450,509,848

State	Type of Impact	Employment		Labor Income		Economic Output	
		Analysis Area	State	Analysis Area	State	Analysis Area	State
Wyoming	Direct	11,089	11,089	1,085,144,628	1,085,144,628	10,691,456,750	10,691,456,750
	Indirect	8,409	8,425	605,149,258	606,384,102	1,945,461,542	1,949,291,584
	Induced	5,367	5,371	217,933,729	218,183,692	837,220,724	838,024,811
	Total	24,865	24,886	1,908,227,615	1,909,712,421	13,474,139,017	13,478,773,144
Total Planning Area (Low Colorado Scenario)	Direct	22,720	22,720	2,407,832,421	2,407,832,421	18,290,445,070	18,290,445,070
	Indirect	19,814	24,022	1,346,770,907	1,795,382,120	4,218,404,261	5,120,324,509
	Induced	12,549	14,975	568,055,068	711,893,919	1,997,857,846	2,450,360,747
	Total	55,083	61,717	4,322,658,396	4,915,108,461	24,506,707,178	25,861,130,327
Total Planning Area (High Colorado Scenario)	Direct	29,137	29,137	3,179,881,256	3,179,881,256	22,174,524,682	22,174,524,682
	Indirect	26,734	33,469	1,809,282,553	2,554,128,962	5,592,822,739	7,086,860,170
	Induced	16,854	20,857	785,362,832	1,025,878,389	2,706,742,113	3,458,923,006
	Total	72,726	83,463	5,774,526,641	6,759,888,606	30,474,089,534	32,720,307,858

Source: IMPLAN 2021 Data for model region including counties in the socioeconomic analysis area in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming as well as for all counties in the state using the multi-regional input-output analysis.
Note: There were no oil and gas developments projected for California and Oregon under all alternatives.

Wyoming

Impacts under the Proposed RMP Amendment would be similar to those as those described under Alternative 5, except in some areas, management decisions on PHMA would lead to a reduction in oil and gas activity, compared with Alternative 5. These decisions would lead to the same impacts on economic and social conditions as under Alternative 6. On annual average, oil and gas production revenue and well development expenditures in the Wyoming analysis area is expected to result in about 1,000 fewer total jobs (about 640 fewer direct jobs), about $110 million less in total labor income (about $64 million less in direct labor income), and about $717 million less in economic output (about $559 million less in direct economic output), than under Alternative 1, throughout the state (see **Table 18-9** in **Appendix 18**).

The decrease in projected oil and gas activity, under Alternative 6, would result in reductions in tax revenues, compared with Alternative 1. The total royalty revenue generated from oil and gas production in Wyoming would be about $1.5 billion, which is about $69 million less than under Alternative 1. The Wyoming severance tax revenue is expected to be about $532 million, which is about $25 million less than under Alternative 1. The oil and gas conservation tax is expected to generate about $4.4 million, which is about $208,000 less than under Alternative 1. Oil and gas production could generate about $559 million across the analysis area in county revenues from ad valorem taxes, which is about $26 million less than under Alternative 1. Additionally, a reduction in oil and gas activity, in Wyoming, under Alternative 6, could lead to a decrease in revenue from rents, bonus bids, and sales and use taxes, compared with Alternative 1. The reductions in tax revenues could put strain on local governments' budgets and could impact public services that are offered to the communities, including education. There could be impacts from BLM decisions on lifestyles and culture for those in mineral development communities of interest, especially for those individuals who rely on oil and gas extraction for employment.

The reduction in the acreage available for fluid mineral leasing could reduce the development-related impacts on nonmarket and social conditions associate with changes in air and GHG emissions, compared with Alternative 1.

18.5 REFERENCES

BLM (United States Department of the Interior, Bureau of Land Management). 2018. Wyoming Oil and Gas State Taxes. Internet website: https://www.blm.gov/policy/ib-wy-2018-002#:~:text=The%20historical%206%25%20severance%20tax,imposing%20a%20(excise)%20tax.

_____. 2022. Addressing Environmental Justice in NEPA Documents: Frequently Asked Questions. U.S. Department of the Interior, Bureau of Land Management, Socioeconomics Program, Washington, DC.

_____. 2023. Data on Allotments where PHMA accounted for 15 percent or more of the acreage. Unpublished.

CEQ (Council on Environmental Quality). 1997. Environmental Justice Guidance under the National Environmental Policy Act. Internet website: https://www.epa.gov/environmentaljustice/ceq-environmental-justiceguidance-under-national-environmental-policy-act.

Colorado Fiscal Institute. 2018. Oil and Natural Gas. Internet website: https://coloradofiscal.org/wp-content/uploads/2018/05/Severance-Tax-Fact-Sheet.pdf.

Covenant Consulting Group. 2017. 2016 Oil and Gas Taxation Comparison for the State of Idaho: Analysis of Severance, Production and Ad Valorem Taxes. Internet website: https://ogcc.idaho.gov/wp-content/uploads/2017/06/2016-oil-gas-taxation-comparison_rev.pdf.

IMPLAN® model. 2021 Data. Using inputs provided by the user and IMPLAN Group LLC, IMPLAN System (data and software), 16905 Northcross Dr., Suite 120, Huntersville, NC 28078. Internet website: https://www.IMPLAN.com.

Montana Department of Revenue. 2020. 2019-2020 Biennial Report Natural Resources. Internet website: https://mtrevenue.gov/wp-content/uploads/2020/12/2019-20-Biennial-Report-Natural-Resources.pdf.

_____. 2022. 2020-2022 Biennial Report Natural Resources. Internet website: https://mtrevenue.gov/wp-content/uploads/mdocs/2020-2022%20-%20biennial%20report%20-%20natural%20resources.pdf.

National Renewable Energy Laboratory. 2016. Jobs and Economic Development Impact (JEDI) Geothermal Model. GT12.23.16. Internet website: https://www.nrel.gov/analysis/jedi/geothermal.html.

Nevada Department of Taxation. 2021-2022 Net Proceeds of Minerals Bulletins. Internet website: http://epubs.nsla.nv.gov/statepubs/epubs/377719-2021-2022.pdf.

State of Utah. 2014. Utah Oil & Gas Production Tax Summary. Internet website: https://www.utah.gov/pmn/files/492637.pdf.

USDA Economic Research Service. 2023. Commodity Costs and Returns (2018-2022). Internet website: https://www.ers.usda.gov/data-products/commodity-costs-and-returns/commodity-costs-and-returns/#Historical%20Costs%20and%20Returns:%20Cow-Calf.

USDA National Agricultural Statistics Service. 2021. Agricultural Statistics 2021. Table 7-35. Sheep and lambs: Inventory and value, United States, Jan. 1, 2010-2019. Internet website: https://usda.library.cornell.edu/concern/publications/j3860694x?locale=en.

US Energy Information Administration (EIA). 2016. Trends in U.S. Oil and Natural Gas Upstream Costs. Internet website: https://www.eia.gov/analysis/studies/drilling/pdf/upstream.pdf.

_____. 2023a. Annual Energy Outlook 2023. Internet website: https://www.eia.gov/outlooks/aeo/data/browser/.

Appendix 19

Idaho Buffers and Required Design Features

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Appendix 19. Idaho Buffers and Required Design Features

19.1 Introduction

Under Idaho's state-specific circumstances, there are proposed changes to Appendix B: Buffers and Appendix C: Required Design Features of the BLM Idaho's 2015 RMP Amendment. Proposed changes include changes to which leks buffers would be applied to for BLM management and project NEPA analysis, and several modifications to lek buffer distances based on the updated plan for GRSG by the State of Idaho, i.e. the 2021 Idaho Sage-grouse Plan (State of Idaho 2021).

19.1.1 Lek Definitions

In the "2015 Idaho ARMPA" (Southwestern Idaho and Montana Approved Resource Management Plan Amendment [BLM and Forest Service 2015a]; Alternative 1), lek definitions were based on Idaho Department of Fish and Game's (IDFG) lek management status and described in the 2015 Idaho ARMPA (also see **Appendix 4**). No changes were made in the 2019 Idaho ARMPA (BLM Idaho 2019; Alternative 2). A lek with a five-year management status of *occupied* was a lek that had been active at least one breeding season within the prior five years. An *active* lek was an annual status and meant that the lek had been attended by more than one male GRSG during the most recent breeding season. A lek with a five-year management status of *unoccupied* was a lek that had not been active for five consecutive years.

19.1.2 Lek Buffer Distances

In the 2015 ARMPA ROD (Alternative 1), BLM based lek buffer distances on the USGS Report, *Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review* (Manier et al. 2014) which provided a summary of scientific literature on the influence of anthropogenic disturbance and infrastructure on GRSG. The BLM decision was to apply lek buffer distances specified as the 'lower end of the interpreted range' in the report which was based on multiple research studies.

The 2019 proposal for the Idaho management alignment alternative included reduced lek buffers. BLM Idaho's 2019 ROD (BLM Idaho 2019; Alternative 2) did not reduce lek buffers in PHMA but did reduce lek buffers in IHMA and GHMA to better align buffer distances with the Governor's three-tiered habitat approach. Lek buffer distances were most restrictive in PHMA (same as 2015 Idaho ARMPA), and slightly reduced in IHMA and further reduced in GHMA. Instead of the 'lower end of the interpreted range' (basis for the 2015 ARMPA buffer distances), buffer distances were based on the 'literature minimum' in the USGS report, i.e., the lowest effect distance reported from multiple research studies. Buffer exception criteria were possible in IHMA and GHMA. This approach encouraged development outside of the best habitat and into lesser quality or non-habitat. The proposal was also consistent with acknowledgement in the USGS report that no single buffer distance would be appropriate for all populations and habitats across the range of sage-grouse (Manier et al. 2014).

19.2 Alternatives 3, 4, 5, and 6

19.2.1 Lek Definitions

For range wide consistency and analysis of lek data, BLM will adopt the updated WAFWA lek definitions (Cook et al. 2022; **Appendix 4**). These differ from the lek definitions in the 2015 Idaho ARMPA (Alternative 1). In Idaho, BLM would apply buffers to *active* and *pending active* leks under Alternatives 3, 4, 5, and 6. An

active lek is a lek that has more than two or more males counted during two or more lek counts within the last 10 years. A *pending active* lek is a lek with one observation of at least two males in the last 10 years and at least one observation of at least two males more than 10 years ago. BLM will rely on the lek status determinations of the Idaho Department of Fish and Game based on their most recent lek data. The change in lek definitions and change from a five-year to a ten-year lek management status better captures fluctuations in GRSG population dynamics, which generally follow 9- to 10-year population cycles (Fedy and Aldridge 2011, Fedy and Doherty 2011). Under Alternatives 3, 4, and 6, any *active* and *pending active* leks would be evaluated whereas under Alternative 5, lek buffers would only apply to *active* and *pending active* leks within HMA.

19.2.2 Lek Buffer Distances

Under Alternatives 3 and 4, lek buffer distances in IHMA and GHMA would be the same as in PHMA, as in the 2015 Idaho ARMPA or Alternative 1 (**Table ID-1**). Lek buffer distances in the 2015 Idaho ARMPA were based on the 'lower end of the interpreted range' of potential effect area and potential distribution of habitat as outlined in Manier et al. (2014).

Under Alternatives 5 and 6, lek buffer distances in IHMA and GHMA are largely based on the 'literature minimum' (Manier et al. 2014), or the minimum distance where effects were documented in the scientific literature, similar to the lek buffer distances in the 2019 Idaho ARMPA (Alternative 2). Alternatives 5 and 6 also includes changes to lek buffer distances in the 2021 Idaho Sage-grouse Plan (Executive Order 2022-03; State of Idaho 2022).

The following modifications were made to the lek buffer distances under Alternatives 5 and 6:

- A decrease for minor linear features (e.g. minor roads) in PHMA from 3.1 to 1.2 miles
- An increase for major linear features in IHMA from 0.8 to 2.0 miles
- An increase for transmission line towers in IHMA from 1.2 to 1.7 miles
- A decrease for communication and meteorological towers in IHMA from 2.0 to 1.7 miles
- A decrease for other types of surface disturbance in GHMA from 2.0 to 0.6 miles

Buffer distances would remain the same in PHMA under all Alternatives, with the one exception for minor linear features noted above. Approximately 75% of all active and pending active leks are in PHMA; thus, buffer distances in PHMA would provide protection for GRSG habitat in PHMA. In areas with tripped triggers, i.e. neighborhood lek clusters for population triggers and fine-scale HAF for habitat triggers, IHMA would be treated as PHMA and PHMA buffers would be applied in NEPA analyses and any associated management decisions.

19.2.3 Required Design Features (RDFs)

Alternatives 3 through 6, consider Required Design Features (RDFs) the same as the 2019 Idaho ARMPA (Alternative 2). Under the Proposed RMP Amendment, RDFs would be the same as under the 2015 Idaho ARMPA (Alternative 1) and incorporate the best management practices and design features for livestock grazing management described in **Appendix 15**.

Table ID-1. Lek Buffer Distances by Disturbance Type, Habitat Management Area (HMA), and Alternative

Disturbance Type	HMA	Lek Buffer Distance[1] (miles)				
		Alts 1[2]	Alt 2[3]	Alts 3 and 4[1]	Alts 5 and 6[4]	Proposed RMP Amendment
Linear features (e.g. roads)[5] - Major / Minor	PHMA	3.1	3.1	3.1	Major – 3.1 Minor – 1.2	3.1
	IHMA	3.1	0.8	3.1	Major – 2.0 Minor – 0.8	3.1
	GHMA	3.1	0.25	3.1	Major – 0.25 Minor – 0.25	3.1
Infrastructure related to energy development	PHMA	3.1	3.1	3.1	3.1	3.1
	IHMA	3.1	2.0	3.1	2.0	3.1
	GHMA	3.1	0.6	3.1	0.6	3.1
Tall structures[6]	PHMA	2.0	2.0	2.0	2.0	2
- Com. or met. towers	IHMA	2.0	--	2.0	--	2.0
- Transmission line towers		--	2.0	--	1.7	--
- Distribution poles		--	1.2	--	1.7	--
		--	0.6	--	0.6	--
	GHMA	2.0	0.6	2.0	0.6	2.0
Low structures (e.g. fences, rangeland structures)	PHMA	1.2	1.2	1.2	1.2	1.2
	IHMA	1.2	0.6	1.2	0.6	1.2
	GHMA	1.2	0.12	1.2	0.12	1.2
Surface disturbance (continuing human activities that alter or remove the natural vegetation)	PHMA	3.1	3.1	3.1	3.1	3.1
	IHMA	3.1	2.0	3.1	2.0	3.1
	GHMA	3.1	2.0	3.1	0.6	3.1

[1] Alternatives are grouped by similar HMA extent and buffer distances, but allocations and management may differ Alts 3 vs. 4, and Alts 5 vs. 6.
[2] Based on the 'lower end of the interpreted range' from the USGS report (Manier et al. 2014) for disturbances in all HMA
[3] For disturbances in PHMA, and IHMA/GHMA, based on the 'lower end of the interpreted range', and the 'literature minimum', respectively (Manier et al. 2014)
[4] Distances from the 2021 Idaho Sage-grouse Plan. In accordance with the 2021 Idaho Sage-grouse Plan, linear features are split into major and minor linear features, and tall structures are split out for disturbances in IHMA.
[5] Roads are linear routes declared as a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use. Roads do not include trails, primitive roads, temporary routes, or administrative routes with maintenance intensity of 0 or 1 (2015 ARMPA ROD).
[6] Communication or meteorological towers

Disturbance Type	HMA	Lek Buffer Distance[1] (miles)				
		Alts 1[2]	Alt 2[3]	Alts 3 and 4[1]	Alts 5 and 6[4]	Proposed RMP Amendment
Noise and related disruptive activities including those do not result in habitat loss	PHMA	≥ 0.25	n/a	≥ 0.25	n/a	≥ 0.25
	IHMA	≥ 0.25	n/a	≥ 0.25	n/a	≥ 0.25
	GHMA	≥ 0.25	n/a	≥ 0.25	n/a	≥ 0.25

19.3 *ALTERNATIVES 3 AND 4* APPENDIX B: BUFFERS

19.3.1 Applying Lek Buffer-Distances When Approving Actions

Buffer Distances and Evaluation of Impact on Leks

Evaluate impacts from actions requiring NEPA analysis on active and pending active leks (Cook, et al. 2022; **Appendix 4**) within HMA. In addition to any other relevant information determined to be appropriate (e.g. State wildlife agency plans), the BLM will assess and address impacts from the following activities using the lek buffer-distances as identified in the USGS Report, *Conservation Buffer Distance Estimates for Greater Sage-Grouse - A Review* (Manier et al. 2014). The BLM will apply the lek buffer-distances specified as the lower end of the interpreted range in the report unless justifiable departures are determined to be appropriate (see below). The lower end of the interpreted range of the lek buffer-distances is as follows:

- Linear features (roads)[7] within 3.1 miles of leks
- Infrastructure related to energy development within 3.1 miles of leks.
- Tall structures (e.g., communication or transmission towers, transmission lines) within 2 miles of leks.
- Low structures (e.g., fences, rangeland structures) within1.2 miles of leks.
- Surface disturbance (continuing human activities that alter or remove the natural vegetation) within 3.1 miles of leks.
- Noise and related disruptive activities including those that do not result in habitat loss (e.g., motorized recreational events) at least 0.25 miles from leks.

Justifiable departures to decrease or increase from these distances, based on local data, best available science, landscape features, and other existing protections (e.g., land use allocations, state regulations) may be appropriate for determining activity impacts. The USGS report recognized "that because of variation in populations, habitats, development patterns, social context, and other factors, for a particular disturbance type, there is no single distance that is an appropriate buffer for all populations and habitats across the sage-grouse range". The USGS report also states that "various protection measures have been developed and implemented… [which have] the ability (alone or in concert with others) to protect important habitats, sustain populations, and support multiple-use demands for public lands". All variations in lek buffer-distances will require appropriate analysis and disclosure as part of activity authorization.

In determining lek locations, the BLM will use the most recent lek determination available from the state wildlife agency.

For Actions in GHMA

- The BLM will apply the lek buffer-distances identified above as required conservation measures to fully address the impacts to leks as identified in the NEPA analysis. Impacts should first be avoided by locating the action outside of the applicable lek buffer – distance(s) identified above.
- The BLM may approve actions in GHMA that are within the applicable lek buffer distance identified above only if:
  - Impacts should first be avoided by locating the action outside of the applicable lek buffer-distance(s) identified above.

[7] Roads are linear routes declared as a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use. Roads do not include trails, primitive roads, temporary routes, or administrative routes with maintenance intensity of 0 or 1 (2015 ARMPA ROD).

- If it is not possible to relocate the project outside of the applicable lek buffer-distance(s) identified above, the BLM may approve the project only if:
  - Based on best available science, landscape features, and other existing protections, (e.g., land use allocations, state regulations), the BLM determines that a lek buffer-distance other than the applicable distance identified above offers the same or a greater level of protection to GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area; **or**
  - The BLM determines that impacts to GRSG and its habitat are minimized such that the project will cause minor or no new disturbance (ex. co-location with existing authorizations); **and**
  - Any residual impacts within the lek buffer-distances are addressed through compensatory mitigation measures sufficient to ensure a net conservation gain, as outlined in the Mitigation Strategy (Appendix J).

For Actions in PHMA and IHMA

- The BLM will apply the lek buffer-distances identified above as required conservation measures to fully address the impacts to leks as identified in the NEPA analysis. Impacts should be avoided by locating the action outside of the applicable lek buffer-distance(s) identified above.
- The BLM may approve actions in PHMA and IMHA that are within the applicable lek buffer distance identified above only if with input from state fish and wildlife agency, it determines, based on best available science, landscape features, and other existing protections, that a buffer distance other than identified above offers the same or greater level of protection for GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area.
- Range improvements which do not impact GRSG, or range improvements which provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats, meet the lek buffer requirement.

The BLM will explain its justification for determining the approved buffer distances meet these conditions in its project decision.

19.4 *ALTERNATIVES 5 AND 6* APPENDIX B: BUFFERS

19.4.1 Applying Lek Buffer-Distances When Approving Actions

Buffer Distances and Evaluation of Impact on Leks

Evaluate impacts from actions requiring NEPA analysis on active and pending active leks (Cook, et al. 2022; **Appendix 4**) within HMA. In addition to any other relevant information determined to be appropriate (e.g., state wildlife agency plans), the BLM will apply the lek buffer-distances described below, unless justifiable departures are determined to be appropriate or buffer exception criteria for GHMA. Buffers do not apply to vegetation treatments specifically designed to improve or protect Greater Sage-Grouse habitat.

The BLM will apply lek buffer-distances as specified in the USGS Report, *Conservation Buffer Distance Estimates for Greater Sage-Grouse - A Review* (Manier et al. 2014). In general, buffer distances would be the 'lower end of the interpreted range' in the USGS report for disturbances in PHMA, the 'literature minimum' for disturbances in IHMA or GHMA, or as specified in the 2021 Idaho Sage-grouse Plan.

PHMA

- Major linear features (roads)[8] within 3.1 miles of leks
- Minor linear features (e.g. minor roads) or low structures (e.g., fences and rangeland structures) within 1.2 miles of leks
- Tall structures (e.g., communication or transmission towers and transmission lines) within 2 miles of leks
- Infrastructure related to energy development within 3.1 miles of leks
- Surface disturbance (continuing human activities that alter or remove the natural vegetation) within 3.1 miles of leks

IHMA

- Major linear features (e.g., roads) within 2 miles of leks
- Minor linear features within 0.8 miles or low structures within 0.6 miles of leks
- Tall structures (e.g., electrical, communication, and meteorological) within 1.7 miles of leks
- Transmission lines/towers within 1.2 miles of leks[2]
- Distribution lines/poles within 0.6 miles of leks[1]
- Infrastructure related to energy development (e.g., oil, gas, wind, and solar) within 2 miles of leks
- Surface disturbance (continuing human activities that alter or remove the natural vegetation) within 2 miles of leks

GHMA

- Major linear features (e.g., roads) within 0.25 miles of leks
- Minor linear features within 0.25 miles of leks; low structures within 0.12 miles of leks
- Tall structures (e.g., electrical, communication, and meteorological) within 0.6 miles of leks

[8] Roads are linear routes declared as a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use. Roads do not include trails, primitive roads, temporary routes, or administrative routes with maintenance intensity of 0 or 1 (2015 ARMPA ROD).

- Infrastructure related to energy development (e.g., oil, gas, wind, and solar) within 0.6 miles of leks; 2-mile feasibility/practicality conditions
- Surface disturbance (continuing human activities that alter or remove the natural vegetation) within 0.6 miles of leks

Justifiable Departures—Justifiable departures to decrease or increase from these distances, based on local data, best available science, landscape features, and other existing protections (e.g., land use allocations and state regulations) may be appropriate for determining activity impacts. The USGS report recognized "that because of variation in populations, habitats, development patterns, social context, and other factors, for a particular disturbance type, there is no single distance that is an appropriate buffer for all populations and habitats across the sage- grouse range." The USGS report also states that "various protection measures have been developed and implemented…[which have] the ability (alone or in concert with others) to protect important habitats, sustain populations, and support multiple-use demands for public lands." All variations in lek buffer-distances will require appropriate analysis and disclosure as part of activity authorization.

In determining lek locations, the BLM will use the most recent lek determination available from the state wildlife agency.

For Actions in PHMA and IHMA

- The BLM will apply the lek buffer-distances identified above as required conservation measures to fully address the impacts on leks, as identified in the NEPA analysis. Impacts should be avoided by locating the action outside the applicable lek buffer-distances identified above.
- The BLM may approve actions in PHMA and IHMA that are within the applicable lek buffer- distance identified above, only if, with input from the state fish and wildlife agency, it determines, based on best available science, landscape features, and other existing protections, that a buffer-distance other than that identified above offers the same or greater level of protection to Greater Sage-Grouse and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area.
- Range improvements that do not affect Greater Sage-Grouse, or range improvements that provide a conservation benefit to Greater Sage-Grouse, such as fences for protecting important seasonal habitats, meet the lek buffer requirement.

The BLM will explain its justification for determining if the approved buffer-distances meet these conditions in its project decision.

Buffer Exception Criteria for IHMA and GHMA—If it is impracticable, technically, or economically, to locate the project outside of the buffer area and impacts are avoided through project siting and design, to the extent reasonable, BLM may approve actions within buffers in IHMA and GHMA.

19.5 *PROPOSED RMP AMENDMENT* UPDATE 2015 IDAHO GRSG RMP AMENDMENT, APPENDIX B: BUFFERS

Under the Proposed RMP Amendment, BLM is proposing the following management direction relative to lek buffers:

- Management direction would apply the buffer distances as defined under the 2015 RMPA as analyzed in Alternatives 1, 3 and 4 of the DEIS;
- Buffers would apply to *pending active* as well as *active* leks instead of *occupied* leks as analyzed in Alternative 5 of the DEIS

Lek buffer distances would be the same as under Alternatives 1, 3 and 4, based on the lower end of the interpreted range from Manier et al. (2014). In addition, the buffer exception criteria would only apply to GHMA, as described under Alternative 4. Please refer to **Appendix 2**, **Table 2.1** for a summary of the 2015 and 2019 buffer management direction and please refer to MD SSS 35 and Alternatives 1 and 2 of the DEIS for the complete set of direction from these two amendments.

Following is the proposed management direction:

19.6 APPLYING LEK BUFFER-DISTANCES WHEN APPROVING ACTIONS

19.6.1 Buffer Distances and Evaluation of Impact on Leks

Evaluate impacts from actions requiring NEPA analysis on active and pending active leks (Cook, et al. 2022; **Appendix 4**) within HMA. In addition to any other relevant information determined to be appropriate (e.g. State wildlife agency plans), the BLM will assess and address impacts from the following activities using the lek buffer-distances as identified in the USGS Report, *Conservation Buffer Distance Estimates for Greater Sage-Grouse - A Review* (Manier et al. 2014).

The BLM will apply the lek buffer-distances specified as the lower end of the interpreted range in the report unless justifiable departures are determined to be appropriate (see below). The lower end of the interpreted range of the lek buffer-distances is as follows:

- Linear features (roads)[9] within 3.1 miles of leks
- Infrastructure related to energy development within 3.1 miles of leks.
- Tall structures (e.g., communication or transmission towers, transmission lines) within 2 miles of leks.
- Low structures (e.g., fences, rangeland structures) within1.2 miles of leks.
- Surface disturbance (continuing human activities that alter or remove the natural vegetation) within 3.1 miles of leks.
- Noise and related disruptive activities including those that do not result in habitat loss (e.g., motorized recreational events) at least 0.25 miles from leks.

Justifiable departures to decrease or increase from these distances, based on local data, best available science, landscape features, and other existing protections (e.g., land use allocations, state regulations) may be appropriate for determining activity impacts. The USGS report recognized "that because of variation in populations, habitats, development patterns, social context, and other factors, for a particular disturbance

[9] Roads are linear routes declared as a road by the owner, managed for use by low-clearance vehicles having four or more wheels, and maintained for regular and continuous use. Roads do not include trails, primitive roads, temporary routes, or administrative routes with maintenance intensity of 0 or 1 (2015 ARMPA ROD).

type, there is no single distance that is an appropriate buffer for all populations and habitats across the sage-grouse range". The USGS report also states that "various protection measures have been developed and implemented… [which have] the ability (alone or in concert with others) to protect important habitats, sustain populations, and support multiple-use demands for public lands". All variations in lek buffer-distances will require appropriate analysis and disclosure as part of activity authorization.

In determining lek locations, the BLM will use the most recent lek data available from the state wildlife agency.

For Actions in GHMA

- The BLM will apply the lek buffer-distances identified above as required conservation measures to fully address the impacts to leks as identified in the NEPA analysis. Impacts should first be avoided by locating the action outside of the applicable lek buffer – distance(s) identified above.
- The BLM may approve actions in GHMA that are within the applicable lek buffer distance identified above only if:
  - Impacts should first be avoided by locating the action outside of the applicable lek buffer-distance(s) identified above.
  - If it is not possible to relocate the project outside of the applicable lek buffer-distance(s) identified above, the BLM may approve the project only if:
    - Based on best available science, landscape features, and other existing protections, (e.g., land use allocations, state regulations), the BLM determines that a lek buffer-distance other than the applicable distance identified above offers the same or a greater level of protection to GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area; **or**
    - The BLM determines that impacts to GRSG and its habitat are minimized such that the project will cause minor or no new disturbance (ex. co-location with existing authorizations); **and**
    - Any residual impacts within the lek buffer-distances are addressed through compensatory mitigation measures sufficient to ensure a net conservation gain, as outlined in the Mitigation Strategy (Appendix J).

For Actions in PHMA and IHMA

- The BLM will apply the lek buffer-distances identified above as required conservation measures to fully address the impacts to leks as identified in the NEPA analysis. Impacts should be avoided by locating the action outside of the applicable lek buffer-distance(s) identified above.
- The BLM may approve actions in PHMA and IMHA that are within the applicable lek buffer distance identified above only if with input from state fish and wildlife agency, it determines, based on best available science, landscape features, and other existing protections, that a buffer distance other than identified above offers the same or greater level of protection for GRSG and its habitat, including conservation of seasonal habitat outside of the analyzed buffer area.
- Range improvements which do not impact GRSG, or range improvements which provide a conservation benefit to GRSG such as fences for protecting important seasonal habitats, meet the lek buffer requirement.

The BLM will explain its justification for determining the approved buffer distances meet these conditions in its project decision.

19.7 *PROPOSED RMP AMENDMENT*
ADOPT 2015 IDAHO GRSG RMP AMENDMENT, APPENDIX C: REQUIRED DESIGN FEATURES

For consistency with the Proposed RMP Amendment's goal to "conserve, enhance, restore, and manage GRSG habitats to support persistent, healthy populations", the Proposed RMP Amendment is proposing to adopt the 2015 Idaho GRSG RMP Amendment Appendix C: Required Design Features (RDFs) from the 2015 Idaho RMPA and incorporate the BMPs and Design Features for livestock grazing management described in **Appendix 15** of this RMP Amendment. The BLM Idaho is currently implementing RDFs from the 2019 Idaho GRSG RMP Amendment under Alternative 2 (No Action). Please refer to **Appendix 2**, **Table 2** for a summary of the 2015 and 2019 RDF management direction.

19.8 AFFECTED ENVIRONMENT

In September 2023, IDFG adopted the new WAFWA lek definitions (Cook et al. 2022; **Appendix 4**). Since current management is the 2015 Idaho ARMPA, BLM uses 2015 Idaho ARMPA definitions for implementation decisions. BLM Idaho applied these definitions to 2023 lek data to determine management status of leks as *occupied* or *unoccupied* (BLM Idaho IM 2024-003). There were 1104 leks in 2023 that would be considered *occupied* under Alternatives 1 and 2; **Table ID-2**). Under the proposed action, there would be 1093 *active* and 161 *pending active* leks (Alternatives 3, 4, 5, and 6).

Table ID-2. Number of Leks by Management Status, Habitat Management Area (HMA), and Alternatives

Lek Management Status	HMA	Alt 1	Alt 2	Alts 3 and 4	Alts 5 and 6
Number of leks where buffers would apply					
Occupied	n/a	1104	1104	n/a	n/a
Active	n/a	n/a	n/a	1093	1093
Pending Active	n/a	n/a	n/a	161	159
Total Leks	n/a	1104	1104	1254	1252
Percent of leks where buffers would apply by HMA type					
Occupied	PHMA IHMA GHMA Non	68 25 5 2	67 26 5 2	n/a	n/a
Active	PHMA IHMA GHMA Non	n/a	n/a	78 19 3 0	73 22 4 0
Pending Active	PHMA IHMA GHMA Non	n/a	n/a	67 22 10 0	67 21 11 0

19.9 ENVIRONMENTAL CONSEQUENCES

19.9.1 Analytical Assumptions

Methods for analyzing impacts are described in **Section 4.1.1**, General Methodology for Analyzing Impacts, and include definitions for 'type of impact', 'context', 'duration', 'intensity', and 'direct, indirect, and cumulative impacts'.

BLM analyzed:

- Changes in lek definitions and number of leks where buffers would be applied, and
- Changes in lek buffer distances

For analytical purposes and comparisons of lek buffer distances among alternatives, buffer distances were considered potential 'protection' or non-development areas, and, thus, percent of HMA closed for development (i.e. areas within HMA and lek buffers) were compared among alternatives. Effects under Alternatives 3 and 4 were assumed to be the similar since buffer distances are the same among these alternatives. Buffer distances for Alternatives 3 and 4 are also the same as buffer distances under Alternative 1 but would apply to *pending active* as well as *active* leks instead of *occupied* leks. Buffer distances under Alternatives 5 and 6 are most similar to Alternative 2 but with some additional modifications.

The analysis focused on differences between:

- Alternatives 1 and 4 (changes in lek definitions),
- Alternatives 2 and 5 (changes in lek buffer distances), and
- Alternatives 4 and 5 (changes in lek buffer distances)

Comparisons between lek buffer distances under Alternatives 1 and 2 were made in the 2018 FEIS (BLM Idaho 2018) and 2020 FSEIS (BLM Idaho 2020). Comparisons of HMA acres and percent of HMA were made on BLM lands only, i.e. 8.7 to 8.8 million acres depending on Alternative (**Table 2-3**).

Changes in Lek Definitions

Adopting range wide lek definitions (Cook et al. 2022; **Appendix 4**) changes both the number of leks evaluated for BLM management leks where buffers would apply from the 2015 Idaho ARMPA lek definitions. This change would result in a 1% change from *occupied* leks under Alternatives 1 and 2 to *active* leks under Alternatives 3 through 6. It would also be a 5 to 10% increase from the number of *occupied* leks in PHMA to the number of *active* leks in PHMA (**Table ID-2**). With the proposed action, there would be a slight increase in the number of active leks in PHMA and IHMA combined and a decrease in the number of leks outside of HMA.

Based on recommendations from the State of Idaho, in addition to *active leks,* the proposed action also considers management for *pending active* leks. This change in 161 *pending active* leks would result in a 15% increase in the number of leks considered for BLM management (**Table ID-2**).

Changing which leks buffers apply to, i.e. *active* and *pending active* leks, could provide protection to additional BLM lands from new disturbances with Alternative 4's lek buffers when compared with Alternative 1. Since two thirds of the pending active leks are in PHMA and PHMA is closed or excluded for multiple disturbance types, such as renewable energy or non-energy leasable minerals, or salable minerals, effects of the proposed action to consider *pending active* leks would be realized more in IHMA and GHMA. However, these changes would be minimal in IHMA and GHMA, with only 6% additional BLM lands in IHMA and 1% in GHMA that would be protected under Alternative 4 compared with Alternative 1.

Resources Potentially Affected by Modifying Lek Buffer Distances

- GRSG
- Mineral Resource Management
- Lands and Realty
- Renewable Energy
- Livestock Grazing
- Travel and Transportation
- Cumulative Effects – Social and Economic Conditions

General Effects of Lek Buffers

Known effects of anthropogenic disturbance on GRSG are described in **Section 4.2.1**. Effects of various anthropogenic disturbances and lek buffer distances were analyzed in the USGS report (Manier et al. 2014) and in 2015 FEIS (BLM and Forest Service 2015), 2018 FEIS (BLM Idaho 2018), and 2020 FSEIS (BLM Idaho 2020). The lek buffer distances from the 2015 Idaho ARMPA (Alternative 1) were based on the lower end of the interpreted range from the USGS Report (Manier et al. 2014) for various types of anthropogenic disturbances, with the major types of anthropogenic disturbance such as energy development with a 3.1-mile buffer. The recommended 3.1-mile buffer was based on disturbance effects reported in the literature and that the majority of nesting birds from a given lek would be protected by that buffer distance. For example, in Nevada and California, 95% of all nests are within 3.1 miles of leks (Coates et al. 2013), and in Wyoming, 64% of nests within 3.1 miles of leks (Holloran and Anderson 2005). In some populations, hens may nest further from leks and a 3.1-mile buffer would protect fewer nesting birds from a given lek. In Idaho, less than 50% of GRSG hens nest within 1.9 miles and 80% within 6 miles from leks where they were captured (Connelly et al. 2013). However, effects of anthropogenic disturbance do not depend solely on where hens are nesting. In some areas, depending on existing disturbance, habitat conditions, and topography, smaller buffers may suffice to protect leks from development. The interpreted range in the USGS report is based on a "typical response" but "there is no single distance that is an appropriate buffer for all populations and habitats across the sage-grouse range" (Manier et al. 2014).

Reducing lek buffers could impact GRSG, including avoidance behavior, reduced productivity, declines in lek attendance, and extirpation of leks. However, the type of impacts and intensity would vary depending on several factors, including habitat conditions, breeding bird density in the area and proximity to other leks, home range size for that particular population, existing anthropogenic disturbance, and whether the potentially impacted area provides unique seasonal habitats or connectivity among other habitat patches. Project-level impacts would be analyzed during NEPA.

Effects of Modified Lek Buffers under Alternatives 3 and 4

Under Alternatives 3, and 4, lek buffer distances would remain the same as in the 2015 Idaho ARMPA (Alternative 1). Therefore, there would be no effects to GRSG under these Alternatives.

Effects of Modified Lek Buffers under Alternatives 5 and 6

The proposed changes to lek buffer distances under Alternatives 5 and 6 would result in the following changes compared with the 2019 Idaho ARMPA (Alternative 2):

- Increase in lek buffers in IHMA—For major linear features, e.g. major roads, in IHMA, the buffer distance would increase from 0.8 to 2.0 miles (**Table ID-1**). This would increase the portions of IHMA protected from major linear features from 6% (0.8-mile buffer) to 24% (2.0-mile buffer), or an increase of 18% in the portion of IHMA protected from major linear features. For transmission

line towers in IHMA, the buffer distance would increase from 1.2 to 1.7 miles. This would increase the portions of IHMA protected from transmission line towers from 12% (1.2-mile buffer) to 19% (1.7-mile buffer), or an increase of 7% in the portion of IHMA protected from transmission line towers.

- Decrease in lek buffers in PHMA—For minor linear features, e.g. minor roads, in PHMA, the buffer distance would decrease from 3.1 to 1.2 miles. This would decrease the portions of PHMA protected from minor linear features from 72% (3.1-mile buffer) to 28% (1.2-mile buffer) or a 44% decrease in the portion of PHMA protected from minor linear features.
- Decrease in lek buffers in IHMA—For communication and meteorological towers in IHMA, the buffer distance would decrease from 2.0 miles to 1.7 miles. This change is due to more recent literature on the effects of tall structures (Kohl et al. 2019a, b). This would decrease the portions of IHMA protected from communication and meteorological towers from 25% (2.0-mile buffer) to 19% (1.7-mile buffer), or a 6% decrease in the portion of IHMA protected from communication and meteorological towers.
- Decrease in lek buffers in GHMA—For surface disturbances due to continuing human activities that alter or remove the natural vegetation, other than infrastructure related to energy development, major and minor linear features, tall structures, and low structures, the buffer distance would decrease from 2.0 miles to 0.6 miles. This change would make the buffer distance consistent with buffer distances for other anthropogenic disturbance in GHMA, such as infrastructure related to energy development also 0.6 miles. This would decrease the portions of GHMA protected from other surface disturbance from 5% (2.0-mile buffer) to 1% (0.6-mile buffer), or a 4% decrease in the portion of GHMA protected from surface disturbance.

The proposed changes to lek buffer distances under Alternative 5 would result in the following changes compared with Alternative 4:

- PHMA—Lek buffers would remain the same in PHMA for all disturbance types across all Alternatives, except for the modification for minor linear features noted above. Under Alternative 5, the buffer distance for minor linear features, e.g. minor roads, would decrease from 3.1 to 1.2 miles (**Table ID-3**). This would decrease the portions of PHMA protected from minor linear features from 93% (3.1-mile buffer) to 28% (1.2-mile buffer) or a 65% decrease in the portion of PHMA protected from minor linear features. Buffer distances for all other types of disturbance would remain the same and provide protection for approximately 76% of all *active* and *pending active* leks that are in PHMA (Alternatives 3 through 6; **Table ID-2**).
- IHMA—Under Alternative 5, reduced buffer distances for disturbances, such as infrastructure related to energy development, other surface disturbance, and linear features, would result in 23% less IHMA protected compared with Alternative 4 (i.e., 47% for a 3.1-mile buffer to 24% for a 2-mile buffer; **Table ID-3**). Buffer distances would be reduced for other types of disturbances compared with Alternative 4 and also result in less IHMA protected, i.e. tall structures 7% less; low structures 5% less; and noise and disruptive activities 1% less.
- GHMA—Under Alternative 5, buffer distances for disturbances would result in 1 to 13% less GHMA protected, where the largest difference would be for infrastructure related to energy development, other types of surface disturbance, and linear features (i.e. 3.1-mile buffer reduced to 0.6- or 0.25-mile buffer; **Table ID-3**). Impacts on GRSG would vary widely since only 5% of all *active* and *pending active* leks are in GHMA and scattered across nearly 2 million acres of BLM lands. On a project-specific basis, BLM would continue to avoid and minimize impacts to the extent practicable within GHMA.

Table ID-3. Habitat Protected by Lek Buffers under Alternatives 4 and 5

Action	PHMA (4,472,499 acres)		IHMA (2,410,920 acres)		GHMA (1,908,361 acres)	
	Buffer	Percent Protected	Buffer	Percent Protected	Buffer	Percent Protected
Alternative 4						
Linear Features (roads)	3.1 Miles	93	3.1 Miles	47	3.1 Miles	13
Infrastructure Related to Energy Development	3.1 Miles	93	3.1 Miles	47	3.1 Miles	13
Tall Structures	2 Miles	58	2 Miles	26	2 Miles	6
Low Structures	1.2 Miles	29	1.2 Miles	11	1.2 Miles	2
Surface Disturbance	3.1 Miles	93	3.1 Miles	47	3.1 Miles	13
Noise and Related Disruptive Activities	0.25 Miles	1	0.25 Miles	1	0.25 Miles	0
Action	**PHMA (4,452,947 acres)**		**IHMA (2,440,288 acres)**		**GHMA (1,717,050 acres)**	
	Buffer	**Percent Protected**	**Buffer**	**Percent Protected**	**Buffer**	**Percent Protected**
Alternative 5						
Linear Features: major minor	3.1 Miles 1.2 Miles	92 28	2 Miles 0.8 Miles	24 6	0.25 Miles 0.25 Miles	0 0
Infrastructure Related to Energy Development	3.1 Miles	92	2 Miles	24	0.6 Miles	1
Tall Structures Distribution poles *only*	2 Miles	49	1.7 Miles 0.6 Miles	19 6	0.6 Miles	1
Low Structures	1.2 Miles	28	0.6 Miles	6	0.12 Miles	0
Surface Disturbance	3.1 Miles	92	2 Miles	24	0.6 Miles	1
Noise and Related Disruptive Activities	--	--	--	--	--	--

Besides differences to Alternatives 2 and 4 described above, Alternative 5 would not include any buffers for noise and related disruptive activities that do no result in habitat loss. Also, Alternative 5 would include 'Buffer Exception Criteria', where BLM may approve actions within IHMA and GHMA, if it is impracticable, technically or economically, to locate the project outside of the buffer and impacts are avoided through project siting and design, to the extent reasonable. The Buffer Exception Criteria and reduced buffers in GHMA and IHMA should encourage development outside of PHMA.

The reduced buffer distances, primarily in IHMA and GHMA, along with the Buffer Exception Criteria in IHMA and GHMA would improve alignment with the Governor's Plan by having the most restrictive management in PHMA and reducing those restrictions in IHMA and further reducing restrictions in GHMA. Other restrictions in IHMA such as RDFs, Mitigation, Disturbance cap, and NSO with limited exception would serve to ensure responsible development. However, infrastructure and development could be allowed closer to leks, subject to the before mentioned restrictions. As described above, the amount of GRSG habitat and HMA that could be protected with lek buffers under Alternative 5 would be lower compared to protections under Alternative 4. As a result, under Alternative 5 development could occur closer to some leks (smaller buffer) than under Alternative 4 and result in increased impacts to GRSG. Project-level impacts would be analyzed during NEPA and consider other measures to ensure responsible development.

Effects of Required Design Features under Alternatives 3 through 6

The RDFs from the 2019 Idaho ARMPA (Alternative 2, No Action) mostly differ from the 2015 Idaho ARMPA in treating RDFs for actions in GHMA as BMPs. Therefore, applying RDFs from the 2019 ARMPA would result in less protection for all GRSG leks and habitat in GHMA than under the 2015 Idaho ARMPA, (Alternative 1).

Effects of Buffers and Required Design Features under the Proposed RMP Amendment

The proposed changes to lek buffer distances under the Proposed RMP Amendment would offer a similar level of protection to GRSG leks in IHMA and GHMA as with Alternatives 1 and 4, and a greater level of protection for GRSG leks in IHMA and GHMA than under Alterative 5. Furthermore, under the Proposed RMP Amendment, there would be additional protection of leks in IHMA compared with Alternative 5, since the buffer exception criteria would only apply to GHMA, not IHMA, as under Alternatives 1 and 4. Compared with Alternative 4, the Proposed RMP Amendment would have negligible impacts on GRSG leks outside of HMA since there are only five leks of the 1252 active and pending leks. These five leks were not included in the HMA mapping since they are small, declining leks and/or on private lands.

The proposed changes to RDFs under the Proposed RMP Amendment would offer similar protection to GRSG in GHMA as in IHMA and PHMA, similar to protections under Alternative 1. In addition, the new BMPs and RDFs for livestock grazing management would be incorporated, consistent with the rangewide Proposed RMP Amendment.

19.10 Literature Cited

Bureau of Land Management (BLM) Idaho. 2018. Idaho Greater Sage-Grouse Proposed Resource Management Plan Amendment and Final Supplemental Environment Impact Statement. Available at: https://eplanning.blm.gov/public_projects/lup/103344/163458/199450/2018_Idaho_GRSG_Proposed_RMPA-Final_EIS_508.pdf

Bureau of Land Management (BLM) Idaho. 2019. Idaho Greater Sage-Grouse Record of Decision and Approved Resource Management Plan Amendment. March 2019. Available at: https://eplanning.blm.gov/public_projects/lup/103344/168711/205330/IdahoRODandARMPAMarch2019.pdf

Bureau of Land Management (BLM) Idaho. 2020. Idaho Greater Sage-Grouse Final Supplemental Environment Impact Statement. Available at: https://eplanning.blm.gov/public_projects/103344/200243182/20029799/250035998/Idaho_GRSG_FSEIS_2020%20COMPILED_508.pdf

Bureau of Land Management (BLM) Idaho. 2015. Idaho and Southwestern Montana Greater Sage-Grouse Approved Resource Management Plan Amendment. Attachment 1 from the USDI 2015 Record of Decision and Approved Resource Management Plan Amendments for the Great Basin Region, including the Greater Sage-Grouse Sub-Regions of Idaho and Southwestern Montana, Nevada and Northeastern California, Oregon, and Utah. September 2015. Available at: https://eplanning.blm.gov/public_projects/lup/31652/63338/68680/IDMT_ARMPA_web.pdf.

Bureau of Land Management (BLM) and Forest Service (United States Department of Agriculture, Forest Service). 2015. Idaho and Southwestern Montana Greater Sage-Grouse: Proposed Land Use Plan Amendment and Final Environmental Impact Statement. June 2015. Available at: https://eplanning.blm.gov/epl-front-office/projects/lup-31652/58666/63729/ID_swMT_GRSG_FEIS_V1.pdf

Coates, P.S., M.L. Casazza, E.J. Blomberg, S.C. Gardner, S.P. Espinosa, J.L. Yee, L. Wiechman, and B.J. Halstead. 2013. Evaluating greater sage-grouse seasonal space use relative to leks: implications for surface use designations in sagebrush ecosystems. Journal of Wildlife Management 77:1598-1609.

Connelly, J.W., A. Moser and D. Kemner. 2013. Greater Sage Grouse Breeding Habitats: Landscape based comparisons. Grouse News 45.

Cook, A.A., P.A. Deibert, S.P. Espinosa, A. Moser, L. Schreiber, and M. Schroeder. 2022. Greater Sage-grouse Range-wide Population Monitoring Guidelines Part A: Standards for Collection and Reporting of Greater Sage-grouse Lek Count Data. WAFWA Sage- and Columbian Sharp-tailed Grouse Technical Team, Boise, Idaho.

Fedy, B.C., and C.L. Aldridge. 2011. The importance of within-year repeated counts and the influence of scale on long-term monitoring of sage-grouse. Journal of Wildlife Management 75:1022-1033.

Fedy, B.C., and K.E. Doherty. 2011. Population cycles are highly correlated over long time series and large spatial scales in two unrelated species: greater sage-grouse and cottontail rabbits. Oecologia 165(4):915-24.

Holloran, MJ, and S.H. Anderson. 2005. Spatial distribution of greater sage-grouse nests in relatively contiguous sagebrush habitats. Condor 107:742-752.

Kohl, M.T., T.A. Messmer, B.A. Crabb, M.R. Guttery, D.K. Dahlgren, R.T. Larsen, S.N. Frey, S. Liguri, and R.J. Baxter. 2019a. The effects of power lines on the breeding ecology of greater sage-grouse. PLoS ONE 14(1):e0209968. https://doi.org/10.1371/journal.pone.0209968

Kohl, M.T., T.A. Messmer, B.A. Crabb, M.R. Guttery, D.K. Dahlgren, R.T. Larsen, S.N. Frey, S. Liguri, and R.J. Baxter. 2019b. Correction: The effects of power lines on the breeding ecology of greater sage-grouse. PLoS ONE 14(1):e0209969. https://doi.org/10/1371/journal.pone.0213669

Manier, D.J., Z.H. Bowen, M.L. Brooks, M.L. Casazza, P.S. Coates, P.S. Deibert, S.E. Hanser, and D.H. Johnson. 2014. Conservation buffer distance estimates for Greater Sage-grouse—A review: U.S. Geological Survey Open File Report 2014-1239, 14 p., https://pubs.usgs.gov/of/2014/1239/

State of Idaho. 2021. The 2021 Idaho Sage-grouse Plan. Policy for Greater Sage-grouse Management in Idaho. Version October 22, 2021, Available at: https://gov.idaho.gov/wp-content/uploads/2022/03/Attachment1_2021IdahoPlan-FINAL.pdf

State of Idaho. 2022. Executive Order No. 2022-03: Adopting Idaho's 2021 Sage-grouse Management Plan and Idaho Sage-steppe Mitigation Principles. March 18, 2022. Available at: https://gov.idaho.gov/wp-content/uploads/2022/03/eo-2022-03.pdf

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Appendix 20

Changes between Draft RMP Amendment/Draft EIS and Proposed RMP Amendment/Final EIS

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Appendix 20. Changes Between Draft RMP Amendment/Draft EIS and Proposed RMP Amendment/Final EIS

This appendix provides a summary of the primary changes between the Draft RMP Amendment/Draft EIS (Draft RMPA/EIS) and this Proposed RMP Amendment/Final EIS (Proposed RMPA/Final EIS) by document section (chapters and appendices).

CHAPTER 1, INTRODUCTION

Chapter 1 has been updated to provide new information on the BLM's Proposed RMPA/Final EIS. Specifically, Chapter 1 has been updated to refine and clarify the Purpose and Need. Information previously in this chapter regarding alternative management approaches considered but not analyzed in detail has been moved to Chapter 2 and included in the Alternatives Considered but not Analyzed in Detail Table 2-1. Two new sections have been added to this Chapter: Section 1.7, summarizing changes between the Draft RMPA/EIS and this Proposed RMPA/Final EIS, and Section 1.9, which details how the BLM anticipates applying this RMPA to ongoing actions. Section 1.8, summarizing consistency with state and local land use plans, was updated based on input received on the Draft RMPA/EIS. Editorial changes were also made throughout Chapter 1 to improve clarity.

CHAPTER 2, ALTERNATIVES

Chapter 2 has been updated to present the goals, objectives, allocations, and management direction of the Proposed RMPA, presented by Habitat Management Area designation and resource topic. The chapter summarizes the alternatives considered in the Draft RMPA/EIS, but the full description of Alternatives 1-6 from the Draft EIS has been moved, with clarifying edits in response to cooperating agency and public comments, to Appendix 21. Chapter 2 also now provides an updated table of alternatives considered but not analyzed in detail and a summary table of the alternatives.

CHAPTER 3, AFFECTED ENVIRONMENT

The BLM has clarified language and incorporated new information since the Draft RMPA/EIS to reflect better or more current information, where available and germane to the current conditions and analysis. Most notably, such updates have been made in Sections 3.2, Greater Sage-Grouse; 3.5, Fish and Wildlife, 3.6, Special Status Species, 3.7, Wild Horses and Burros; 3.9, Lands and Realty (Including Renewable Energy); 3.11, ACECs and RNAs; 3.12 Social and Economic Conditions (Including Environmental Justice); 3.14, Soil Resources; and 3.15, Water Resources.

Additional literature was reviewed and added to the baseline information, particularly in Sections 3.2, Greater Sage-Grouse; 3.12 Social and Economic Conditions (Including Environmental Justice); 3.14, Soil Resources; and 3.15, Water Resources.

CHAPTER 4, ENVIRONMENTAL CONSEQUENCES

Analysis of Alternatives 1 through 6 has been moved to Appendix 10, and the state-specific Socioeconomic and Environmental Justice analysis for all alternatives (including the Proposed RMP Amendment) has been moved to Appendix 18. Chapter 4 now includes a summary of environmental consequences table, and for each resource, the nature and type of effects, likely direct and indirect impacts on the human and natural

environment that could occur from implementing the BLM Proposed RMP Amendment presented in Chapter 2, Alternatives, and cumulative effects.

The BLM has clarified language and incorporated new information since the Draft RMPA/EIS to reflect better or more current information, where available and germane to the current conditions and analysis. The BLM updated all sections of Chapter 4 with such changes.

CHAPTER 5, CONSULTATION AND COORDINATION

The BLM updated Chapter 5 to include information related to ongoing consultation and coordination efforts that have progressed since the Draft RMPA/EIS. Specifically, additional information has been added, summarizing formal consultation efforts with Federally recognized Tribes and the U.S. Fish and Wildlife Service, pursuant to Section 7(a)(2) of the Endangered Species Act, and coordination efforts with State Historic Preservation Officers, consistent with Section 106 of the National Historic Preservation Act. Sections have been updated that detail BLM's public outreach efforts and coordination with cooperating agencies on the Draft RMPA/EIS. Two new sections have been added in Sections 5.5 and 5.6 detailing the BLM's next steps, including the protest period on the Proposed RMPA/Final EIS and Governors consistency review, and BLM's intent to issue Approved RMPA/Records of Decisions for each state in the planning area, have also been added. Refinements were made to the list of preparers.

APPENDIX 1, MAPS

Maps in Appendix 1 were updated based on refinements to alternatives considered in the Draft RMPA/EIS. New maps were added that display the BLM's Proposed RMPA.

APPENDIX 2, COMPARISON OF PROPOSED RMP AMENDMENT TO EXISTING GREATER SAGE-GROUSE RMP MANAGEMENT DIRECTION

Appendix 2 was updated to provide a description of changes between BLM's existing RMP management direction for GRSG and the BLM's Proposed RMPA, including the appendices from prior planning efforts. For each state, tables now display BLM's management direction in the 2015 BLM GRSG Approved RMP Amendment, 2019 BLM GRSG Approved RMP Amendment, and a summary of the Type of Change to Existing Management Direction that would be made by the Proposed RMPA: no change, partial revision, complete revision, or new direction. Consistent with these updates, the appendix was renamed from "Existing Greater Sage-Grouse RMP Management Direction" to "Comparison of Proposed RMP Amendment to Existing Greater Sage-Grouse RMP Management Direction".

APPENDIX 3, GREATER SAGE-GROUSE HABITAT MANAGEMENT AREA STATE-BY-STATE MAPPING STRATEGIES

This appendix has been updated to reflect changes made to GRSG HMA mapping strategies since the Draft RMPA/EIS. The HMA delineation approaches utilized in the Proposed RMPA for all HMA types, both rangewide and state specific, are identified.

For the rangewide HMAs, clarifying language has been made to the descriptions of Priority Habitat Management Areas (PHMA) and General Habitat Management Areas (GHMA) to better describe how BLM identified these areas and BLM's management intent. Based on internal review and input received on the Draft RMPA/EIS, BLM has identified areas within PHMA that require additional protections to support conservation of GRSG habitat, referred to as PHMA with limited exceptions. Appendix 3 details the process and criteria BLM used to identify PHMA with limited exceptions and provides a state-by-state summary of the areas identified as PHMA with limited exceptions.

In Oregon and Nevada/California, HMAs were refined based on updated data (from Oregon Department of Fish and Wildlife and US Geological Survey, respectively) that became available between the publication of the Draft RMPA/EIS and the Proposed RMPA/Final EIS.

APPENDIX 4, LEK STATUS DEFINITION COMPARISON

In 2022 the Western Association of Fish and Wildlife Agencies (WAFWA) Sage and Columbian sharp-tailed grouse Technical Committee published a list of lek definitions to allow for more consistent data sharing and analyses across the range of GRSG. All the state wildlife agencies have adopted these new definitions. The BLM has adopted these definitions to ensure consistency with the state wildlife agencies and provide consistent management direction when implementing habitat conservation and allocations across the planning area. This appendix compares the 2022 lek definitions adopted by the BLM and state wildlife agencies and compares them to previous definitions used in 2015 and 2019 by state.

APPENDIX 5, EVALUATION OF AREAS OF CRITICAL ENVIRONMENTAL CONCERN FOR GREATER SAGE-GROUSE HABITAT

This appendix has been updated to provide a comprehensive review of the internally and externally nominated ACECs; the relevance and importance criteria evaluation process that was conducted for the nominated ACECs; and a summary the potential ACECs identified in the Draft EIS. The appendix also describes changes made in the ACECs analyzed between Draft and Final EIS, provides maps of the ACECs considered in each state, and describes the effects of the alternatives and the Proposed RMP Amendment on the 32 potential ACECs considered in Alternatives 3 and 6 in the Final EIS.

APPENDIX 6, NTT, COT, AND USGS SCIENCE INCORPORATION

This appendix clarifies the role of the NTT report, COT report and USGS science in developing this RMPA for GRSG. While both the NTT and COT reports provide conservation recommendations for GRSG and their habitats, neither was intended as the definitive directive for management. This appendix clarifies the role of these reports in the development of the GRSG RMPA.

APPENDIX 7, GREATER SAGE-GROUSE MONITORING FRAMEWORK

The BLM GRSG Monitoring Framework outlines how the BLM tracks sagebrush habitats across the planning area. The appendix provides the updated monitoring framework. Since implementing the monitoring efforts described in the original Monitoring Framework, new data has become available and new approaches to analyzing these data have been developed. This update maintains the existing measures included in the original document and expands upon them to include this new science. Measures for monitoring are identified at two scales: the rangewide scale and land use plan scale. The former will provide insight into habitat conditions and BLM management actions across jurisdictional boundaries which will, in turn, provide context to the smaller scale land use plan monitoring.

APPENDIX 8, GREATER SAGE-GROUSE HABITAT INDICATORS AND BENCHMARKS

The BLM uses the multi-scale Habitat Assessment Framework (HAF) to determine whether an area is likely to provide GRSG habitat, and if so, the quality of that habitat to inform management. The HAF (BLM TR 6710-1, as revised) provides a standardized, scientifically based methodology to assess sage-grouse habitat suitability at multiple scales (broad, mid, fine, and site-scales). Habitat suitability occurs along a gradient ranging from unsuitable to suitable and is rarely uniform within and across the scales. Using multi-scale evaluations is important for assessing GRSG habitat by considering the entire suite of conditions that contribute to high quality habitat, the success of past conservation actions, and prioritizing future land uses

and conservation actions. This appendix provides the updated habitat indicators and benchmarks used by the HAF, as adjusted by individual states to consider ecological differences across the species' range.

APPENDIX 9 TABLES AND FIGURES

Tables and Figures in Appendix 9 were updated based on refinements to alternatives considered in the Draft RMPA/EIS. Several tables were removed since they were not used to inform the analysis. Several tables were consolidated and revised to provide more informative data by HMA category. New tables and figures were added that detail the BLM's Proposed RMPA.

APPENDIX 10, CHAPTER 4 METHODOLOGY, ASSUMPTIONS, INDICATORS, AND ENVIRONMENTAL CONSEQUENCES FOR ALTERNATIVES 1-6

Analyses for the draft alternatives (Alternatives 1 through 6) were moved to this appendix and adjusted based on public and internal comments. Notably, additional analysis of effects on ACECs was included in Section 10.11, Special Designations. Other changes were made in Sections 10.2 (Greater Sage-Grouse), 10.3 (Vegetation), 10.5 (Fish and Wildlife), 10.9 (Lands and Realty), 10.12 (Social and Economic Conditions (Including Environmental Justice)), 10.14 (Soil Resources), 10.15 (Water Resources), 10.18 (Lands with Wilderness Characteristics), and 10.19 (Recreation and Visitor Services).

APPENDIX 11, SPECIAL STATUS SPECIES

Appendix 11 includes an updated list of special status species in the planning area and associated descriptions of preferred habitat. The BLM maintains a list of special status species across all taxa to for conservation consideration. Each BLM state office updates these lists as new information becomes available. These state lists were reviewed and compared to the planning area for this RMPA. Overlapping species were updated in this appendix.

APPENDIX 12, REASONABLY FORESEEABLE DEVELOPMENT SCENARIO

The BLM revised the Wyoming section of the document to better reflect changes in the nature and type of development that has occurred in recent years. The changes also use information provided by Cooperating Agencies to improve the accuracy of the included information and analysis. Minor edits were made throughout the appendix to improve clarity.

APPENDIX 13, SOCIOECONOMIC BASELINE REPORT

The BLM has clarified language to reflect better or more current information, where available and germane to the current conditions and analysis. The BLM updated the baseline information for wind and solar ROWs (in Section 3.4) and percentages of ranches by type (in Section 3.5) to reflect the latest and best available information.

APPENDIX 14, CUMULATIVE EFFECTS SUPPORTING INFORMATION

BLM refined the list of state and local conservation plans detailed in Section 14.1 and the list of past, present, and reasonably foreseeable future actions in Section 14.3 to reflect more current information and suggestions received during public comment of the Draft RMPA/EIS. BLM also adjusted the order of the sections and made editorial changes throughout this appendix to improve clarity.

APPENDIX 15, LIVESTOCK GRAZING MANAGEMENT BEST MANAGEMENT PRACTICES AND DESIGN FEATURES AND SUPPLEMENTAL INFORMATION

Minor editorial changes were made to improve clarity of Appendix 15.

APPENDIX 16, MONTANA/DAKOTAS OIL AND GAS LEASE STIPULATIONS

The BLM has updated the appendix to include the oil and gas lease stipulations identified in the Proposed RMP Amendment.

APPENDIX 17, PROPOSED RMP AMENDMENT AND ANALYSIS OF KEY RESEARCH NATURAL AREAS IN OREGON

The analysis in this appendix has been updated and now includes the Proposed RMPA. In the Proposed RMPA, the size of the area allocated as unavailable to grazing in the Mahogany Ridge key Research Natural Area (RNA) would change. The Proposed RMPA also includes exclosures near the North Ridge Bully Creek RNA, the South Ridge Bully Creek RNA, and the Spring Mountain RNA in vegetative communities identified as important for Greater Sage-grouse.

APPENDIX 18, SOCIAL AND ECONOMIC IMPACT ANALYSIS METHODOLOGY AND STATE-SPECIFIC IMPACT ANALYSIS

Analysis of the state-specific impacts on socioeconomic conditions and environmental justice populations were moved to this appendix for all alternatives (including the Proposed RMP Amendment). The BLM updated the description to include the assumptions and methodology used to calculate impacts on socioeconomic conditions from changes in revenue from rents and bonus bids, ad valorem taxes, sales and use taxes, and other local state taxes and fees.

The BLM has clarified language and incorporated new information since the Draft RMPA/EIS to reflect better or more current information, where available and germane to the impact analysis, specifically the state-specific socioeconomic impact analysis due to potential changes in oil and gas activity from BLM decisions, in Section 18.4.

APPENDIX 19, IDAHO BUFFERS AND REQUIRED DESIGN FEATURES

This appendix has been updated to identify the buffer management direction for the Proposed RMP Amendment and include required design features management direction for all of the alternatives, including the Proposed RMP Amendment.

APPENDIX 20, CHANGES BETWEEN DRAFT RMP AMENDMENT/EIS AND PROPOSED RMP AMENDMENT/FINAL EIS

This new appendix provides a summary of the primary changes between the Draft RMPA/Draft EIS and this Proposed RMP Amendment/Final EIS by document section (chapters and appendices).

APPENDIX 21, DETAILED DESCRIPTION OF DRAFT EIS ALTERNATIVES

This new appendix provides the description of the six alternatives analyzed in the Draft EIS in the same manner they were presented in the Draft EIS. Some updates to the alternatives have been made in response to internal review and comments received from cooperating agencies and the public during the Draft EIS comment period. These updates include edits in the comparison of alternatives tables to improve the clarity of the description of the alternatives and updates to the Areas of Critical Environmental Concern Table 2-14.

APPENDIX 22, DRAFT RMPA/EIS PUBLIC OUTREACH AND RESPONSES TO SUBSTANTIVE PUBLIC COMMENTS

This new appendix summarizes public outreach conducted on the Draft RMPA/EIS during the 90-day comment period. It also includes substantive comment summaries and general responses by topic, along with a list of commenters and the topics they provided comments on.

APPENDIX 23, CONSISTENCY WITH STATE AND LOCAL LAND USE PLANS

This new appendix details known inconsistencies between the Proposed RMPA and federal, state, local, and Tribal plans.

Appendix 21

Detailed Description of Draft EIS Alternatives

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Appendix 21. Detailed Description of Draft EIS Alternatives

This appendix provides the description of the six alternatives analyzed in the Draft EIS in the same manner they were presented in the Draft EIS. Some updates to the alternatives have been made in response to internal review and comments received from cooperating agencies and the public during the Draft EIS comment period. These updates include edits in the comparison of alternatives tables to improve the clarity of the description of the alternatives and updates to the Areas of Critical Environmental Concern (ACEC) **Table 21-13**. Please also refer to **Appendix 5** for updates and clarifications on the ACECs proposed for nomination under Alternatives 3 and 6 between the Draft EIS and the Final EIS.

21.1 Detailed Description of Draft Alternatives

At the beginning of each management direction section there is a brief description introducing the action/topic and rationale for alternatives development. These introductions are not planning decisions but are included to establish context for the alternatives. **Section 2.5** includes rangewide alternatives applicable to all states, organized by the cross-cutting management topics/issues identified during scoping (see **Section 1.6**). Accompanying these narratives are tables showing side-by-side descriptions of the alternatives. **Section 2.6** includes the alternatives associated with state-specific circumstances, organized by state. Alternatives 1 and 2 in **Section 2.5** are presented as summaries due to variations by state or planning area. Not all decisions from the 2015 and 2019 amendment efforts are included in Alternatives 1 and 2. Only management actions being considered for amendment in Alternatives 3, 4, and 5 are brought forward from the 2015 and 2019 efforts. The remaining decisions from the prior planning efforts will remain in place regardless of which alternative is selected. **Appendix 2**, Existing GRSG Management in BLM RMPs identifies all existing GRSG management (inclusive of both 2015 and 2019 ARMPAs) for each state and identifies whether an action may be amended in the current effort.

Actions applicable to all alternatives are shown in one cell across a row and would be implemented regardless of which alternative is ultimately selected. Actions applicable to more than one but not all alternatives are indicated by either combining cells for the applicable alternatives, or by denoting them as the same for another alternative (e.g., "same as Alternative A"). "No similar action" is used to indicate there is no similar goal, objective or action to the other alternatives, or that the similar goal, objective or action is reflected in another management action in the alternative.

Many management actions are informed by the location of GRSG leks (breeding areas associated with GRSG nesting habitat). Existing management actions across the species' range use different lek definitions (e.g., active, occupied, pending, or historic), as identified by state wildlife agencies where the lek occurred. In 2022, the Western Association of Fish and Wildlife Agencies (WAFWA) published standardized definitions for leks to resolve inconsistencies between states, thereby allowing for comparable data analyses across the species' range (Cook et. al., 2022). Through these plan amendments, the BLM proposes to adopt the lek definitions published by WAFWA and use them when implementing GRSG management. **Appendix 4** compares the new WAFWA lek definitions to definitions used in each existing BLM RMP/EIS. Unless otherwise specifically noted, the term "lek" applies to the WAFWA definition for "active lek."

21.1.1 Clarifying the RMP Goal for GRSG

In 2015, BLM RMPs were amended or revised to include updated goals or objectives for GRSG management in consideration of the National Technical Team (NTT) Report (BLM 2011). The NTT comprised resource specialists and scientists from the BLM, State Fish and Wildlife Agencies, U.S. Fish and Wildlife Service (USFWS), Natural Resources Conservation Service (NRCS) and U.S. Geological Survey (USGS). In the report the authors identified a management goal to: "Maintain and/or increase sage-grouse abundance and distribution by conserving, enhancing or restoring the sagebrush ecosystem upon which populations depend in cooperation with other conservation partners."

Some iteration of the NTT Report goal is in all current BLM RMPs for GRSG. Through this planning effort, the BLM proposes to clarify its goal, which is to conserve, enhance, restore, and manage GRSG habitats to support persistent, healthy populations, consistent with BLM's Special Status Species Management Policy (BLM-M-6840) and in coordination and cooperation with state wildlife agencies. Habitat conservation and management should maintain existing connectivity between GRSG populations.

Table 21-1, Comparison of Alternatives, GRSG RMP Goal, presents management by alternative for this management issue.

Table 21-1. Comparison of Alternatives, GRSG RMP Goal

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
All states have at least one goal or objective that includes the following language and/or concept: • Maintain and enhance populations and distribution of GRSG by protecting and improving sagebrush habitats and ecosystems that sustain GRSG populations. • Conserve, enhance, and restore the sagebrush ecosystem upon which GRSG populations depend in an effort to maintain and/or increase their abundance and distribution, in cooperation with other conservation partners. • Maintain and enhance quality/suitable habitat to support the expansion of GRSG populations on federally-administered lands within the planning area.		BLM resource management plans (RMPs) would identify the desired condition for GRSG in the following overarching goal: Conserve, enhance, restore and manage GRSG habitats to support persistent, healthy populations, consistent with BLM's Special Status Species Management Policy (BLM-M-6840) and in coordination and cooperation with state wildlife agencies. Habitat conservation and management should maintain existing connectivity between GRSG populations.		

21.1.2 Habitat Management Area Alignments and Associated Major Land Use Allocations

The BLM has reviewed new scientific publications since our previous planning efforts which provide key population (e.g., Doherty et al. 2016, Coates et al., 2021), genetic (e.g., Cross et al., 2018, Oyler-McCance et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021). This information was used to update GRSG habitat designations in concert with state wildlife agencies, to determine if BLM was applying appropriate management allocations consistent with the purpose and need of this amendment. While HMAs may encompass multiple land ownerships, reflecting the wide-ranging ecological needs of GRSG, management actions that follow are specific to BLM-administered lands.

Priority Habitat Management Areas (PHMA) have the highest value to maintaining sustainable GRSG populations and can include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors. The BLM objective for these areas is to maintain and enhance habitat conditions that will support persistent and healthy GRSG populations through management to minimize habitat loss and degradation. See **Appendix 3** for a description of the strategies applied by each state to identify PHMA.

Important Habitat Management Areas (IHMA; ID only) are defined as lands that encompass moderate to high-quality GRSG habitat and populations necessary for providing a management buffer for PHMA, connecting patches of PHMA, and in some cases supporting important populations and habitat independent of PHMA. The objective for IHMA is to maintain habitat conditions that will support persistent and healthy GRSG populations.

General Habitat Management Areas (GHMA) are lands that are or have the potential to become occupied seasonal or year-round habitat outside of PHMA or IHMA, managed to sustain GRSG populations. These areas are defined differentially by state wildlife management agencies, but generally are of poorer GRSG habitat quality with reduced occupancy when compared to PHMA. Some state wildlife agencies have identified areas of GHMA as important for restoration, connectivity, or seasonal habitats, and most require mitigation for unavoidable impacts within this designation. The objective for GHMA is to maintain habitat conditions to support GRSG populations consistent with the state agency designations of recovery, connectivity, or seasonal habitats.

Other habitat management areas are identified by individual states for a variety of purposes, typically as subsets of GHMA (i.e., lower priority than PHMA). These are defined and described in detail in **Appendix 3**.

Table 21-2, Comparative Summary – Acres GRSG Habitat Management Areas by State by Alternative. **Appendix 3** provides a summary of each state strategy in developing their habitat management areas, as well as the definitions for the GRSG habitat management areas used in each state. **Maps 2.1** through **2.6** show the relationship of the habitat management areas across the west.

In addition to habitat management areas, this section summarizes allocations for major land uses. Additional details for alternatives 1 and 2 (e.g., specific avoidance criteria for rights-of-way, specific controlled surface use stipulations for fluid minerals, etc.), is presented in **Appendix 2**. If specific language from previous plans is not included in this amendment, it is not being considered for amendment in this effort.

Table 21-2. Comparative Summary – Acres GRSG Habitat Management Areas by State by Alternative (BLM administered surface only)

Habitat Management Area	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Rangewide Habitat Management Area Alignments					
PHMA	32,465,000	32,535,000	69,199,000	36,701,000	34,803,000
GHMA	26,383,000	25,878,000	N/A	25,946,000	23,718,000
Colorado Habitat Management Area Alignments					
PHMA	748,000	921,000	1,538,000	751,000	751,000
GHMA	788,000	727,000	N/A	786,000	786,000
LMA	97,000	82,000	97,000	97,000	97,000
Idaho Habitat Management Area Alignments					
PHMA	4,178,000	4,106,000	8,860,000	4,472,000	4,573,000
IHMA	2,736,000	2,796,000	N/A	2,477,000	2,503,000
GHMA	1,958,000	1,958,000	N/A	1,910,000	1,722,000
Montana/Dakotas Habitat Management Area Alignments					
PHMA	3,275,000	3,275,000	5,254,000	3,300,000	3,300,000
GHMA	2,384,000	2,384,000	N/A	1,859,000	1,859,000
RHMA	165,000	165,000	N/A	94,000	94,000
CHMA	N/A	N/A	298,000	298,000	298,000
Nevada/California Habitat Management Area Alignments					
PHMA	9,266,000	9,268,000	21,138,000	9,780,000	9,661,000
GHMA	5,783,000	5,749,000	N/A	7,551,000	6,183,000
OHMA	4,862,000	4,870,000	N/A	3,806,000	2,977,000
Oregon Habitat Management Area Alignments					
PHMA	4,589,000	4,557,000	11,022,000	6,283,000	6,281,000
GHMA	5,634,000	5,662,000	N/A	4,739,000	3,539,000
Utah Habitat Management Area Alignments					
PHMA	2,080,000	2,080,000	3,568,000	2,192,000	1,627,000
GHMA	438,000	N/A	N/A	1,195,000	646,000
Wyoming Habitat Management Area Alignments					
PHMA	8,328,000	8,328,000	17,821,000	9,921,000	8,609,000
GHMA	9,397,000	9,397,000	N/A	7,905,000	8,981,000
Stewardship Areas	N/A	N/A	N/A	N/A	15,000

Table 21-3. Comparison of Alternatives, Habitat Management Area Alignments, Associated Major Land Use Allocations, and Non-Habitat

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Habitat Management Area Alignments and Associated Major Land Use Allocations				
GRSG habitat management areas would be identified and managed using the boundaries from the 2015 amendments or revisions (as maintained). See **Map 2.1** for the HMA map. Acres by state and rangewide are shown in **Table 21-2** above. Information on state-by-state GRSG HMA mapping strategies is in **Appendix 3**. ID, MT, NV, OR, UT, WY: Manage Sagebrush Focal Areas (SFAs) as described in the 2015 amendments or revisions. CA, CO, ND, SD: Does not include SFAs.	GRSG habitat management areas would be identified and managed using the boundaries from the 2019 amendments. See **Map 2.2** for the map of the HMAs. Acres by state and rangewide are shown in **Table 21-2** above. Information on state-by-state GRSG HMA mapping strategies is in **Appendix 3**. MT/DK: Manage the same HMAs as Alternative 1. ID, NV, UT, WY removed SFAs and associated management. CA, CO, MT/DK are the same as Alternative 1. OR retained the SFAs, but removed the recommendation for withdrawal from location and entry under the Mining Law of 1872.	GRSG habitat management areas would be identified and managed as shown on **Map 2.3**. Acres by state and rangewide are shown in **Table 21-2** above. Information on state-by-state GRSG HMA mapping strategies is in **Appendix 3**. Under Alternative 3, all areas managed for GRSG would be PHMA. (In addition to the PHMA, there would be ACECs designated. See the ACEC section below, and **Appendix 5**.)	GRSG habitat management areas would be identified and managed as shown on **Map 2.4**. Acres by state and rangewide are shown in **Table 21-2** above. Information on state-by-state GRSG HMA mapping strategies is in **Appendix 3**. No areas would be identified or managed as SFAs.	GRSG habitat management areas would be identified and managed as shown on **Map 2.5**. Acres by state and rangewide are shown in **Table 21-2** above. Information on state-by-state GRSG HMA mapping strategies is in **Appendix 3**. No areas would be identified or managed as SFAs. (HMA boundaries under Alternative 6 are the same as those under Alternative 5. **Map 2.6** shows the HMA boundaries and the GRSG ACECs that would be designated.See the ACEC section below, and **Appendix 5**.)

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Summarized PHMA (and ID IHMA) allocations: (Wind, solar, livestock grazing, and major ROWs are addressed in separate tables below.) • Fluid minerals: o Except as noted below, all states are open to new leasing, with no surface occupancy (NSO) stipulations in PHMA (and in IHMA in ID). o WY: NSO within 0.6 mi of leks. PHMA outside 0.6 mi has seasonal limitations (breeding, nesting, early brood-rearing & winter habitat) and CSU (density and disturbance). o CO: Closed within 1 mile of leks. • Saleable Minerals/Mineral Materials: o Except as noted below, all states are closed in PHMA (and in IHMA in ID), but open for new free use permits and expansion of existing pits. o WY: Open subject to occupancy, seasonal limitations, disturbance, and density.	**Summarized PHMA (and ID IHMA) allocations:** (Wind, solar, livestock grazing, and major ROWs are addressed in separate tables below.) • Fluid minerals: Same as Alternative 1, except CO PHMA is NSO (no closed areas). • Saleable Minerals/Mineral Materials: Same as Alternative 1, except as noted below: o NV/CA: Exception criteria added to the closure.	**Summarized PHMA allocations**: (Wind, solar, livestock grazing, and major ROWs are addressed in separate tables below.) • Fluid minerals: Closed to leasing • Saleable Minerals/Mineral Materials: Closed	**Summarized PHMA allocations:** (Wind, solar, livestock grazing, and major ROWs are addressed in separate tables below.) • Fluid minerals: o Except as noted below, all states have NSO in PHMA (and IHMA in ID and RHMA in MT). o MT: Closed in UMRBNM; CSU in Cedar Creek RHMA; NSO 0.6 mile from lek, then CSU for Musselshell RHMA. (See the CO, MT/DK, and WY state specific circumstances for additional details for fluid mineral allocation decisions) • Saleable Minerals/Mineral Materials: o Except as noted below, all states are closed in PHMA, but open for new free use permits and expansion of existing pits. o ID: open for new free use permits and expansion of existing pits if screening and development criteria met o ID IHMA open o WY: Same as Alternative 1. (See the ID and OR state specific circumstances for additional details for saleable mineral allocation decisions)	**Summarized PHMA allocations:** (Wind, solar, livestock grazing, and major ROWs are addressed in separate tables below.) • Fluid minerals: o Same as Alternative 2. (See the CO, MT/DK, and WY state specific circumstances for additional details for fluid mineral allocation decisions) • Saleable Minerals/Mineral Materials: Same as Alternative 4 except ID PHMA, which is open for new free use permits and expansion of existing pits subject to screening and development criteria. (See the ID and OR state specific circumstances for additional details for saleable mineral allocation decisions)

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• Non-Energy minerals: o Except as noted below, all states are closed, but can consider expansion of existing leases. o WY: Open subject to occupancy, seasonal limitations, disturbance, and density. o IHMA in ID is open in Known Phosphate Leasing Areas (KPLAs). IHMA Outside KPLAs is open subject to disturbance thresholds.	• Non-Energy minerals: Same as Alternative 1, except NV/CA added exception criteria to the closure.	• Non-Energy minerals: Closed	• Non-Energy minerals: o Except as noted below, all states are closed. o NV/CA: Closed with exceptions. o ID IHMA: Open o WY: Same as Alternative 1. (See the NV/CA state specific circumstances for additional details for non-energy mineral allocation decisions)	• Non-Energy minerals: Same as Alternative 4.
• Coal: o CO, MT/DK, UT, and WY include the following language: At the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR Part 3461.5. PHMA is essential habitat for maintaining GRSG for purposes of the suitability criteria as per 43 CFR Part 3461.5(o)(1). o ID, NV/CA, and OR: Did not address coal due to absence of the mineral.	• Coal – All States same as Alt 1, except UT: At time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR Part 3461.5. Coordination with the appropriate State of Utah agency and the determination of essential habitat for maintaining GRSG as per the suitability criteria at 43 CFR Part 3461.5(o)(1) will consider site-specific information associated with lease nomination areas as part of the unsuitability process identified above.	• Coal: o CO, MT/DK, UT and WY would include the same language as UT Alt 2, unless a suitability process has already been conducted that considered GRSG HMAs. o ID, NV/CA, and OR would not address coal due to absence of the mineral.	• Coal: Same as Alternative 3	• Coal: Same as Alternative 3.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• Locatable minerals: ID, MT, NV, OR, UT, WY: SFAs were recommended for withdrawal from location and under the Mining Law of 1872. The BLM applied for a withdrawal pursuant to 204(a) of FLPMA and the Secretary initiated the withdrawal process for those lands. That process is currently underway. o MT: UMRBNM is already withdrawn.	• Locatable minerals: o MT/DK: Same as Alternative 1. o ID, NV/CA, OR, UT, and WY: Same as alternative 1, except removed the recommendation for withdrawal from location and entry under the Mining Law of 1872 associated with SFAs.	• Locatable minerals. The BLM recommends PHMA for withdrawal from location and entry under the Mining Law of 1872. The portion of the PHMA that is within the SFA boundaries from 2015 were recommended for withdrawal from location and under the Mining Law of 1872. The BLM applied for a withdrawal pursuant to 204(a) of FLPMA and the Secretary initiated the withdrawal process for those lands. That process is currently underway.	• Locatable minerals: o MT: UMRBNM is already withdrawn	• Locatable Minerals: Same as Alternative 4.
• Minor Rights-of-Way (ROW): o Except as noted below, PHMA in all states is avoidance for minor ROWs (<100 kV transmission lines and < 24" pipelines) o IHMA in ID is avoidance when consistent with screening criteria and subject to RDFs and buffers. o WY: Open to smaller ROWs, subject to buffers and mitigation.	• Minor ROW: Same as Alternative 1, except NV/CA added exception criteria to the Avoidance.	• Minor ROW: Exclusion (outside of designated corridors)	• Minor ROW: o Same as Alternative 1(including IHMA), except as noted below: o For minor ROWs, MT/DK exclusion within 1.2 miles of active leks and crucial winter range. Avoidance in designated corridors in those areas, and in the remainder of PHMA and RHMA. (See the CO state specific circumstances for additional details for ROW allocation decisions)	• Minor ROW: o Same as Alternative 1 (including IHMA), except as noted below: o For minor ROWs, MT/DK exclusion within 0.6 miles of active leks and crucial winter range. Avoidance in designated corridors in those areas, and in the remainder of PHMA. RHMA Avoidance within 1.2 miles of active leks and in crucial winter range. Remainder of RHMA open. (See the CO state specific circumstances for additional details for ROW allocation decisions)

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• Travel and Transportation Management: o All states: Manage PHMA and IHMA as limited to existing roads and trails, with isolated areas open to cross-country use where suitable based on local conditions (e.g., sand dunes, rocky areas, etc.).	• Travel and Transportation Management: Same as Alternative 1.	• Travel and Transportation Management: Same as Alternative 1.	• Travel and Transportation Management – Same as Alternative 1.	• Travel and Transportation Management – Same as Alternative 1.
Summarized GHMA allocations: • Fluid minerals: o CO: closed within 1 mile of leks, NSO within 2 miles of leks, and seasonal limitations elsewhere. o ID: CSU (lek buffers) o MT/DK – varies by local office (see **Table 21-27**). o NV/CA: CSU (lek buffers and seasonal limitations) o OR: NSO within 1 mile of leks, and CSU (seasonal limitations) o UT: NSO near leks (varies by office) and CSU (seasonal limitations) based on allocations in plans that predated the 2015 amendment. o WY: NSO within 0.25 miles of leks, and seasonal limitations within 2 miles of leks. open with standard terms and conditions outside of 2-mile lek buffer.	**Summarized GHMA allocations:** • Fluid minerals: Same as Alternative 1, except CO changed the closure within one mile of leks to be an NSO.	**Summarized GHMA allocations:** Not applicable to this alterative, as GHMA, IHMA, OHMA, and RHMA under Alternative 3 would be managed as PHMA.	**Summarized GHMA allocations:** • Fluid minerals: o CO: NSO w/in 2 miles of leks, TL elsewhere. o ID: CSU o MT/DK: NSO w/in 0.6 mile of leks and in crucial winter range; CSU elsewhere and in CHMA. o NV/CA, OR: open with minor stipulations (CSU – seasonal limitations) o UT: NSO near leks and seasonal limitations (varies by office) o WY: NSO w/in 0.25 mile of leks; seasonal limitations within 2 miles of leks; open with standard terms and conditions outside of 2-mile lek buffer. (See the CO and WY state specific circumstances for additional details for fluid mineral allocation decisions)	**Summarized GHMA allocations:** • Fluid minerals: o Same as Alternative 4 for all states except CO: CSU w/in 2 miles of leks, TL w/in rest of GHMA o CO Alternative 6: CSU w/in 1 mile of PHMA, TL w/in rest of GHMA. (See the CO and WY state specific circumstances for additional details for fluid mineral allocation decisions)

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• Saleable minerals/Mineral Materials: o All states: no allocations for GHMA (meaning open), though most have minimization measures such as RDFss/BMPs and mitigation.	• Saleable minerals/Mineral Materials: Same as Alternative 1, except ID changed applying "RDFs and buffers" in GHMA to applying "BMPs."	—	• Saleable minerals/Mineral Materials: Same as Alternative 2.	• Saleable minerals/Mineral Materials: Same as Alternative 2.
• Non-energy minerals: o All states: no specific allocations for GHMA(meaning open) though most have minimization measures such as RDFs/BMPs and mitigation	• Non-energy minerals: Same as Alternative 1, except ID changed applying "RDFs and buffers" in GHMA to applying "BMPs."	—	• Non-Energy minerals – Same as Alternative 1.	• Non-Energy minerals – Same as Alternative 1.
• Coal: No states mentioned coal management in GHMA.	• Coal: Same as Alternative 1.	—	• Coal – Unsuitability evaluation approach same as applied in PHMA.	• Coal – Same as Alternative 4.
• Locatable minerals: SFAs were recommended for withdrawal from location and under the Mining Law of 1872. The BLM applied for a withdrawal pursuant to 204(a) of FLPMA and the Secretary initiated the withdrawal process for those lands. That process is currently underway.	• Locatable minerals: Same as Alternative 1.	—	• Locatable minerals – Same as Alternative 1.	• Locatable minerals – Same as Alternative 1.
• Minor Rights-of-Way: Substantial variation by state: o All states: open to minor ROWs with mitigation, except in WY.	• Minor Rights-of-Way: Same as Alternative 1, except ID changed applying "RDFs and buffers" in GHMA to applying "BMPs."	—	• Minor Rights-of-Way: o CO, MT/DK: Avoidance o OR: Avoidance within breeding, nesting, and/or seasonal habitats, otherwise open o ID, NV/CA, UT, WY: Open	• Minor Rights-of-Way: o CO: Avoidance o ID, UT, WY: Open o MT/DK: Avoidance w/in 1.2 miles of active leks and w/in crucial winter range, open elsewhere. CHMA: Avoidance o NV/CA, OR: Open with minimization measures

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• Travel and Transportation Management: Limited to existing roads and trails, with isolated areas open to cross-country use where suitable based on local conditions (e.g., sand dunes, rocky areas, etc.).	• Travel and Transportation Management: Same as Alternative 1.	—	• Travel and Transportation Management: Same as Alternative 1.	• Travel and Transportation Management Same as Alternative 1.
Criteria-Based Management for Non-Habitat within GRSG Habitat Management Areas				
All states include language encouraging location of potential projects in areas of non-habitat before considering them in areas with habitat in GRSG habitat management areas. UT included management (MA-SSS-1) allowing managers to identify areas of GHMA that lack principal habitat components necessary for GRSG, including but not limited to rock outcrops, alkaline flats, and pinyon-juniper ecological sites. This non-habitat in GHMA could be identified when considering a project proposal and application of GHMA objectives and management actions could be excepted if: • the non-habitat does not provide important connectivity between areas with existing or potential habitat; • all direct and indirect impacts that impair the function of adjacent seasonal habitats or the life-history or behavioral needs of the GRSG population are eliminated through project design (e.g.,	All states include language encouraging location of potential projects in areas of non-habitat before considering them in areas with habitat in GRSG habitat management areas. UT adjusted MA-SSS-1 to apply to PHMA – allowing managers to identify areas of PHMA that lack principal habitat components necessary for GRSG, including but not limited to rock outcrops, alkaline flats, pinyon-juniper ecological sites, and areas that have crossed an ecological threshold to a different stable non-GRSG habitat vegetation community, such as cheatgrass monocultures or pinyon/juniper woodlands (phase 3, absent sagebrush understory) . This non-habitat in PHMA could be identified when considering a project proposal and application of PHMA objectives and management actions could be excepted if: • the non-habitat does not provide important connectivity between seasonal habitats; and	No similar action.	The GRSG habitat management areas include areas where goals, objectives, and management for conservation of GRSG are applied. The habitat management area boundaries are not intended to represent a survey-grade habitat boundary, may include results of large-scale modeling, and are not to be used exclusively for habitat determinations at a project or site-level scale. However, habitat use and occupancy, and vegetation communities are dynamic, and therefore careful consideration of areas within habitat management areas and field investigations are needed to apply GRSG management in a manner that meets GRSG plan goals and objectives. In accordance with existing law, regulation and policy, inventories will continue to be conducted to provide information on GRSG habitat and distribution (FLPMA, 43 USC 1701 Sec. 201 (a), BLM Manual 6840 .04 D 3; BLM-M-6840 .04 E 2). If during consideration of a proposed action (project level authorization) within GRSG PHMA, GHMA, IHMA (in ID), RHMA (in MT), SHMA (in WY) and OHMA (in NV/CA) potential non-habitat is identified, a field investigation should be conducted by a BLM biologist (or reviewed and accepted for confirmation). This investigation should use published, scientific methods (preferably more than 1) for identifying GRSG habitat (e.g., Stiver et. al. 2015 [as revised], NRCS ecological site descriptions (ESDs) and associated state and transition models) and be coordinated with the interdisciplinary team. Any discrepancies between the mapped GRSG habitat management areas and the site-specific conditions will be disclosed, with supporting data (e.g., vegetation monitoring, state and transition models, ecological site descriptions, etc.) and analyzed as a component of the NEPA process. In the mapped GRSG habitat management areas there may be areas of non-habitat – areas that lack the ecological potential to provide principal habitat components necessary to support GRSG and where conformance with the RMP would not support GRSG conservation (see definitions for existing habitat, potential habitat,	

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
minimize sound, preclude tall structures, require perch deterrents), as demonstrated in the project's NEPA document. Any exception granted by the Authorized Officer based on above criteria would only apply to the specific project-level authorization. Excepting a site-specific project from compliance with GRSG management in an area of non-habitat would not change the boundaries of GHMA.	• direct and indirect impacts on adjacent seasonal habitats (disturbance to or disruption of) that would impair their biological function of providing the life-history or behavioral needs of the GRSG population are eliminated through project design (e.g., minimize sound, preclude tall structures, require perch deterrents), as demonstrated in the project's NEPA document. Any exception granted by the Authorized Officer based on the above criteria would only apply to the specific project-level authorization. Excepting a site-specific project from compliance with GRSG management in an area of non-habitat would not change the boundaries of PHMA. NV/CA added management (MD SSS 5) that allowed the State Director to grant exceptions to allocations and stipulations in PHMA, GHMA, and OHMA if location of the proposed activity is determined to be unsuitable"(by a biologist with GRSG experience using methods such as Stiver et. al. 2015, as revised) and lacks the ecological potential to become marginal or suitable habitat; and will not result in direct, indirect, or cumulative impacts on GRSG and its habitat. Management allocation decisions will not apply to those areas determined	*(See above.)*	and non-habitat in glossary). However indirect and direct impacts to adjacent GRSG populations and their habitats (including potential habitat) still need to be considered when planning and authorizing projects in these non-habitat areas. All management objectives and decisions associated with each management area type will apply unless all the following criteria are documented: • The project is proposed in verified non-habitat. • In addition to indirect impacts associated with distance (as established above), indirect impact consideration also includes: no direct or indirect impacts (considering impacts within distances described in applicable research) to adjacent habitat and potential habitat or individual or populations of GRSG occupying these adjacent areas due to project design and required design features (e.g., minimize noise, preclude tall structures, require perch deterrents, etc.), as demonstrated in the project's NEPA document. Indirect impact consideration includes the following: o The project does not impact connectivity: (1) within or between populations, (2) between seasonal habitats (e.g., nesting, early brood rearing, winter, etc.), or (3) within or between existing habitat. o Project related access through/across GRSG habitat (as verified through site-specific field checks) only occurs on existing routes, and the proposed action would not include new roads or upgrades to roads that would change the vehicle use, vehicle type, or traffic volume during the applicable season of GRSG use, subject to valid existing rights, throughout all stages of the proposed project. • Coordination with the appropriate state and federal agencies, including applicable biologists, has been documented. If coordination is not possible the reasons will be documented. Any proposed action approved through application of the above criteria would only apply to that specific project-level authorization. Any other proposed projects in the same area would need to undergo individual analysis to confirm the criteria are met prior to subsequent authorizations. Excepting a site-specific project from conformance with GRSG management in an area of non-habitat based on the above criteria would not change the GRSG habitat management area boundaries as identified in the RMP.	

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	to be unsuitable if the area has passed a threshold and lacks the ecological potential to become marginal or suitable habitat.	*(See above.)*	The determination to not apply GRSG management to a proposed project based on the above criteria may only be made by the Authorized Officer. However, if there is not concurrence between the coordinating federal and/or state biologists, then the conclusion will be at the discretion of the BLM State Director. Projects that do not meet the above criteria are not automatically denied by the Authorized Officer, but they must comply with the applicable habitat management area management. Further consideration of projects that don't meet the above criteria will be subject to the analysis and requirements (disturbance, RDFs, buffer distances, mitigation, etc.) outlined for GRSG.	

21.1.3 Mitigation

FLPMA provides the Secretary and the BLM broad authority to conserve and enhance public land values, including requiring mitigation. In all GRSG habitat management areas and consistent with valid existing rights and applicable law, BLM will apply the mitigation hierarchy (avoidance first, then minimization, compensation last) when authorizing actions resulting in GRSG habitat loss and degradation. For alternatives 3 through 6 the proposal is to achieve the at a minimum no net habitat loss (full restoration of functional habitats or enhancement of habitats such that it offsets the loss of capacity in impacted areas). The principles of HAF can be used to measure habitat sufficiency in implementing mitigation. The BLM is focusing on habitat mitigation, as sagebrush habitat fragmentation, loss and disturbance have been identified as the primary influences on GRSG population trends (Knick and Hanser, 2011). Compensatory mitigation should be durable, ensuring it will be resilient and persist as GRSG habitat (barring any natural disaster), and should be completed prior to associated actions occurring. Compensatory mitigation should also be prioritized to occur within the same area of the impact (within the same HAF fine scale area, or if not possible, within the same neighborhood cluster (e.g., Greater sage-grouse hierarchical population monitoring framework level 2; Coates et al. 2021) or HAF mid-scale area where practicable) so that it provides habitat for GRSG populations affected by the project.

Table 21-4, Comparison of Alternatives, Mitigation, presents management by alternative for this management issue.

Table 21-4. Comparison of Alternatives, Mitigation

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
CO, ID, MT/DK (most plans), NV/CA, OR, and UT: Requires and ensures mitigation provides a net conservation gain to GRSG. Mitigation will follow the regulations from the White House Council on Environmental Quality (CEQ) (40 CFR Part 1508.20), referred to as the mitigation hierarchy. Any compensatory mitigation will be durable, timely, and in addition to that which would have resulted without the compensatory mitigation. The BLM will develop a WAFWA Management Zone Regional Mitigation Strategy to guide the application of the mitigation hierarchy. The Regional Mitigation Strategy should include mitigation guidance on avoidance, minimization, and compensation, as follows: • Avoidance ○ Include avoidance areas; and, ○ Include any potential, additional avoidance actions with regard to GRSG conservation. • Minimization ○ Include minimization actions already included in laws, regulations, policies, land use plans, and/or land-use authorizations; and, ○ Include any potential, additional minimization	CO, ID, NV/CA, OR, UT and WY: Specify compensatory mitigation would be voluntary unless required by laws other than FLPMA or by the State. Other differences are described below.	In all GRSG habitat management areas and consistent with valid existing rights and applicable law, BLM will apply the mitigation hierarchy when authorizing third-party actions resulting in GRSG habitat loss and degradation (including indirect impacts) to achieve the minimum standard of no net habitat loss (see **Appendix 7**, Monitoring Framework for table of activities related to habitat loss and degradation). BLM will apply mitigation in accordance with the BLM mitigation handbook and other mitigation related BLM policy, as well as CEQ regulations (40 CFR Part 1508.20). Mitigation shall be durable and resilient ensuring GRSG habitat will persist (barring any natural disaster). Mitigation shall be prioritized to occur within the same area of the impact (within the same HAF fine scale area (Stiver et al., 2015, as revised), or if not possible, within the same neighborhood cluster (Coates et al. 2021) to the extent practicable or nearest equivalent HMA designated habitat so that it provides habitat for GRSG populations affected by the project. Compensatory mitigation will not be required for activities implemented to conserve species listed as threatened or endangered under the Endangered Species Act. Application of Mitigation Hierarchy: *Avoidance*: Avoiding impacts is defined by not taking certain action or parts of an action (CEQ regulations; 40 CFR Part 1508.20). Impact avoidance in GRSG habitats is the priority since restoration of most sagebrush systems can take decades. While the avoidance priority is reflected in many PHMA allocations, BLM may also determine on a case-by-case basis to avoid impacts by not issuing an authorization in areas open to development. *Minimization*: Where avoidance is not possible, impacts can be minimized through managing the severity of a project impact at a specific location. If impacts to GRSG habitats cannot be avoided, minimization measures will be applied (e.g., minimizing the disturbance footprint, lek buffers, BMPs, and RDFs). BLM can consider site-specific minimization measures beyond those listed in this plan, through site-specific environmental review to meet the no net habitat loss standard. Minimization does not eliminate project impacts and remaining residual impacts may require compensatory mitigation for habitat loss or degradation. *Compensation*: Any impacts that cannot be avoided or minimized to no net habitat loss would be compensated at a level and in a manner to fully offset both direct and indirect (e.g., disturbance, noise, changes in water availability) impacts to habitat function. Mitigation amounts should comply with State agency or regulatory requirements and consistent with BLM mitigation policy. In States without a mitigation requirement, mitigation should minimally meet no net habitat loss. Establishing no net loss will require full restoration of functional habitats or enhancement of habitats to minimally support the number of GRSG present prior to disturbance at the apex of the population cycle. The metrics identified in the HAF should be used to determine if restoration actions provide GRSG habitat. Where restoration is not possible, preservation (e.g., conservation easements, acquisition of inholdings) can be used to offset impacts and should be designed to protect uniquely important habitats (e.g., limiting winter habitats, connectivity corridors) or areas of GRSG habitats that are at a high risk of conversion. Compensatory mitigation should be completed prior to initiating the activity causing the need for compensation and monitored for retention and efficacy. Compensatory		

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
actions with regard to GRSG conservation. • Compensation o Include discussion of impact/project valuation, compensatory mitigation options, siting, compensatory project types and costs, monitoring, reporting, and program administration. No similar language for WY.	*(See above.)*	mitigation is not required by the BLM for operations conducted under the Mining Law of 1872, but operators may always voluntarily engage in compensatory mitigation. Minimization actions and compensation should be discussed with project proponents/operators and incorporated into alternatives when appropriate. Compensation may also be required by state regulations.		
• CO, ID, MT/DK, NV/CA, OR, UT: When authorizing actions that result in habitat loss and degradation, require and ensure mitigation achieves a net conservation gain in all HMA types. • In WY: Same as other states in PHMA. No mitigation required in GHMA. • UT: Includes exception for vegetation treatments to benefit Utah prairie dog. • ID and NV (not CA): Includes specific language regarding coordination with local GRSG teams to develop or implement compensatory mitigation programs. • CO, ID, MT/DK (most plans), NV/CA, OR, and UT: Includes an appendix with further details on how mitigation would be applied. • WY: Mitigation applied according to the Wyoming Strategy (EO2015-4).	• MT/DK and OR: Same as Alternative 1. • CO: Would work with the state to provide mitigation with outcomes that are "at least equal to the lost or degraded values." • ID: Similar to Alternative 1, except would manage for a no net loss standard. • NV/CA: Maintains net conservation gain standard, in coordination with State goals for GRSG. • UT and WY: Removed the net conservation gain requirement. • ID, NV/CA, UT, and WY: Reference mitigating to meet the BLM's overarching planning goals and objectives, as well as the BLM Manual 6840 to "minimize or eliminate threats affecting the status of [GRSG] or to improve the condition of [GRSG] habitat…"	The BLM will apply the mitigation hierarchy to address changes in existing development or new development as the result of valid existing rights. Where avoidance or minimization will not fully offset a project's impacts compensatory mitigation is required and will at minimum meet the requirements of the state wildlife agency or other appropriate state authority, and BLM/DOI mitigation policy. If the state agency does not require mitigation, BLM will require compensatory mitigation to achieve no net habitat loss.	The BLM will apply the mitigation hierarchy. Where avoidance or minimization will not fully offset a project's impacts compensatory mitigation is required and will at minimum meet the requirements of the state wildlife agency or other appropriate state authority, and BLM/DOI mitigation policy. If the state agency does not require mitigation, or state-sponsored mitigation is determined by BLM to be inconsistent with BLM/DOI policy, BLM will require compensatory mitigation to achieve no net habitat loss. Where habitat and/or population adaptive management thresholds have been met, compensatory mitigation beyond what is required by the States may be considered. BLM shall coordinate closely with the state wildlife management or other appropriate state agency in determining the amount and form of additional mitigation on	The BLM will apply the mitigation hierarchy. Where avoidance or minimization will not fully offset a project's impacts compensatory mitigation is required and will at minimum meet the requirements of the state wildlife agency or other appropriate state authority, and BLM/DOI mitigation policy. If the state agency does not require mitigation, or state-sponsored mitigation is determined by BLM to be inconsistent with BLM/DOI policy, BLM will require compensatory mitigation to achieve no net habitat loss.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• ID: Full reclamation bond required, consistent with regulations for minerals activities, in all HMA types.	• CO, ID, NV/CA, UT, and WY: Describe various processes for coordinating mitigation efforts with the state.	*(See above.)*	a case-by-case basis, considering project activity, direct and indirect impacts to GRSG habitats, and restoration success rates.	*(See above.)*

21.1.4 Application of Habitat Objectives

Habitat objectives identify the desired habitat outcome on BLM-administered lands in GRSG HMAs at multiple scales including seasonal habitats and connectivity within and between populations. Tables identifying indicators and benchmarks for use as guidelines at the site-scale will be retained in the Habitat Indicators appendix (**Appendix 8**) as a tool through which habitat suitability is informed based on location and ecological conditions.

The Habitat Assessment Framework (HAF/ BLM TR 6710-1; Stiver et al., 2015, as revised) provides a standardized, scientifically based methodology to assess GRSG habitat suitability at multiple scales (mid, fine, and site-scale, see Map 3.7 and 3.8). Using multi-scale evaluations considers the entire suite of conditions contributing to high quality habitat, the success of past conservation actions, and prioritizing future land uses and conservation actions. Descriptions of habitat scales (broad-, mid-, fine-, and site-) and associated indicators for assessment at each scale are available in the HAF (BLM TR 6710-1). The Habitat Indicators Tables (**Appendix 8, Tables 8-1.A-G**) provide a list of indicators and benchmarks, derived from local and regional research on GRSG habitat selection, that collectively are used to inform habitat suitability. BLM offices will use **Appendix 8**, Greater Sage-grouse Habitat Indicators and Benchmarks, notably **Tables 8-1.A-G** to assess each monitoring location within seasonal habitats for site-scale suitability, with data collected during the appropriate corresponding seasonal use period, as applicable to address phenological changes.

The BLM will use terrestrial AIM methods (Herrick et al., 2017), additional monitoring approaches for wetland & riparian habitats, partner data as available, and supplemental guidelines (e.g., training, monitoring guidelines, sampling protocols, etc.) to collect data on site-scale habitat condition (**Appendix 8**). As research advances, new data could refine, or clarify GRSG selection for vegetation structure and composition in seasonal habitats. The Habitat Indicators Table(s) (**Appendix 8, Table 8-1.A-G**) will be periodically reviewed to consider, and as needed, incorporate the best available science in coordination with applicable federal, state, and tribal agencies. The addition or adjustment to indicators or benchmarks in the Habitat Indicators Table must include the reference or basis for which the changes are made. Revisions will only be made if warranted by scientific evidence. Use and inclusion of the HAF, including the relationship to Land Health Standards and monitoring is covered in more detail in the appendices (e.g., **Appendix 8, Table 8-2**).

Table 21-5, Comparison of Alternatives, Application of Habitat Objectives, presents management by alternative for this management issue.

Table 21-5. Comparison of Alternatives, Application of Habitat Objectives

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• CO, ID, MT/DK, NV/CA, UT: Include language noting indicators and values from habitat objectives table would be considered when authorizing activities in GRSG habitat. • CO, ID, MT/DK, NV/CA, UT, and WY: Note the values in the table would be used during the land health evaluation process to help determine if the standard applicable to GRSG habitat is being met. • ID, MT/DK, UT and WY: The values may not be obtainable on every acre, and/or should consider local ecological ability. • MT/DK and UT: The values may be adjusted based on local factors, data, or updated science. • NV/CA and OR: Land uses will be managed to meet the desired conditions identified in the tables. • UT: Identifies a qualitative desired condition, with a note that the table is a summary of what science indicates may be needed to meet the qualitative objective.	• CO, ID, MT/DK, NV/CA, UT: Same language regarding considering indicators and values as Alternative 1. • All States: Same language regarding using the habitat objectives table during the land health evaluation process as Alternative 1. • ID, MT/DK, OR, UT and WY: Same language regarding values not being obtainable on every acre as Alternative 1. • ID, MT/DK, NV/CA, OR, and UT: Same language regarding values being adjusted as Alternative 1. • ID and UT: Identify a qualitative desired condition separate from the quantitative values in the table.	The tables with the attributes, indicators, and values with associated text would be replaced in the action alternatives with the following new objectives and management actions: **Objective SSS [X]:** Within GRSG habitat management areas provide suitable habitat by managing for connected mosaics of sagebrush and associated communities that provide for seasonal habitats, dispersal, and migration, while limiting widespread anthropogenic disturbances and fragmentation. This objective will be accomplished by applying RMP land use allocations and management actions among HMAs, proactive habitat treatments, and project-level application of mitigation (avoiding, minimizing, and compensating, per MS-1794 and H-1794) for internal and external project proposals. **Management Action SSS [X1]:** Assess the suitability of GRSG habitat at HAF mid- and fine-scales (HAF Levels 2 and 3, respectively) based on the methods in the Sage-grouse Habitat Assessment Framework (HAF, Stiver et al. 2015, BLM TR 6710-1, as revised; see **Appendix 8**). **Management Action SSS [X2]:** Design and implement projects that will maintain or improve habitat suitability, availability, and connectivity, based on site location, existing seasonal values, and habitat needs using the results of mid- and fine-scale habitat assessments and other complementary research, tools, or information and in coordination with partners across land management jurisdictions. **Objective SSS [Y]:** Manage GRSG habitat management areas to provide seasonal habitats at the HAF Site Scale (Level 4) by providing for habitat characteristics that support seasonal habitat needs, including adequate protective cover and food needed to survive and reproduce. Seasonal habitats may include areas where sagebrush is the current dominant vegetation type, sagebrush is a primary shrub species within the various states of the ecological site, or dominated by other vegetation types but still provides GRSG habitats, such as mesic areas. This objective will be accomplished through the combination of RMP land use allocations and management actions and restoration – based on ecological potential, current vegetative condition, and existing seasonal values – and the project-level application of mitigation (avoiding, minimizing, and compensating, per MS-1794 and H-1794) for internal and external project proposals. **Management Action SSS [Y1]:** Assess suitability of GRSG habitat at the HAF site-scale (Level 4) based on the methods in Sage-grouse HAF (Stiver et al. 2015, BLM TR 6710-1, as revised; **Appendix 8**) utilizing current geographically applicable research on seasonal habitat requisites of GRSG (see **Appendix 8**). Updates to seasonal habitat indicators and ESDs will be developed locally and coordinated with partners (see **Appendix 8**). **Management Action SSS [Y2]:** Maintain, improve, or restore the suitability of GRSG seasonal habitats using the Habitat Indicators Table (see **Appendix 8**) to inform measurable project objectives during implementation-level planning for BLM-permitted and BLM-initiated site-specific actions in HMAs, in coordination with applicable partners. Use the results of site-scale habitat assessments and other best available information to inform management decisions and the design and implementation of habitat projects.		

21.1.5 Disturbance Cap

Anthropogenic disturbance negatively impacts GRSG abundance and persistence (Knick et al., 2011, 2013). When authorizing disturbing activities within important GRSG habitats (PHMA and IHMA in Idaho) the BLM applies disturbance caps to limit habitat losses associated with discrete anthropogenic disturbances and their associated human activity. Other management tools consider effects from diffuse or non-anthropogenic disturbances such as wildfire, such as sagebrush availability objectives, GRSG habitat objectives, and adaptive management thresholds. Disturbance caps identify an upper limit (maximum disturbance permitted) above which no new development is generally permitted (subject to applicable laws and regulations and valid existing rights). A disturbance cap acts as a "backstop" to ensure that total disturbance does not exceed the level of GRSG tolerance for anthropogenic activities. Disturbance caps only address direct impacts and indirect impacts associated with anthropogenic disturbances may not be fully captured by use of this tool; other management tools consider indirect impacts, such as noise required design features/actions and mitigation requirements. Additional minimization measures may be necessary to reduce the full impact of a project on GRSG.

To conserve seasonal habitat requirements associated with a local GRSG populations disturbance caps will be applied to PHMA within the Habitat Assessment Framework (HAF) fine scale (Stiver et al. 2015, as revised)., as well as at the project scale. Previous application of a disturbance cap at a larger scale (e.g., biologically significant unit) did not limit the consideration to local populations and were often "diluted" by large amounts of non-habitat. Calculation of disturbance caps must consider all disturbances (existing and new) since GRSG are negatively impacted by the total disturbance. Within designated spatial analysis areas, disturbance on all surface ownerships should be considered to accurately capture potential impacts of new authorizations on GRSG.

With the exception of Wyoming and Montana, disturbance caps are currently set at 3% of the project and "biologically significant units" identified by the BLM at the state level, but do not include habitat loss from wildfire or agricultural conversion. The latter two factors will be quantified by separate calculations of sagebrush availability via the vegetation objectives, habitat objectives, and adaptive management thresholds, as tracked by approaches described in the Monitoring Framework (**Appendix 7**). Ninety-nine percent of active leks occurred within landscapes that were less than 3% developed in a landscape analysis of GRSG (Knick et al. 2013) and a follow-up study on disturbance from existing energy infrastructure and human activity supported those findings (Kirol et al. 2020). Similar results were observed for other species that use sagebrush for all or part of their life cycle, including mule deer (Sawyer et al. 2020, Lambert et al. 2022), pronghorn (Lambert et al. 2022) pygmy rabbits (Germaine et al. 2017), elk (Gigliotti et al. 2023), and sagebrush songbirds (Kirol and Fedy 2021). Wyoming and Montana use a 5% disturbance cap but include wildfire and agricultural conversion (the latter is not applicable on BLM lands) to their calculations. North Dakota and South Dakota apply a mix of the two approaches – with a 5% cap that includes wildfire and agriculture, but also limiting anthropogenic disturbances to 3%.

Table 21-6, Comparison of Alternatives, Disturbance Cap, presents management by alternative for this management issue.

Table 21-6. Comparison of Alternatives, Disturbance Cap

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Disturbance Cap Overview				
• CO, ID, NV/CA, OR, UT, ND, SD: 3% disturbance cap in PHMA (and IHMA in ID) on specific anthropogenic activities such as development of minerals and renewable energy, as well as ROWs. • CO, ID, NV/CA, OR, UT, ND, SD: disturbance cap applies at both BSU-scale and at proposed project analysis area (calculated similar to WY Disturbance Density Calculation Tool – DDCT) within PHMA. • MT, ND, SD, WY: 5% disturbance cap at the project DDCT area scale in PHMA. Includes wildfire and agriculture.	• CO, ID, NV/CA, OR, UT, ND, SD: 3% disturbance cap in PHMA (and IHMA in ID) on specific anthropogenic activities such as development of minerals and renewable energy, as well as ROWs. • CO, NV/CA, OR, UT, ND, SD: disturbance cap applies at both BSU-scale and at proposed project DDCT analysis area within PHMA. • ID cap applies at just the BSU scale. • MT, ND, SD, WY: Same as Alt 1.	In PHMA (and IHMA in ID), direct habitat disturbance from existing infrastructure developments would be limited to 3% at the 1) project scale (see description below) and 2) Habitat Assessment Framework (HAF) Fine Scale habitat selection area (or CO management zones and populations – see **Section 2.7.1**). The disturbance cap would not be applicable to new authorizations since all PHMA would be closed to new infrastructure projects. The disturbance cap would be applied to existing authorizations within the agencies' capacity to do so to the extent allowable under applicable law and while recognizing prior authorizations, lease terms, and valid existing rights.	In PHMA (and IHMA in ID), if direct habitat disturbance from existing and proposed infrastructure developments exceeds either 3% at the 1) project scale (see description below) or 2) Habitat Assessment Framework (HAF) Fine Scale habitat selection area (or CO management zones and populations – see **Section 2.7.1**), new infrastructure projects would be deferred to the extent allowable under applicable laws (such as the Mining Law of 1872), or valid existing rights: • until such time as the percentage of habitat disturbance in the areas has been reduced below the cap threshold through restoration of existing disturbance to meeting habitat objectives, or • redesigned to not result in additional surface disturbance (co-location), redesigned to move it outside of habitat in PHMA (and IHMA in Idaho) (see non-habitat criteria), or redesigned to move it outside PHMA (and IHMA in Idaho).	In PHMA (and IHMA in ID), if direct habitat disturbance from existing and proposed infrastructure developments exceeds either 1) 3% at the project scale (see description below) in all states except MT and WY, where it is 5% at the project scale, or 2) 3% at the Habitat Assessment Framework (HAF) Fine Scale habitat selection area for all states (or CO management zones and populations – see **Section 2.7.1**), new infrastructure projects would be deferred to the extent allowable under applicable laws (such as the Mining Law of 1872), or valid existing rights: • until such time as the percentage of habitat disturbance in the areas has been reduced below the cap threshold through restoration of existing disturbance to meeting habitat objectives or increasing the amount of suitable habitat through restoration, or • redesigned to not result in additional surface disturbance (co-location), redesigned to move it outside of habitat in PHMA (and IHMA in Idaho) (see non-habitat criteria), or redesigned to move it outside PHMA (and IHMA in Idaho).

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Disturbance Cap Numerator				
• CO, ID, NV/CA, OR, UT, ND, SD: infrastructure only - cap does not include wildfire or agriculture. • MT, WY, ND, SD: 5% cap includes infrastructure, wildfire and agriculture.	• CO, ID, NV/CA, OR, UT, ND, SD: same as Alt 1. • MT, WY: Same as Alt 1.	For all states, the disturbance cap calculation is limited to the following specific activities, whether existing projects or new proposals (see **Appendix 7** for additional details on how these items would be monitored): • Oil and gas wells and development facilities • Coal mines • Wind developments (e.g., towers, sub-stations, etc.) • Solar fields • Geothermal development facilities • Mining (active locatable, nonenergy leasable and saleable/mineral material developments) • Roads (transportation features with a maintenance intensity of level 3 or 5 – see BLM Technical Note 422 – Roads and Trails Terminology, 2006 or as updated (does not include two-tracks) • Railroads • Power lines • Communication towers • Other vertical infrastructure, as well as developed rights-of-way with habitat loss (e.g., pipelines) • Coal bed methane ponds (at the project scale) • Meteorological towers (e.g., wind energy testing) (at the project scale) • Nuclear energy facilities (at the project scale)	Same as Alternative 3, however under this alternative wildfire would not be included as a numerator for disturbance.	Same as Alternative 3 at the project scale for all states except for WY and MT which would include disturbances associated with their respective DDCT approaches (e.g., wildfire and agricultural, with Montana also including subdivisions and urban development) in the numerator (agriculture and subdivision disturbance data would be provided by the state, since no such activities are permitted on public lands). None of the states would include wildfire and agriculture (or Montana subdivisions and urban development) in the numerator at the HAF Fine Scale.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	• Airport facilities and infrastructure (at the project scale) • Military range facilities and infrastructure (at the project scale) • Hydroelectric plants/facilities (at the project scale) • Recreation areas facilities and infrastructure larger than 0.25 acres (e.g., parking lots, campgrounds, trail heads, etc.) (at the project scale) • Wildfire Where such data are available, this disturbance is measured by the footprint of direct disturbance of the PHMA (and IHMA in ID) area where habitat is removed (including staging areas, dispersed structures, parking lots, equipment storage areas, etc.), or by the distance between the outermost lines for transmission lines. When considering new project proposals, any project associated with the above list that has been approved/authorized but not yet constructed should be treated as though it were already constructed when calculating the disturbance cap to account for authorized but not yet constructed disturbance. No other activities or actions beyond those listed in the above list are included when calculating the cap (e.g., wildfire, agriculture, vegetation treatments, residences, barns, fencing or range improvements, etc.).	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	A disturbed area is included in the numerator until it has been restored to provide equal or improved habitat function as was provided by the area before the disturbance. Consistent with the BLM's responsibility to consider cumulative impacts when making decisions for activities on public lands, the disturbance percentage includes acres from the above disturbances regardless of land ownership, where such data are available. This will only inform decision-making on public lands and cannot impact private property rights.	*(See above.)*	*(See above.)*
Disturbance Cap Denominator				
• CO, ID, NV/CA, OR, UT, ND, SD 3% cap applies at both BSU-scale and at proposed project DDCT analysis area within PHMA. • MT, ND, SD, WY: 5% cap applies at the project DDCT area scale in PHMA. Includes wildfire and agriculture. Using the DDCT approach to identify project level boundaries developed by the State of Wyoming is, in summary, as follows: 1) Determine potentially affected active leks by placing a 4-mile buffer around the proposed area of physical disturbance related to the proposed project. All active leks located within the 4-mile project buffer and within PHMA	• CO, NV/CA, OR, ND, SD same as Alt 1. • UT similar to Alternative 1, but allows project boundaries to be identified based on what areas of PHMA are used by the birds affected by the project. • ID removed the disturbance cap at the project scale, applying it only at the BSU scale. • MT, ND, SD, WY: Same as Alternative 1.	At the project scale, the assessment area (denominator) is determined by identifying the extent of the GRSG PHMA (and IHMA in ID) that supports the GRSG population potentially affected by the proposed project that is also located in PHMA (and IHMA); it is not to be limited to the area where indirect impacts are anticipated. The project scale denominator should include the PHMA (and IHMA) used by the potentially affected local GRSG population, including the associated seasonal habitats and the transition zones between those habitats (only within PHMA) associated with where the project is proposed.	Same as Alternative 3.	Same as Alternative 3, except as noted below: At either scale, all areas in PHMA (and IHMA in ID) would be included in the denominator unless specific information documents otherwise (i.e., seasonal habitat maps for the HAF Fine Scale assessment area). Any potential areas that are unsuitable at the HAF site scale are treated neither as habitat nor disturbance, which results in the area being removed from the denominator piece of the formula.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(and IHMA) will be considered affected by the project. 2) Next, place a 4-mile buffer around each of the affected active leks. 3) All PHMA (and IHMA) within the 4-mile project buffer, combined with the 4-mile lek buffer(s), creates the project analysis area for each individual project, absent other monitoring data. If there are no active leks within the 4-mile project buffer, the project scale analysis area will be that portion of the 4-mile project buffer within PHMA.	*(See above.)*	If sufficient monitoring information is not available to identify the portions of the PHMA used by the potentially affected local GRSG population, identify project level boundaries using an approach similar to the DDCT approach developed by the State of Wyoming: 1) Determine potentially affected active leks by placing a 4-mile buffer around the proposed area of physical disturbance related to the proposed project. All active leks located within the 4-mile project buffer and within PHMA (and IHMA) will be considered affected by the project. 2) Next, place a 4-mile buffer around each of the affected active leks. 3) All PHMA (and IHMA) within the 4-mile project buffer, combined with the 4-mile lek buffer(s), creates the project analysis area for each individual project, absent other monitoring data. If there are no active leks within the 4-mile project buffer, the project scale analysis area will be that portion of the 4-mile project buffer within PHMA. "Pending leks" and other similarly defined state-based lek categories can be considered as active leks based on inclusion from the state wildlife agency. In CO, BLM would use the state management zones (see **Section 2.7.1**). At the HAF Fine Scale, the assessment area (denominator) is the acres of PHMA (and IHMA in Idaho) within the boundaries of	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	the HAF Fine Scale habitat delineation area. Calculation of the 3 percent cap would include all acres of PHMA (and IHMA in Idaho) in the Fine Scale area as the denominator. In CO, BLM would use the state identified populations (see **Section 2.7.1**). At either scale, all areas in PHMA (and IHMA in ID) would be included in the denominator. Portions of PHMA that are potential or non-habitat (e.g., areas not currently supporting sagebrush cover due to wildfire) would still be included in the denominator piece of the formula. The denominator includes all lands (regardless of land ownership) to help the BLM consider the cumulative impacts of disturbances on GRSG when considering projects on public lands.	*(See above.)*	*(See above.)*
Disturbance Cap Exceptions				
• ID: 3% cap can be exceeded within existing designated utility corridors at the project scale only if there would be a net benefit to GRSG (multiple states have this in the Lands section, ID just has it specifically in the disturbance cap section) • NV: Disturbance can exceed 3% at the project or BSU scale except where a biological analysis indicates a net conservation to GRSG.	• ID: 3% cap can be exceeded within existing designated utility corridors at the project scale only if there would be a net benefit to GRSG (multiple states have this in the Lands section, ID just has it specifically in the disturbance cap section). • UT: 3% can be exceeded if will benefit GRSG. • NV: Disturbance can exceed 3% at the project or BSU scale except where a biological	Unless required by law, regulation, policy, or presence of valid existing rights, the BLM would not consider allowances for exceptions to the disturbance cap. All states: Apply the disturbance cap to the extent consistent with applicable law (such as the Mining Law of 1872) and valid existing rights.	All states: The Authorized Officer may consider projects on public lands that could result in exceeding the 3% disturbance cap across all ownerships at the project scale only if the following three criteria are met: 1) with concurrence from the State Director, 2) if the environmental review document(s) explains how the GRSG RMP goals and objectives will be met, including compliance	Same as Alternative 4, except in WY and MT where the project scale disturbance cap is 5%. All states would also replace bullet #4 under criteria #3 with the following: • Compensatory mitigation would not have to be completed and functioning prior to being able to grant the exception. To grant the activity based on compensatory mitigation, prior to construction, surface

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Exceedance may be approved only with concurrence of the State Director, and unless NDOW, USFWS, and BLM unanimously find the proposed action achieves a net conservation gain. • MT: Any proposals for deviations must demonstrate that the proposed activities will not cause declines in GRSG populations in core areas, with input from MT FWP and USFWS (see **Appendix 2** for specific text). • WY: 5% cap can be exceeded if the project, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of GRSG. All states: Apply the disturbance cap to the extent consistent with applicable law (such as the Mining Law of 1872) and valid existing rights.	analysis indicates a net conservation to GRSG. The requirement for unanimous concurrence was removed. • NV/CA: includes exception options if: ○ The area is non-habitat including through ground-truthing of areas mapped as habitat, and will not have direct, indirect, or cumulative effects, or ○ Compensatory mitigation is provided, or ○ The proposed activity addresses public health and safety concerns, or ○ The proposed activity is a renewal or re-authorization of existing infrastructure in previously disturbed sites and would not result in direct, indirect, or cumulative impacts, or ○ The proposed activity is determined to be a routine administrative function…and will have no adverse impacts on GRSG and its habitat • MT: Same as Alternative 1. • WY: Same as Alternative 1. All states: Apply the disturbance cap to the extent consistent with applicable law (such as the Mining Law of 1872) and valid existing rights.	*(See above.)*	with the RMP's GRSG mitigation strategy, documenting efforts to: • First avoid impacts by locating the proposed project in areas outside of PHMA, collocated within the footprint of existing disturbance, or in areas of non-habitat shall be documented. • Second to minimize impacts by applying project design features shall be documented (e.g., use of RDFs, buffer distances, seasonal limitations, etc.). • Third, only then to consider using compensatory mitigation. It is important to note compensatory mitigation may not be appropriate in some GRSG habitats/populations. Before using compensatory mitigation as an approach for this exception, the effectiveness of whether compensatory mitigation can offset impacts to the affected habitat and associated population without risking impacts to those GRSG habitats and populations shall consider local biological considerations, including, but not limited to population size, connectivity to other populations, availability of existing functional habitat, and the availability of mitigation projects that could benefit the impacted population. **and**	occupancy, or surface disturbing activities the compensation project must be planned, funded, and approved by the operator, BLM, surface owner, and in coordination with the appropriate State agency. However, due to the uncertainty associated with whether the planned compensatory mitigation project would successfully become habitat in order to offset the impacts, one of the following would need to apply: ○ The area of habitat improvement associated with compensatory mitigation would need to increase to account for a level of risk that the compensatory mitigation action may fail or not persist for the full duration of the impact based on the type of specific compensatory project(s) and ecological conditions, or ○ The operator provides long-term assurances that the compensatory project would become functional (e.g. project maintenance or retreatment, easements, mitigation bonding – BLM H-1794-1, section 7.3, etc.). Compensatory mitigation rate would need to consider number of acres necessary to offset acres affected by direct and indirect effects (see

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	3) if one of the following circumstances can be documented: • The exceedance at the project scale is the result of consolidating disturbance associated with the proposed project as a strategy to leave other undisturbed portions of the PHMA (and IHMA) undisturbed from new authorizations, and the third bullet below, addressing compensatory mitigation, is applied to any residual impacts. • Within RMP designated utility corridors, the 3% disturbance cap may be exceeded at the project scale if the site specific NEPA analysis indicates that doing so will decrease the impacts to GRSG habitat in comparison to siting a project outside the designated corridor in areas under the disturbance cap and requiring mitigation. This exception is limited to projects that fulfill the use for which the corridors were designated (ex., transmission lines, pipelines) and the designated width of a corridor will not be exceeded as a result of any project co-location. • If a technical team evaluates and recommends that site-specific GRSG habitat and population information, combined with project design elements – including	Mitigation section), as well as likelihood that the mitigation project may not provide the anticipated compensation for the duration of the impact. In addition, the compensation necessary to grant this exception must provide the offsetting benefit in the same HAF Fine Scale unit being impacted by the potential development.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	compensatory mitigation, indicates the proposed project is expected to improve the condition of GRSG habitat within the proposed project analysis area. Factors considered by the team will include GRSG abundance and trends, movement patterns – including impacts to connectivity, habitat amount and quality, extent and alignment of project disturbance, location and density of existing disturbance (e.g., potential for increased fragmentation), project design options, and other biological factors (e.g., potential for topographic screening, impacts from other threats such as predation, invasive species, drought, noise, etc.). The technical team should consist of, at a minimum, a BLM field biologist and a biologist from the appropriate State agency. The methods, rationale, and data used in developing recommendations shall be retained as part of the project record. • If the exception relies on compensatory mitigation, the mitigation must be completed prior to the disturbance that results in the exceedance of the disturbance cap so the value of the mitigation can be accurately compared to the value of the habitat to be affected by the proposed disturbance. In addition, the	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	compensation necessary to grant this exception must provide the offsetting benefit in the same HAF Fine Scale unit being impacted by the potential development. Consideration may be given to providing compensatory mitigation in adjacent fine-scale HAF areas if doing so will more effectively provide the offsetting benefit. • Disturbance associated with the renewal or re-authorization of existing infrastructure in previously disturbed sites or expansions of existing infrastructure that do not result in new direct, indirect, or cumulative impacts on GRSG and its habitat. There would be no exceptions to the 3% PHMA (and IHMA) disturbance cap at the HAF Fine Scale unless the disturbance is needed for the protection of human life and safety, as concurred by the State Director. If proposed disturbance cap exception is requested in an area (neighborhood cluster) that has met one of the adaptive management thresholds (hard or soft), no exceptions to the 3% disturbance cap at the project scale would be considered until the causal factor analysis is completed unless the disturbance is needed for the protection of human life and safety, as concurred by the State Director.	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	To approve this exception, the Authorized Officer must document, in coordination with the appropriate State agency, that the proposed action satisfies the three criteria listed above. All states: Apply the disturbance cap to the extent consistent with applicable law (such as the Mining Law of 1872) and valid existing rights.	*(See above.)*

21.1.6 Fluid Mineral Development and Leasing Objective

Research indicates fluid mineral development can negatively affect GRSG at multiple scales through direct impacts (habitat loss and fragmentation; Connelly et al. 2004, Lyon and Anderson 2003, Walker et al. 2007, Holloran et al. 2010, Knick et al. 2011, Green et al. 2017) and indirect impacts (increased noise and behavioral avoidance of human activity and infrastructure, including roads; Aldridge and Boyce 2007, Holloran et al. 2010, Kirol et al. 2015, Rice et al. 2016, Coates et al. 2023). Development can also contribute to cumulative impacts if it results in an increased distribution of invasive annual grasses or predator abundance.

This section addresses the RMP objective for GRSG habitat in relation to fluid minerals, RMP management actions providing guidance when considering leasing GRSG habitat management areas, and development associated with existing fluid mineral leases. Other aspects of fluid mineral leasing and development are addressed elsewhere in this amendment or existing RMP language, including specific fluid mineral allocations and associated stipulations (see **Section 2.5.2**), and waivers, exceptions, modifications (see **Section 2.5.7**). and application of RDFs (existing RMP decisions that are not being considered for amendment in this process).

Table 21-7, Comparison of Alternatives, Fluid Mineral Development and Leasing Objective, presents management by alternative for this management issue.

Table 21-7. Comparison of Alternatives, Fluid Mineral Development and Leasing Objective

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• CO, ID, ND, NV/CA, OR, UT, WY, parts of MT/DK (Dillon, Billings, HiLine, Miles City, ND, SD): Priority will be given to leasing and development of fluid mineral resources, including geothermal, outside of PHMAs and GHMAs, or within the least impactful areas within PHMA and GHMA if avoidance is not possible. • No similar objective in Lewistown or Butte.	• CO, ID, OR, and MT/DK offices: Same as Alternative 1. • UT, NV/CA: No similar objective (removed the objective). • WY: Clarified the objective to acknowledge that leasing is allowed in PHMA, and that if the BLM has a backlog of Expressions of Interest for leasing, the BLM would prioritize its work first in non-habitat management areas, followed by lower priority habitat management areas (e.g., GHMA) and then higher priority habitat management areas (i.e., PHMA). Clarified that for fluid mineral development on existing leases that could adversely affect GRSG populations or habitat, the BLM would work with the lessees, operators, or other project proponents to avoid, reduce, and mitigate adverse impacts on the extent compatible with lessees' rights to drill and produce fluid mineral resources.	All States: • No leasing strategy/objective is needed since PHMA would be closed to leasing. Leasing objective language would be removed. • New Management Action to address development in areas already leased: In PHMA (and IHMA), the BLM will work with lessees, operators, or other project proponents to avoid, minimize, and compensatorily mitigate for impacts to GRSG and their habitat (e.g., habitat loss, fragmentation, indirect impacts, etc.) from new oil and gas development on existing leases to the extent consistent with surface use rights as part of the environmental review process (e.g., 43 CFR Part 3101.1-2). If possible, place development outside of PHMA (and IHMA); if determined that such placement renders the recovery of fluid minerals on the lease infeasible, or where development of existing leases exceeds a disturbance density of 1 per 640, and/or 3 percent disturbance cap, seek to apply other measures to site the proposed lease activities to meet GRSG habitat objectives and require compensatory mitigation to replace direct and indirect habitat impacts. Locate infrastructure in areas that avoids or minimizes	Revised Fluid Mineral Objective for all states: • Manage fluid mineral leasing and development (including geothermal) in GRSG habitat management areas to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction. New management action: • Leasing is allowed in GRSG habitat management areas open to fluid mineral leasing (including geothermal), subject to the stipulations and RDFs included in the RMP. The BLM will evaluate parcels or those portions of parcels available for leasing associated with nominations (e.g., expressions of interest) and determine areas to continue analyzing for inclusion in a lease sale as part of the lease sale NEPA review or analysis. Where there is an existing evaluation process that considers at a minimum GRSG habitat and development proximity, the BLM will use that evaluation process. However, in the absence of an existing evaluation process or where informative to an existing process, the BLM will evaluate parcels with GRSG habitat management areas as part of the lease sale NEPA review or	Revised Fluid Mineral Objective for all states would be the same as Alternative 4. No specific objective or management action would specify a fluid mineral leasing strategy. However, not including specific leasing prioritization language or a leasing strategy does not remove the desired condition to manage public lands to provide suitable GRSG habitat at the HAF mid-, fine- and site-scales. Fluid mineral leasing would be considered in GRSG habitat management areas consistent with the Secretary's discretion under the Mineral Leasing Act (as amended), as well as applicable BLM regulations and policies, and in conformance with RMP goals, objectives, stipulations, and required design features to avoid, minimize, and compensate impacts to GRSG. • Management Action to address development in areas already leased would be the same as Alternative 4.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	habitat loss and impacts to breeding and nesting habitats. Work with lessees, operators, or other project proponents to place development at the most distal part of the lease from the lek or in areas least harmful to GRSG populations and habitat (e.g., where local terrain features such as ridges and ravines may shield nearby habitat from disruptive factors, or co-location with existing disturbance). For developments that cannot avoid impacts to GRSG, apply conservation measures that reduce impacts to GRSG through implementation decisions (e.g., approval of an application for permit to drill, geothermal drilling permit, Sundry Notice, Master Development Plans, etc.) and upon completion of the environmental record of review (43 CFR Part 3162.5). In this process, evaluate whether the conservation measures are "reasonable" (43 CFR Part 3101.1-2) and consistent with the valid existing rights. • If an existing lease terminates by operation of law, the reinstatement will not be authorized within PHMA (and IHMA).	• analysis by considering, at a minimum, the following: o Proximity to existing oil and gas developments, giving preference to lands upon which a prudent operator would seek to expand existing operations (e.g., existing leases, leases held by production, designated units, etc.). Such existing developments would not usually include areas with minimal existing infrastructure such as wildcat well locations. Areas with development in PHMA (and IHMA) that is at or approaching the density or disturbance caps at the project scale would indicate areas that would meet this criteria. Any nominated parcel subject to immediate drainage or within five miles of existing development would have a higher preference value for analysis in lease documents. o Potential impacts to important GRSG habitats or areas that provide important connectivity, giving preference to lands that would not result in impairing habitat suitability and proper function (see GRSG habitat objectives). This evaluation should consider impacts to GRSG habitat suitability at the	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	HAF mid-, fine- and site-scales, considering information including, but not limited to the presence and distance from leks; presence of nesting and brood rearing habitats, important winter habitat, or other limiting habitat types; the relationship between leks, nesting habitat and other seasonal habitats with topography; migration/movement corridors; adaptive management thresholds (hard and soft); amount and distribution of existing disturbances; the presence of degraded or non-habitat, and impacts to adjacent habitat that may affect the biological importance of the remaining intact habitat. Coordinate with the applicable State agencies to ensure the most current and applicable biological information is considered. Parcels where development would not decrease habitat suitability would have higher preference value for analysis in lease documents. If a parcel receives a low preference value for impacts to important GRSG habitats, it will receive an overall low preference value. An office may offer low preference	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	parcels in a lease sale if the Field Office resources (e.g., staff time) allow after all high preference parcels have been evaluated for inclusion in the sale. In such a scenario, the office will select one or more low preference parcels that present the least conflicts based on the evaluation criteria to analyze for inclusion in the sale. • Management Action to address development in areas already leased: When considering exploration and development on areas leased for fluid mineral resources in PHMAs (and IHMA in ID), including geothermal, application of measures to avoid, minimize, rectify, reduce and/or mitigate potential impacts will be considered through completion of the environmental record of review (43 CFR Part 3162.5 and 36 CFR Part 228.108), including appropriate documentation of compliance with NEPA. Such measures may include existing lease stipulations, project design, operator-committed measures, RMP required design features (RDFs), and local conditions of approval (COAs). The BLM will work with project proponents to promote measurable GRSG	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	conservation objectives such as, but not limited to, consolidation of project related infrastructure to reduce habitat fragmentation and loss and to promote effective conservation and connectivity of seasonal habitats and PHMAs (and IHMAs). The BLM will continue to work with project proponents and the state wildlife agency to site their projects in a manner that honors their lease rights but have been determined to contain the least sensitive habitats (based on vegetation, topography, or other habitat features) and resources whether inside or outside of PHMAs (and IHMA). Surface use rights associated with existing leases will be recognized and respected. For proposed operations in PHMAs (and IHMAs), the Surface Use Plan of Operations (see 43CFR Part 3162.3-1(f)) shall address, at a minimum, the applicable RDFs in the RMP. Seasonal habitats or project features related to potential GRSG impacts that are not addressed in the Surface Use Plan of Operations based on site-specific or project-specific considerations shall be noted in the project file, along with a rationale for not including them.	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	In this process the BLM will evaluate whether each conservation measure is reasonable and consistent with surface use rights as part of the environmental review process (e.g., 43 CFR Part 3101.1-2).	*(See above.)*

21.1.7 Fluid Mineral Lease Stipulation Waivers, Exceptions, and Modifications

Federal regulations at 43 CFR Part 3171.24 provide the BLM direction for conditions under which variance from specific stipulations can be considered. This document presents the draft range of alternatives for waivers, exceptions, and modifications (WEMs) associated with the described stipulations on new fluid mineral leasing (e.g., oil, gas, and geothermal) in GRSG habitat management areas. Consideration of amending the WEM language in this planning effort is limited to future leases that have stipulations associated with no surface occupancy (NSO), disturbance cap – generally applied as a controlled surface use (CSU) stipulation, and seasonal timing limitations. This planning effort is not considering amendment of WEMs associated with other stipulations.

This section is limited to consideration of WEMs during the development phase. Other aspects of fluid mineral leasing and development are addressed elsewhere in this amendment or existing RMP language, including specific fluid mineral allocations and associated stipulations (see **Section 2.5.2**), the RMP objective for GRSG habitat in relation to fluid minerals (see **Section 2.5.6**), RMP management actions providing guidance when considering leasing GRSG habitat management areas (see **Section 2.5.6**), development associated with existing fluid mineral leases (see **Section 2.5.6**), and application of RDFs (existing RMP decisions that are not being considered for amendment in this process).

The WEMs in this document would apply to new fluid mineral leases and lease reinstatements on public lands, as well as existing leases if they do not specifically include WEMs associated with lease stipulations, and are limited to the stipulations described below. GRSG fluid mineral stipulations not mentioned in this document, as well as those program areas/stipulations not considered in this planning effort would continue where they apply. If there is a conflict between such stipulations and those presented in this document, the more restrictive would take precedence during implementation.

Description of Surface Stipulations

This planning process is considering an amendment to the language for WEMs associated with three general types of GRSG surface stipulations that would be applied to new fluid mineral leases.

No Surface Occupancy (NSO)

Use or occupancy of the land surface for fluid mineral exploration or development is prohibited to protect GRSG and GRSG habitat. Generally considered a major constraint, in areas open to fluid mineral leasing with NSO stipulations, fluid mineral leasing activities are permitted, but activities with surface occupancy cannot be conducted unless an exception, modification, or waiver is granted. Absent the approval of a waiver, exception, or modification, access to fluid mineral deposits would require drilling from outside the boundaries of the NSO stipulation. In the 2015 not warranted determination for GRSG the USFWS cited application of regulatory tools, such as NSO stipulations, as an effective conservation tool in minimizing exposure of the species to fluid mineral development.

Controlled Surface Use (CSU) – Disturbance Cap

This planning effort is considering amendments to the GRSG disturbance cap, including clarifying that it will be applied to new fluid mineral leases as a CSU stipulation. A CSU stipulation is a category of moderate constraint that allows some use and occupancy of public land while protecting identified resources or values. A CSU stipulation allows the BLM to require additional conditions be met to protect a specified resource or value in addition to standard lease terms and conditions. A new lease with the disturbance cap CSU stipulation would not guarantee the lessee the right to occupy the surface of the lease for the purpose of producing fluid minerals within GRSG designated PHMAs

(and IHMA in Idaho). The surface occupancy restriction criteria identified in this stipulation may preclude surface occupancy and may be beyond the ability of the lessee to meet due to existing surface disturbance on federal, state, or private lands within designated PHMAs/IHMAs or surface disturbance created by other land users.

Seasonal Timing Limitations (TL)

Areas identified for TLs, a moderate constraint, are closed to fluid mineral exploration and development during identified time frames to eliminate, to the degree possible, activities disruptive to GRSG during the associated seasons of use. Ground disturbing activities, drilling, stimulation, and plug and abandonment work should not be allowed during the identified periods. Production and maintenance activities on wells and well work required by another program to protect the environment (e.g. Underground Injection Control) and administrative activities may be exempt from the timing limitations at the discretion of the BLM Authorized Officer. GRSG seasonal timing limitations from prior planning efforts will not change, but waivers, exceptions, and modifications for seasonal timing limitations are being updated.

Project-specific Flexibility

For fluid minerals, surface stipulations could be excepted, modified, or waived by the Authorized Officer. An exception exempts the holder of the lease from the stipulation on a one-time basis. A modification changes the language or provisions of a stipulation due to changed conditions or new information either temporarily or for the term of the lease. A modification may or may not apply to all other sites within the leasehold. A waiver permanently exempts the surface stipulation for a specific lease, planning area, or resource based on absence of need.

An exception, modification, or waiver may be granted at the discretion of the BLM Authorized Officer if the specific criteria described below are met. WEMs specific to each stipulation are included in the leasing documents and are considered based on site-level conditions during implementation of the lease terms. The proponent must submit a written request for an exception, modification, or waiver and provide the data necessary to demonstrate that specific criteria have been met. The BLM would consider that information, in combination with all other information provided by State, County, and other local agencies; tribal governments; other federal agencies; or interested stakeholders as applicable, though decision to grant the WEM remains with the Authorized Officer.

In the event there are overlapping stipulations (e.g., NSO area overlapping a disturbance cap CSU overlapping a seasonal timing limitation), WEMs would need to be considered for each stipulation separately based on the processes identified below.

Table 21-8, Comparison of Alternatives, Fluid Mineral Leasing Waivers, Exceptions, and Modifications, presents management by alternative for this management issue.

Table 21-8. Comparison of Alternatives, Fluid Mineral Leasing Waivers, Exceptions, and Modifications

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
No Surface Occupancy Stipulations for GRSG within PHMA (and IHMA in Idaho and West Decker RHMA in MT):				
• ID, MT/DK, NV/CA, OR, UT: In SFA, there will be no waivers, exceptions, or modifications. • CO, ID, MT/DK, NV/CA, OR, UT: The Authorized Officer may grant an **exception** to a fluid mineral lease no-surface-occupancy stipulation only where the proposed action: i. Would not have direct, indirect, or cumulative effects on GRSG or its habitat; or, ii. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide a clear conservation gain to GRSG. Exceptions based on conservation gain (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid federal fluid mineral lease existing as of the date of this ARMPA. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such	• MT/DK, OR, and WY: Same as Alternative 1. • CO: <u>NSO-1 – Within One mile of Active Leks:</u> **__Exceptions__ or __modifications__ may be considered if, in consultation with the State of Colorado, it can be demonstrated that there is no impact on Greater Sage-Grouse based on one of the following: ○ Topography/areas of non-habitat create an effective barrier to impacts. ○ No additional impacts would be realized above those created by existing major infrastructure (for example, State Highway 13). ○ The exception or modification precludes or offsets greater potential impacts if the action were proposed on adjacent parcels (for example, due to landownership patterns). **In order to approve exceptions or modifications to this lease stipulation, the Authorized Officer must obtain: agreement, including written justification, between the BLM District Managers and CPW that the proposed action satisfies at least one of the criteria listed above.*	No new WEMs would be necessary, since all GRSG habitat management areas would be closed to new fluid mineral leasing so there would be no new leases with associated stipulations.	**Exception #1 – applicable to the NSO stipulation within 0.6 miles of active leks (WAFWA definition) in PHMA (and IHMA in Idaho)**: The Authorized Officer may consider and grant an **exception** to the NSO stipulation within 0.6 miles of active leks in PHMA (and IHMA in Idaho) if it can be demonstrated that development and surface occupancy would have no direct impacts to or disruption of GRSG or its habitat based on at least one of the following – after documenting the review of available information associated with the site proposed for the exception – both internally compiled and as provided by State, County and other local agencies, tribal governments, project proponents, other federal agencies, or interested stakeholders: • The location of the proposed authorization is determined to be non-habitat (see Glossary; as determined by a biologist with GRSG experience using methods such as the Habitat Assessment Framework), does not provide important connectivity between habitat areas, and the project includes design features to prevent indirect disturbance to or disruption of adjacent seasonal habitats (whether adjacent seasonal habitat are within 0.6	Same as Alternative 4, except in CO where the exception would apply in PHMA within 1 mile of active leks.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
benefits will endure for the duration of the proposed action's impacts. Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the applicable state wildlife agency, the USFWS, and the BLM unanimously find that the proposed action satisfies (i) or (ii). Such finding shall initially be made by a team of one field biologist or other GRSG expert from each respective agency. In the event the initial finding is not unanimous, the finding may be elevated to the appropriate BLM State Director, USFWS State Ecological Services Director, and state wildlife agency head for final resolution. In the event their finding is not unanimous, the exception will not be granted. Approved exceptions will be made publicly available at least quarterly. • WY: NSO 0.6 lek buffer in PHMA: **Exception**: The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater	• ID: The Authorized Officer may grant an exception to a fluid mineral lease NSO stipulation only where the proposed action: i. Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or, ii. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and would provide no net loss to GRSG. Exceptions based on no net loss (ii) may only be considered in (a) PHMA of mixed ownership where federal minerals underlie less than fifty percent of the total surface, or (b) areas of the public lands where the proposed exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP amendment. Exceptions based on conservation gain must also include measures, such as enforceable institutional controls and buffers, sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. Any exceptions to this lease stipulation may be approved by the Authorized Officer only with the concurrence of the State Director and in coordination with the Technical and Policy	*(See above.)*	• miles of an active lek or greater than 0.6 miles from active leks) that would impair their biological function. • Topography/areas of non-habitat create an effective barrier to adverse impacts (e.g., protected from visual and audible disturbances to GRSG and its habitat). • By co-locating the proposed authorization with existing disturbance, no additional impacts would be realized above those already associated with the existing similarly-sized infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function. Beyond considering an exception where no direct or indirect impacts on GRSG or its habitat would occur, an exception could also be considered if the proposed location on public lands would be undertaken as an alternative to a similar action occurring on a nearby non-public lands parcel (for example, due to landownership patterns), and development on the public parcel in question would eliminate impacts on more important and/or limited GRSG habitat (e.g., wet meadows, brood-rearing habitat, etc.) on the non-public nearby parcel; this exception must also include measures sufficient to allow the BLM to conclude in its documenting analysis that such	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Sage-Grouse. The BLM can and does grant exceptions if the BLM, in coordination with the WGFD, determines that granting an exception would not adversely impact the population being protected.	Team. Approved exceptions will be made publicly available at least quarterly. • NV/CA: An **exception** to stipulations associated with GRSG Habitat Management Areas (HMAs) may be granted by the authorized officer (State Director), in coordination with the appropriate state agency (NDOW, SETT, and/or CDFW), if one the following conditions are met: i. The location of the proposed authorization is determined to be unsuitable (by a biologist with GRSG experience using methods such as Stiver et al 2015) and lacks the ecological potential to become marginal or suitable habitat; and would not result in direct, indirect, or cumulative impacts on GRSG and its habitat. Management allocation decisions would not apply to those areas determined to be unsuitable because the area lacks the ecological potential to become marginal or suitable habitat, and/or ii. The proposed activity's impacts could be offset to result in no adverse impacts on GRSG or its habitat, through use of the mitigation hierarchy consistent with Federal law	*(See above.)*	benefits will endure for the duration of the proposed action's impacts on public lands (e.g., confirmation of an easement). To approve this exception based on any of the above criteria, after coordination with the appropriate State agency, the Authorized Officer must document, that the proposed action satisfies at least one of the criteria listed above. If the State agency does not concur with granting the exception, the Authorized Officer must provide rationale for how the criteria are met considering the information the State provides. Prior to granting an exception to an NSO stipulation, the potential exception shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process). If the area associated with the proposed development seeking the exception (e.g., well pad, compressor station, etc.) is in an area (neighborhood cluster) that has met one of the adaptive management thresholds (hard or soft) (see **Section 2.5.13**), no exceptions would be considered until the causal factor analysis is completed. If the causal factor analysis concludes that development associated with the type of activity seeking the exception is or could contribute to the threshold being met or not recovering, no exception would	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	and the state's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations developed to implement this order). In cases where exceptions may be granted for projects with a residual impact, voluntary compensatory mitigation consistent with the State's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations developed to implement this order) would be one mechanism by which a proponent achieves the Approved RMP Amendment goals, objectives, and exception criteria. When a proponent volunteers compensatory mitigation as their chosen approach to address residual impacts, the BLM can incorporate those actions into the rationale used to grant an exception. The final decision to grant a waiver, exception, or modification would be based, in part, on criteria consistent with the State's GRSG management plans and policies. • UT: Within PHMA, the Authorized Officer may grant an **exception** to a fluid mineral lease NSO	*(See above.)*	be granted. If the analysis is inconclusive on cause, exceptions could be considered.	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	stipulation where the proposed action: ○ Occurs in non-habitat that does not provide important connectivity between habitat areas and the development would not cause indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function of providing the life-history or behavioral needs of the Greater Sage-Grouse population due to project design (e.g., minimize sound, preclude tall structures, require perch deterrents), as demonstrated in the project's NEPA document; or ○ Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel, and development on the parcel in question would have less of an impact on Greater Sage-Grouse or its habitat than on the nearby parcel; this exception must also include measures sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. Approved exceptions will be made publicly available at least quarterly. In addition, any lease activities will apply the pertinent management for discretionary	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	activities in PHMA identified in MA-SSS-3 (e.g., mitigation, disturbance cap, minerals/energy density, seasonal restrictions, and RDFs), including if an exception to the NSO is granted.	*(See above.)*	*(See above.)*	*(See above.)*
Not applicable	A two-tiered NSO exception is not applicable for any state but CO. • CO: NSO-2 – One Mile from Active Leks to the Remainder of PHMA: **Exception: The BLM will grant an exception (any occupancy must be removed within 1 year of approval) to NSO-2 after consulting with the State of Colorado, consistent with MD-SSS-3 and based on the following factors: o It is determined by evaluating the proposed lease activities that adverse or undesirable impacts to Greater Sage-Grouse can be avoided based on site-specific terrain, topography and habitat type, or offset consistent with criterion #2 below. For example, in the vicinity of leks, local terrain features such as ridges and ravines may shield potential disruptive impacts from affecting nearby Greater Sage-Grouse habitat. or o It is determined, based on site-specific information (using tools such as the Habitat Assessment Framework, the Colorado Habitat Exchange Habitat	No WEMs would be necessary, since all GRSG habitat management areas would be closed to new fluid mineral leasing.	**Exception #2 – No Surface Occupancy Stipulation in the Remainder of PHMA (or IHMA in Idaho) beyond 0.6 miles from active leks – as applicable:** The Authorized Officer may consider and grant an **exception** to the NSO stipulation associated with the remainder of PHMA (and IHMA in Idaho) if one of the following criteria apply – after documenting the review of available information associated with the site proposed for the exception – both internally compiled and as provided by State, County and other local agencies, tribal governments, project proponents, other federal agencies, or interested stakeholders: 1) The criteria presented in Exception #1. 2) If it can be demonstrated by a biologist with GRSG experience, based on site-specific information (using tools such as the Habitat Assessment Framework, State mitigation programs, or others), where it has been demonstrated that the project cannot be avoided or minimized and granting the exception would not result in adverse effects to GRSG	**Exception #2 – No Surface Occupancy Stipulations in the Remainder of PHMA (or IHMA in Idaho) beyond 0.6 miles from active leks – as applicable:** Same as Alternative 4, except under the #2 criteria, compensatory mitigation would not have to be completed and functioning prior to being able to grant the exception. To grant the activity based on compensatory mitigation, prior to construction, surface occupancy, or surface disturbing activities the compensation project must be planned, funded, and approved by the operator, BLM, surface owner, and in coordination with the appropriate State agency. However, due to the uncertainty associated with whether the planned compensatory mitigation project would successfully become habitat in order to offset the impacts, one of the following would need to apply: • The area of habitat improvement associated with compensatory mitigation would need to increase to account for a level of risk that the compensatory mitigation action may fail or not persist for the full duration of the impact based on the type of

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	Quantification Tool, or others), that the impacts anticipated by the proposed activity would be offset through compensatory mitigation developed in coordination with the State of Colorado (as a requirement of State policy or authorization or as offered voluntarily by leaseholder) that meets accepted principles of compensatory mitigation including: ➢ Achieving measurable outcomes for Greater Sage-Grouse habitat function that are at least equal to the lost or degraded values. **If, prior to development, the county in which the tract is located provides information indicating that an NSO stipulation can be excepted or modified based on a reasonable understanding of likely development because either of the criterion above would apply, the BLM would manage that lease accordingly unless the BLM determines, at the APD stage and in consultation with the State of Colorado, that neither of the criteria identified above is met. *In order to approve exceptions or modifications to this lease stipulation, the Authorized Officer must obtain agreement, including written justification, between the BLM District Manager and CPW*	*(See above.)*	seasonal habitats. Granting the exception must be in conformance with the RMP GRSG goal and habitat objectives, and the impacts anticipated by the proposed activity would be addressed through application of the mitigation hierarchy, including consideration of compensatory mitigation developed in coordination with the applicable state agency that meets the GRSG mitigation principles identified in the RMP, including providing for no net loss of habitat. To grant an exception based on the use of compensatory mitigation, the following must be followed and documented: a. As the first step in mitigating impacts to GRSG, efforts to avoid impacts by locating the proposed project in areas outside the NSO areas or in areas of non-habitat shall be documented. b. As the second step in mitigating impacts to GRSG, efforts to minimize impacts by applying project design features shall be documented (e.g., use of RDFs, buffer distances, seasonal limitations, etc.). c. Using compensatory mitigation may not be appropriate in some GRSG habitats/populations. Before using compensatory mitigation	the specific compensatory project(s) and local ecological conditions, or • The operator provides long-term assurances that the compensatory project would become functional for the duration of the impact (e.g. project maintenance or retreatment, easements, mitigation bonding – BLM H-1794-1, section 7.3, etc.). Compensatory mitigation rate would need to consider number of acres necessary to offset acres affected by direct and indirect effects (see Mitigation section), as well as likelihood that the mitigation project may not provide the anticipated compensation for the duration of the impact.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*that the proposed action satisfies at least one of the criteria listed above.*	*(See above.)*	as an approach for this exception, the effectiveness of whether compensatory mitigation can offset impacts to the impacted habitat and associated population without risking other impacts shall consider local biological considerations, including, but not limited to population size, connectivity to other populations, availability of existing functional habitat, and the availability of mitigation projects that could benefit the impacted population. d. The compensation project must be completed and habitat functionality documented before the exception is granted to ensure the offset in impacts will occur. e. The compensation necessary to grant this exception must provide the offsetting benefit to the population being impacted by the potential development. For a description of what qualifies as an offsetting benefit, refer to the mitigation framework. To approve this exception, the Authorized Officer must document, in coordination with the appropriate State authority,	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	that the proposed action satisfies at least one of the criteria listed above. If the State agency does not concur with granting the exception, the Authorized Officer must provide rationale for how the criteria are met considering the information the State provides. Prior to granting an exception to an NSO stipulation the potential exception shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process). If the area associated with the proposed development seeking the exception (e.g., well pad, compressor station, etc.) is in an area (neighborhood cluster) that has met one of the adaptive management thresholds (hard or soft) (see **Section 2.5.13**), no exceptions would be considered until the causal factor analysis is completed. If the causal factor analysis concludes that development associated with the type of activity seeking the exception is or could contribute to the threshold being met or not recovering, no exception would be granted. If the analysis is inconclusive on cause, exceptions could be considered.	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• CO, ID, MT/DK, NV/CA, OR, UT: None • WY: NSO 0.6 lek buffer in PHMA: **Modification**: The authorized officer may modify the area subject to the stipulation or the NSO criteria if an environmental record of review finds that a portion of the NSO area is nonessential, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater Sage-Grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting.	• ID, MT/DK, OR and WY: Same as Alternative 1. • CO: <u>NSO-1 – Within One mile of Active Leks:</u> **__Exceptions__** or **modifications** may be considered if, in consultation with the State of Colorado, it can be demonstrated that there is no impact on Greater Sage-Grouse based on one of the following: o Topography/areas of non-habitat create an effective barrier to impacts. o No additional impacts would be realized above those created by existing major infrastructure (for example, State Highway 13). o The exception or modification precludes or offsets greater potential impacts if the action were proposed on adjacent parcels (for example, due to landownership patterns). **_In order to approve exceptions or modifications to this lease stipulation, the Authorized Officer must obtain: agreement, including written justification, between the BLM District Managers and CPW that the proposed action satisfies at least one of the criteria listed above._	No WEMs would be necessary, since all GRSG habitat management areas would be closed to new fluid mineral leasing.	**Modification**: The Authorized Officer may consider and grant a **modification** to the fluid mineral lease NSO stipulation, allowing for surface occupancy only where: • an exception is granted, as described above, for the primary disturbance (e.g., well pad, compressor station), and • the potential associated infrastructure related to the development is not individually precluded by other GRSG actions (e.g., roads, pipelines, power lines that could otherwise be considered through a ROW). While the NSO stipulation could be modified for these additional developments, they must still comply with other GRSG management actions (e.g., mitigation, disturbance cap, minerals/energy density, seasonal restrictions, RDFs, etc.) if an exception to the NSO is granted. Prior to modifying the area subject to the NSO stipulation, the potential modification shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process). If the area (neighborhood cluster) associated with the proposed exception has met one of the adaptive management thresholds (hard or soft) (see **Section 2.5.13**), no exceptions would be considered until the causal factor	Same as Alternative 4, except for the addition of the following: <u>Specifically for Wyoming</u>: In addition to the above, the Authorized Officer may consider and grant a **modification** if after documenting the review of available information, in coordination with the appropriate State agency, that a portion of the NSO area is nonessential (e.g., the lek upon which the NSO is centered is not active), or it is identified through scientific research or monitoring that the existing area (i.e., the active lek and associated buffer) is inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the GRSG, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	• CO: NSO-2 – One Mile from Active Leks to the Remainder of PHMA: ****Modification**: The BLM will grant modifications (changes to the stipulation either temporarily or for the term of either part of the entire lease) to NSO-2 after consultation with the State of Colorado, consistent with MD-SSS-3 and based on the following factors: ○ It is determined by evaluating the proposed lease activities that adverse or undesirable impacts to Greater Sage-Grouse can be avoided based on site-specific terrain, topography and habitat type, or offset consistent with criterion #2 below. For example, in the vicinity of leks, local terrain features such as ridges and ravines may shield potential disruptive impacts from affecting nearby Greater Sage-Grouse habitat. or ○ It is determined, based on site-specific information (using tools such as the Habitat Assessment Framework, the Colorado Habitat Exchange Habitat Quantification Tool, or others), that the impacts anticipated by the proposed activity would be with the State of Colorado (as a requirement of State	*(See above.)*	analysis is completed. If the causal factor analysis concludes that development associated with the type of activity seeking the exception is or could contribute to the threshold being met or not recovering, no modification would be granted. If the analysis is inconclusive on cause, modifications could be considered.	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	offset through compensatory mitigation developed in coordination policy or authorization or as offered voluntarily by leaseholder) that meets accepted principles of compensatory mitigation including: ➢ Achieving measurable outcomes for Greater Sage-Grouse habitat function that are at least equal to the lost or degraded values; ➢ Accounting for a level of risk that the mitigation action may fail or not persist for the full duration of the impact. **If, prior to development, the county in which the tract is located provides information indicating that an NSO stipulation can be excepted or modified based on a reasonable understanding of likely development because either of the criterion above would apply, the BLM would manage that lease accordingly unless the BLM determines, at the APD stage and in consultation with the State of Colorado, that neither of the criteria identified above is met. *In order to approve exceptions or modifications to this lease stipulation, the Authorized Officer must obtain agreement, including*	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*written justification, between the BLM District Manager and CPW that the proposed action satisfies at least one of the criteria listed above.* • NV/CA: The only language for modifications and waivers related to timing stipulations. The language from the NV/CA 2019 ARMPA is located in that section. • UT: The BLM Authorized Officer may grant a **modification** to a fluid mineral lease no surface occupancy stipulation only where an exception is granted, as described above, for the primary disturbance (e.g., well pad, compressor station). A modification to the no surface occupancy stipulation could be considered for the associated infrastructure related to the development that are not individually precluded by other Greater Sage-Grouse actions (e.g., roads, pipelines, power lines). While the no surface occupancy stipulation could be modified for this infrastructure, it must still comply with other Greater Sage-Grouse management contained in MA-SSS-3.	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• CO, ID, MT/DK, NV/CA, OR, UT: None • WY: NSO 0.6 lek buffer in PHMA: **Waiver**: This stipulation may be waived over the entire lease if, in coordination with the state wildlife agency, it is determined that the Greater Sage-Grouse lek has been classified as unactive as determined by the state wildlife agency. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.)	• ID, MT/DK, OR, WY: Same as Alternative 1. • CO: <u>NSO-1 (Within One mile of Active Leks) and NSO-2 (One Mile from Active Leks to the Remainder of PHMA):</u> No waivers are authorized unless the area or resource mapped as possessing the attributes protected by the stipulation is determined during collaboration with the State of Colorado to lack those attributes or potential attributes. A 30-day public notice and comment period is required before waiver of a stipulation. Waivers would require BLM State Director approval. • NV/CA: **Waiver**: The stipulation may be waived if the authorized officer, in consultation with the appropriate state agency (NDOW, SETT, and/or CDFW), determines that the entire leasehold is within unsuitable habitat (see exceptions above) and would not result in direct, indirect, or cumulative impacts to GRSG and/or its habitat. • UT: The BLM Authorized Officer may grant a **waiver** to a fluid mineral lease no surface occupancy stipulation if, through the appropriate planning process (i.e., plan maintenance, amendment) the area is no longer within PHMA.	No WEMs would be necessary, since all GRSG habitat management areas would be closed to new fluid mineral leasing.	**Waiver**: The Authorized Officer may consider and grant a **waiver** of the NSO stipulation on an existing lease after documenting, in coordination with the appropriate State agency, that the lease with the GRSG NSO stipulation is no longer in PHMA (and IHMA in Idaho). This would only be applicable on leases that were issued when the parcel was in PHMA, then the PHMA boundaries were subsequently adjusted through the appropriate planning process (i.e., plan maintenance or amendment). Prior to waiving the NSO stipulation for a given area, the potential waiver shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process).	Same as Alternative 4.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
No Surface Occupancy Stipulations Associated with Active Leks in GHMA (applicable in MT/DK, WY, CO, OR, and UT), and Musselshell RHMA in MT:				
• ID, NV/CA do not have NSO for GRSG in GHMA. • While UT has NSO on leks in GHMA, they are associated with RMP decisions that pre-date the 2015 amendment. As such, no new stipulations or WEMs were considered in the 2015 ARMPA. • CO: w/in 2 miles of active leks: **Exception**: In consultation with the State of Colorado, an exception to occupancy of the surface associated with GRSG NSO-46e(2) in GHMA could be granted on a one-time basis (any occupancy must be removed within 1 year of approval) based on an analysis of the following factors: o Location of proposed lease activities in relation to critical GRSG habitat areas as identified by factors including, but not limited to, average male lek attendance and/or important seasonal habitat o An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation (see Chapter 2, Section 2.6.3 of the Proposed LUPA/Final EIS, Regional Mitigation)	• CO, ID, MT/DK, NV/CA, OR, UT, WY: Same as Alternative 1.	No WEMs would be necessary, since all GRSG habitat management areas would be closed to new fluid mineral leasing.	**Exception**: The Authorized Officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of GRSG due to site-specific terrain and habitat features, such as topographic features that would reduce the habitat impacts by shielding nearby habitat from disruptive factors. An exception could also be granted if it can be demonstrated by a biologist with GRSG experience, based on site-specific information (using State mitigation tools such as Habitat Equivalency Analysis or Habitat Quantification Tool, or other State mitigation programs), that the impacts anticipated by the proposed activity would be offset through compensatory mitigation developed in coordination with the appropriate State agency that meets principles of GRSG compensatory mitigation identified in the RMP, including providing for no net loss of habitat.	Same as Alternative 4.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
○ An evaluation of the proposed lease activities in relation to the site-specific terrain and habitat features. For example, in the vicinity of leks, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. • MT/DK: Miles City (w/in 0.6 miles of a lek in GHMA: The AO, may grant an **Exception** if the action will not result in sage-grouse lek abandonment. South Dakota (w/in .06 miles of leks in GHMA and in winter habitat): The AO may grant an **Exception** only where the proposed action: i. Will not have direct, indirect, or cumulative effects on GRSG or its habitat; or ii. Is proposed to be undertaken as an alternative to a similar action occurring on a nearby parcel and will provide a clear conservation gain to GRSG. Exceptions based on conservation gain (ii) may only be considered in: a) PHMAs of mixed ownership where Federal minerals underlie less than fifty percent (50%) of the total surface, or	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
b) Areas of the public lands where the proposed Exception is an alternative to an action occurring on a nearby parcel subject to a valid Federal fluid mineral lease existing as of the date of this RMP. (See further requirements in the WEMs preamble near the beginning of the Appendix G.1.) Billings (w/in .06 miles of leks in GHMA): A **Modification** or **Exception** may only be considered where the proposed action is determined to be non-habitat, the area is not used by GRSG, and the proposed action would not have direct, indirect, or cumulative effects to GRSG or its habitat. The determination would be made by the BLM in consultation with a team of agency GRSG experts, including an expert from the state wildlife agency, USFWS, and BLM/USFS. The State Director must have received a determination before approving any Modification or Exception. All Modifications or Exceptions must be approved by the State Director. Billings: winter habitat: The AO, after coordination with the state wildlife management agency, may grant an Exception if the action will not result impair the function or suitability of the winter range habitat. HiLine (w/in 0.6 miles of leks in GHMA): The AO, in consultation with Montana Fish, Wildlife and Parks (MFWP), may grant an	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Exception if portions of the area can be occupied without adversely affecting Greater Sage-Grouse leks. Lewistown (winter habitat): The Authorized Officer, after coordination with the state wildlife management agency, may grant an Exception if the action will not impair the function or suitability of the crucial winter range habitat. Lewistown (w/in 0.6 miles of leks in GHMA): The Authorized Officer may grant Exception if the action will not result in Greater Sage-Grouse lek abandonment. • OR: NSO within 1 mile of pending or occupied lek in GHMA: **Exception**: The BLM authorized Officer may grant an exception, in coordination with the ODFW, during project implementation and if BMPs (e.g., anti-perch devices for raptors) are implemented. • WY: NSO 0.25 lek buffer outside PHMA: **Exception**: The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse. The BLM can and does grant exceptions if the BLM, in coordination with the WGFD,	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
determines that granting an exception would not adversely impact the population being protected.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*
• ID: None • CO: w/in 2 miles of active leks: In consultation with the State of Colorado, a **modification** (changes to the stipulation either temporarily or for the term of either part of or the entire lease) to GRSG NSO-46e(2) could be granted based on an analysis of the following factors: o Location of proposed lease activities in relation to critical GRSG habitat areas as identified by factors including, but not limited to, average male lek attendance and/or important seasonal habitat o An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation (see Chapter 2, Section 2.6.3 of the Proposed LUPA/Final EIS, Regional Mitigation) o An evaluation of the proposed lease activities in relation to the site-specific terrain and habitat features. For example, in the vicinity of leks, local terrain features such as ridges and ravines may	• CO, ID, MT/DK, NV/CA, OR, UT, WY: Same as Alternative 1.	No WEMs would be necessary, since all GRSG habitat management areas would be closed to new fluid mineral leasing.	**Modification**: The Authorized Officer may grant a modification after a review of available information, and in coordination with the applicable state agency, documents that a portion of the NSO area is nonessential, or it is identified through scientific research or monitoring that the existing area is inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the GRSG, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting, considering both direct and indirect impacts from a potential modification.	Same as Alternative 4.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
reduce the habitat importance and shield nearby habitat from disruptive factors. • MT/DK: NSO 0.6 lek buffer in GHMA: Miles City: The AO, may **modify** the boundaries of the stipulated area if portions of the leasehold are no longer within 6/10 mile of the perimeter of an active lek, or a portion of the habitat has been altered to the point sage-grouse no longer occupy the site and there is no likelihood of habitat capable of supporting sage-grouse being restored. South Dakota: No modifications. Billings: Modification included in the exception language. Billings: winter habitat: The AO, after coordination with the state wildlife management agency, may modify the boundaries of the stipulated area if portions of the leasehold no longer support wintering wildlife HiLine (w/in 0.6 miles of leks in GHMA): The boundaries of the stipulated area may be modified if the AO, in consultation with MFWP, determines that portions of the area can be occupied without adversely affecting Greater Sage-Grouse leks. The AO, in consultation with MFWP, may also modify the size and shape of the area based on studies documenting actual habitat suitability and/or local periods of actual use	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Lewistown (winter habitat): The Authorized Officer, after coordination with the state wildlife management agency, may modify the boundaries of the stipulated area if portions of the leasehold no longer support wintering wildlife. Lewistown (w/in 0.6 miles of leks in GHMA): The Authorized Officer may modify the boundaries of the stipulation area if portions of the leasehold are no longer within 0.6 miles of the perimeter of an active lek, or a portion of the habitat has been altered to the point Greater Sage-Grouse no longer occupy the site and there is no likelihood of habitat capable of supporting Greater Sage-Grouse being restored. • OR: NSO within 1 mile of pending or occupied lek in GHMA: **Modification**: None. • WY: NSO 0.25 lek buffer outside PHMA: **Modification**: The authorized officer may modify the area subject to the stipulation or the NSO criteria if an environmental record of review finds that a portion of the NSO area is nonessential, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Greater Sage-Grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*
• ID: None • CO: w/in 2 miles of active leks: No **waivers** are authorized unless the area or resource mapped as possessing the attributes protected by the stipulation is determined during collaboration with the State of Colorado to lack those attributes or potential attributes. A 30-day public notice and comment period is required before waiver of a stipulation. Waivers would require BLM State Director approval. • MT/DK: NSO 0.6 lek buffer in GHMA: Miles City: The AO, may **waive** this stipulation if no portion of the leasehold is within 6/10 mile of the perimeter of an active lek. South Dakota: The AO, may waive this stipulation if no portion of the leasehold is within 6/10 mile of the perimeter of an active lek. Billings: The AO may waive this stipulation if: o The entire leasehold is no longer within 0.6 mile of the perimeter of a lek; o It is determined sage-grouse are no longer a BLM special status species or federally threatened or endangered;	• CO, ID, MT/DK, NV/CA, OR, UT, WY: Same as Alternative 1.	No WEMs would be necessary, since all GRSG habitat management areas would be closed to new fluid mineral leasing.	**Waiver**: This stipulation may be waived for a specific lek if, in coordination with the appropriate State agency, it is determined that the GRSG lek that was active has been classified as inactive as determined by the WAFWA definitions and confirmed by the appropriate State agency. Prior to waiving the stipulations, surveys should confirm that the lek is inactive and not moved to another location in the vicinity. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes.	Same as Alternative 4.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
○ No reasonable alternative development scenario exists; or ○ The habitat has been altered to the point sage-grouse no longer use the site and there is little likelihood of habitat capable of supporting sage-grouse being restored. Billings: winter habitat: The AO, after coordination with the state wildlife management agency, may waive this stipulation if the entire leasehold has been altered to an extent that future use by wintering wildlife is unlikely. HiLine (w/in 0.6 miles of leks in GHMA): The stipulation may be waived if the AO, in consultation with MFWP, determines that no portion of the leasehold is within 0.6 mile of the perimeter of an active lek. Lewistown (winter habitat): The Authorized Officer, after coordination with the state wildlife management agency, may waive this stipulation if the entire leasehold has been altered to an extent, future use by wintering wildlife is unlikely. Lewistown (w/in 0.6 miles of leks in GHMA): The Authorized Officer may waive this stipulation if no portion of the leasehold is within 0.6 miles of the perimeter of an active lek • OR: NSO within 1 mile of pending or occupied lek in GHMA:	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Waiver: The BLM Field Manager may waive application of the above use restrictions and meeting objectives within general habitat if off-site mitigation were successfully completed in priority habitat or opportunity areas, following discussions with the BLM and ODFW. Even in situations where use restrictions are waived in general habitat, to avoid direct disturbance or mortality of GRSG, disturbances would not be approved during the sensitive seasons. • WY: NSO 0.25 lek buffer outside PHMA: **Waiver**: This stipulation may be waived over the entire lease if, in coordination with the state wildlife agency, it is determined that the Greater Sage-Grouse lek has been classified as unactive as determined by the state wildlife agency. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.)	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Controlled Surface Use: Disturbance Cap				
• CO, ID, MT/DK and OR did not include the disturbance cap as a stipulation. As such, there were no WEMs. • CA: No exceptions. • NV: Nevada lands only—Any **exceptions** to the disturbance cap may be approved by the Authorized Officer only with the concurrence of the State Director. The Authorized Officer may not grant an exception unless the NDOW, the USFWS, and the BLM unanimously find that the proposed action satisfies the conditions stated in the stipulation. Initially, the technical team would make such finding; the team consists of a field biologist or other GRSG expert from each respective agency. In the event the initial finding were not unanimous, the finding may be elevated to the BLM State Director, USFWS State Ecological Services Director, and NDOW Director for final resolution. In the event their recommendation were not unanimous to grant the exception, the exception would not be granted. • UT: No exceptions. • WY (Core only): **Exception**: The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site	• CO, ID, MT/DK, OR, WY: Same as Alternative 1. • CA: New development/activity would not exceed the 3% disturbance cap protocol at the project scale in PHMA, except in situations where a net conservation gain to the species is achieved as a component of compliance with a state mitigation plan, program, or authority. • NV: Nevada lands only— New development/activity would not exceed the 3% disturbance cap protocol at the project scale in PHMA, except in situations where a net conservation gain to the species is achieved as a component of compliance with a state mitigation plan, program, or authority, such as required by the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law). • UT: The 3 percent cap may be exceeded at the proposed project analysis scale if a technical team determines that site-specific Greater Sage-Grouse habitat and population information, combined with project design elements indicates the project will improve the condition of Greater Sage-Grouse habitat within the	No WEMs would be necessary, since all GRSG habitat management areas would be closed to new fluid mineral leasing.	All States: **Exception**: The Authorized Officer may consider fluid mineral infrastructure on public lands that could result in exceeding the 3 percent disturbance cap at the project scale only if the following three criteria are met: 1) with concurrence from the State Director, 2) if the environmental review document(s) explains how the RMP GRSG goals and objectives will be met, including compliance with the RMP's GRSG mitigation strategy, documenting efforts to: • First avoid impacts by locating the proposed project in areas outside of PHMA, collocated within the footprint of existing disturbance, or in areas of non-habitat shall be documented. • Second to minimize impacts by applying project design features shall be documented (e.g., use of RDFs, buffer distances, seasonal limitations, etc.). • Third, only then to consider using compensatory mitigation. It is important to note compensatory mitigation may not be appropriate in some GRSG habitats/populations. Before using compensatory mitigation as an approach for this exception, the effectiveness of whether compensatory mitigation can offset impacts to the affected habitat and associated population without risking impacts to those GRSG	Same as Alternative 4, except in WY and MT where the project scale disturbance cap is 5%. All states would also include the following additional exceptions included under criteria #3: Compensatory mitigation would not have to be completed and functioning prior to being able to grant the exception. To grant the activity based on compensatory mitigation, prior to construction, surface occupancy, or surface disturbing activities the compensation project must be planned, funded, and approved by the operator, BLM, surface owner, and in coordination with the appropriate State agency. However, due to the uncertainty associated with whether the compensatory mitigation project would successfully offset the impacts, one of the following would need to apply: • the area of habitat improvement associated with compensatory mitigation would need to increase to account for a level of risk that the compensatory mitigation action may fail or not persist for the full duration of the impact based on the type of specific compensatory project(s) and ecological conditions, or • The operator provides long-term assurances that the compensatory project would become functional (e.g., project maintenance or

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse. The BLM can and does grant exceptions if the BLM, in coordination with the WGFD, determines that granting an exception would not adversely impact the population being protected. • WY (Connectivity only): **Exception**: The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, would not impair the function or utility of the site for the current or subsequent seasonal habitat, life-history, or behavioral needs of Greater Sage-Grouse. An exception to the stated limits may be granted when compensatory mitigation is determined to provide an overall beneficial effect to sage-grouse habitat and populations. The BLM can and does grant exceptions if the BLM, in coordination with the WGFD, determines that granting an exception would not adversely impact the population being protected.	proposed project analysis area. Factors considered by the team are in Appendix E and in MA-SSS-3B (of the 2019 Utah GRSG ARMPA). Such exceptions to the 3 percent disturbance cap may be approved by the Authorized Officer only with the concurrence of the State Director. The finding and recommendation shall be made by the technical team, which should consist of a BLM field biologist, other local Greater Sage-Grouse experts, and biologists and other representatives from the appropriate State of Utah agency. *This would only be applicable to new fluid minerals leases if the exception criteria identified for the NSO stipulation above were granted.	*(See above.)*	habitats and populations shall consider local biological considerations, including, but not limited to population size, connectivity to other populations, availability of existing functional habitat, and the availability of mitigation projects that could benefit the impacted population. **and** 3) if one of the following circumstances can be documented: • The exceedance at the project scale is the result of consolidating disturbance associated with the proposed project as a strategy to leave other portions of the PHMA (and IHMA) undisturbed from new authorizations, and the third bullet below, addressing compensatory mitigation, is applied to any residual impacts. No exceedances would be allowed at the HAF Fine Scale. • If a technical team evaluates and recommends that site-specific GRSG habitat and population information, combined with project design elements – including compensatory mitigation, indicates the proposed project is expected to improve the condition of GRSG habitat within the proposed project analysis area. Factors considered by the team will include GRSG abundance and trends, movement patterns – including impacts to connectivity, habitat amount	retreatment, easements, mitigation bonding – BLM H-1794-1, section 7.3, etc.). Compensatory mitigation rate would need to consider number of acres necessary to offset acres affected by direct and indirect effects (see Mitigation section), as well as likelihood that the mitigation project may not provide the anticipated compensation for the duration of the impact. In addition, the compensation necessary to grant this exception must provide the offsetting benefit in the same HAF Fine Scale unit being impacted by the potential development.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	and quality, extent and alignment of project disturbance, location and density of existing disturbance (e.g., potential for increased fragmentation), project design options, and other biological factors (e.g., potential for topographic screening, impacts from other threats such as predation, invasive species, drought, noise, etc.). The technical team should consist of, at a minimum, a BLM field biologist and a biologist and other representatives from the appropriate State agency. • Disturbance associated with the renewal or re-authorization of existing infrastructure in previously disturbed sites or expansions of existing infrastructure that do not result in new direct, indirect, or cumulative impacts on GRSG and its habitat. To approve this exception, the Authorized Officer must document, in coordination with the appropriate State agency, that the proposed action satisfies the three criteria listed above. For this exception to apply, the compensatory mitigation must be completed prior to the disturbance that results in the exceedance of the disturbance cap so the value of the mitigation can be accurately compared to the value of the habitat to be affected by the proposed disturbance. In	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	addition, the compensation necessary to grant this exception must provide the offsetting benefit to the population being impacted by the potential development. Prior to granting an exception to the disturbance cap stipulation the potential exception shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process). If the area associated with the proposed development seeking the exception (e.g., well pad, compressor station, etc.) is in an area (neighborhood cluster) that has met one of the adaptive management thresholds (hard or soft) (see **Section 2.5.13**), no exceptions would be considered until the causal factor analysis is completed. If the causal factor analysis concludes that development associated with the type of activity seeking the exception is or could contribute to the threshold being met or not recovering, no exception would be granted. If the analysis is inconclusive on cause, exceptions could be considered.	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• NV/CA, and UT: No modifications. • WY (Core only): **Modification**: The authorized officer may modify the area subject to the stipulation or surface occupancy criteria if an environmental record of review finds that a portion of the CSU area is nonessential, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater Sage-Grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. • WY (Connectivity only): **Exception**: The authorized officer may modify the area subject to the stipulation or surface occupancy criteria if an environmental record of review finds that a portion of the CSU area is nonessential, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater Sage-Grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting.	• CO, ID, MT/DK, NV/CA, OR, WY: Same as Alternative 1. • UT: The stipulation can be modified to allow disturbance to exceed 3 percent on the lease if disturbance in the project analysis area and PHMA associated with a Greater Sage-Grouse population area remains under 3 percent. *This would only be applicable to new fluid minerals leases if the exception criteria identified for the NSO stipulation above were granted.	No WEMs would be necessary, since all GRSG habitat management areas would be closed to new fluid mineral leasing.	**Modification:** None.	Same as Alternative 4.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• NV/CA, and UT: No waivers. • WY (Core only): **Waiver**: No waiver. • WY (Connectivity only): **Waiver**: No waiver.	• CO, ID, MT/DK, NV/CA, OR, WY: Same as Alternative 1. • UT: The Authorized Officer may grant a waiver to a fluid mineral lease NSO stipulation if, through the appropriate planning process (i.e., maintenance, amendment), the area is no longer within PHMA. *This would only be applicable to new fluid minerals leases if the exception criteria identified for the NSO stipulation above were granted.	No WEMs would be necessary, since all GRSG habitat management areas would be closed to new fluid mineral leasing.	**Waiver**: The Authorized Officer may consider and grant a **waiver** of the stipulation on an existing lease if the area mapped as PHMA (and IHMA in Idaho) when the lease was issued is no longer mapped as such through the appropriate planning process (i.e., plan maintenance or amendment). Prior to waiving the disturbance cap stipulation for a given area, the potential waiver shall be subject to public review for at least a 30-day period (e.g., could be part of the APD NEPA process).	Same as Alternative 4.
Seasonal Constraints/Stipulations (WEMs associated with such GRSG stipulations in all applicable habitat management area types)				
• ID: No timing/seasonal stipulations were included in the stipulations appendix. • CO: In consultation with the State of Colorado, a **modification** or an **exception** to GRSG TL-46 could be granted based on an analysis of the following factors: o Location of proposed lease activities in relation to critical GRSG habitat areas as identified by factors including, but not limited to, average male lek attendance and/or important seasonal habitat o An evaluation of the potential threats from proposed lease activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site	• CO, ID, OR, UT, WY: Same as Alternative 1. • NV/CA: In the 2019 ARMPA, WEMs for all the seasonal/timing stipulations refer the reader back to the same WEMs for the NSO.	No WEMs would be necessary, since all GRSG habitat management areas would be closed to new fluid mineral leasing.	**Exception**: The Authorized Officer may consider and provide temporary relief from seasonal constraints by granting an **exception** after documenting the review of available information associated with the site proposed for the exception. While the BLM considers information from all sources, the State wildlife agency can provide information directly associated with bird use, including whether GRSG populations are not using the seasonal habitat during that year's seasonal life cycle period. Based on this information and recommendation, and documented variability in climatic conditions (e.g., early/late spring, long/heavy winter), use patterns, or other applicable information the Authorized Officer may consider a one-time exception if development associated with it will not affect GRSG habitat use, movement or	Same as Alternative 4.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
mitigation (see Chapter 2, Section 2.6.3 of the Proposed LUPA/Final EIS, Regional Mitigation) ○ An evaluation of the proposed lease activities in relation to the site-specific terrain and habitat features. For example, within 4 miles of a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. • MT/DK: Dillon: An Exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated. Butte and Dillon: An Exception to this stipulation may be granted by the authorized officer, in consultation with the Montana Fish, Wildlife and Parks (FWP) and the U.S. Fish and Wildlife Service (FWS), if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated. North Dakota: This stipulation may be waived or reduced if circumstances change, or if the lessee can demonstrate that operations can be conducted without causing unacceptable impacts. Exceptions to this	*(See above.)*	*(See above.)*	reproduction, including seasonal reproductive displays, nest attendance, egg or chick survival, or early brood-rearing success or otherwise impair the seasonal function, suitability, and use of winter concentration areas.	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
limitation in any particular year may be specifically approved in writing by the authorized officer. In all cases, the stipulation (including any Modification) will be designed to present the least restrictive measure for avoiding unacceptable adverse impacts. Butte: An Exception to this stipulation may be granted by the authorized officer if the operator submits a plan that demonstrates that impacts from the proposed action are minimal or can be adequately mitigated. Billings: An Exception to this stipulation may be granted by the AO, in consultation with Montana FWP, if the operator submits a plan which demonstrates that the proposed action will not affect sage grouse or their habitat. Refer to "Requirements and/or Guidelines for Wildlife Controlled Surface Use (CSU) and Exceptions to No Surface Occupancy (NSO) and Timing Limitation Stipulations", Appendix H or portions of the area no longer have sage grouse or their habitat, or the lek is confirmed inactive (10 years with no males or sign of lek activity). Activities would be allowed, if they are consistent with the goals and objectives for the Restoration Area (RA) or General habitat. HiLine: The AO may grant an Exception if the operator submits a plan that demonstrates the impacts from the proposed action are acceptable or can be adequately mitigated.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• NV/CA: (w/in 4 miles of active or pending leks in GHMA, winter habitat, early and late brood rearing habitat): The Authorized Officer may grant an **exception** where an environmental review and consultation with the appropriate state agency (Nevada Department of Wildlife, Sagebrush Ecosystem Technical Team, California Department of Fish and Wildlife) determines that the action, as proposed or otherwise restricted, does not adversely affect GRSG or its habitat. An exception may also be granted if the proponent, the BLM, and the appropriate state agency negotiate mitigation that would provide a clear net conservation gain to GRSG and its habitat. • OR GHMA (Winter habitat): The BLM Field Manager could grant **exceptions** to the seasonal restrictions and use restrictions if the project plan and NEPA document demonstrate that impacts from the proposed action can be adequately mitigated. • OR GHMA (Breeding, Nesting, Early and late brood rearing habitat): The BLM Field Manager could grant exceptions to the seasonal and use restrictions under the following conditions: o If surveys determine there are no active or occupied	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
leks within 4 miles of the proposed project during the year (based on ODFW lek survey protocol) and the proposed activity would not take place beyond the season being excepted ○ If the project plan and NEPA document demonstrate that impacts from the proposed action could be adequately mitigated • UT (breeding, nesting, early and late brood rearing, and winter habitat): No exceptions. • WY PHMA (Core and Connectivity) and GHMA: **Exception**: The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, will not affect reproductive displays, nest attendance, egg or chick survival, or early brood-rearing success. Actions designed to enhance the long-term utility or availability of suitable Greater Sage-Grouse habitat may be exempted from this timing limitation. The BLM can and does grant exceptions to seasonal restrictions if the BLM, in coordination with the WGFD, determines that granting an exception would not adversely impact the population being protected.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• WY Winter Concentration Areas: **Exception**: The authorized officer may grant an exception if an environmental record of review determines that the action, as proposed or conditioned, will not impair the function and suitability of the winter concentration area, or it is determined that the winter concentration area is not active by concentrated populations of Greater Sage-Grouse during the period of concern. Actions designed to enhance the long-term utility or availability of suitable Greater Sage-Grouse habitat may be exempted from this timing limitation. The BLM can and does grant exceptions to seasonal restrictions if the BLM, in coordination with the WGFD, determines that granting an exception would not adversely impact the population being protected.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• CO: Modification language included in the exception language above. • MT/DK: Dillon: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area can be occupied without adversely affecting sage grouse leks. Butte and Dillon: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area no longer contain Sage Grouse winter/spring range. The dates for the timing restriction may be modified if new information indicates that the December 1 through May 15 dates are not valid for the leasehold. North Dakota: This stipulation may be waived or reduced if circumstances change, or if the lessee can demonstrate that operations can be conducted without causing unacceptable impacts. Exceptions to this limitation in any particular year may be specifically approved in writing by the authorized officer. In all cases, the stipulation (including any Modification) will be designed to present the least restrictive measure for avoiding unacceptable adverse impacts. Butte: The boundaries of the stipulated area may be modified if the authorized officer determines that portions of the area can be occupied without adversely affecting sage grouse leks.	• CO, ID, MT/DK, OR, UT, WY: Same as Alternative 1. • NV/CA: The authorized officer, in coordination with the appropriate state wildlife agency (NDOW, and/or CDFW), can **modify** and/or **waive** dates for seasonal timing restrictions based on the criteria described below, based on site-specific information that indicates: i. A project proposal's NEPA analysis and/or project record, and correspondence from NDOW and/or CDFW, demonstrates that any modification (shortening/extending seasonal timeframes or waiving the seasonal timing restrictions all together) is justified on the basis that it serves to better protect or enhance GRSG and its habitat than if the strict application of seasonal timing restrictions are implemented. Under this scenario modifications can occur if: a. A proposed authorization would have beneficial or neutral impacts on GRSG and its habitat. b. Topography or other factors eliminate direct and indirect impacts from visibility and audibility to GRSG and its habitat.	No WEMs would be necessary, since all GRSG habitat management areas would be closed to new fluid mineral leasing.	**Modification:** The BLM can and does grant modifications to seasonal restrictions if the BLM, in coordination with the state wildlife agency on a case-by-case basis, determines that granting the modification would not adversely impact the population being protected. The authorized officer may consider and grant a **modification** to the dates and areas associated with seasonal timing restrictions based on the criteria described below – after documenting the review of available information associated with the site proposed for the modification, if: i. The geographic and temporal conditions demonstrate that any modification (shortening/extending seasonal timeframes) is justified on the basis that it serves to better protect or enhance GRSG and its habitat than if the strict application of seasonal timing restrictions are implemented. Under this scenario modifications can occur if one or more of the following conditions can be documented: a. A proposed authorization is expected to have beneficial or neutral impacts on GRSG and its habitat. b. Topography or other factors eliminate direct and indirect impacts	Same as Alternative 4.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Billings: The boundaries of the stipulated area may be modified if the AO determines that portions of the area can be occupied without adversely affecting sage grouse leks or portions of the area no longer have sage grouse or their habitat. The timing restriction dates may be modified if new information indicates that the dates are not valid for the leasehold. HiLine: The boundaries of the stipulated area may be modified if the AO determines that portions of the area no longer contain viable winter range. The dates for the timing restriction may be modified if new wildlife use information indicates that the dates are not valid for the leasehold. The AO may also modify the size and shape of the area based on studies documenting actual habitat suitability and/or local periods of actual use • NV/CA: (w/in 4 miles of active or pending leks in GHMA, winter habitat, early and late brood rearing habitat): The Authorized Officer may **modify** the size and shape of the restricted area or the period of limitation where an environmental review and consultation with the appropriate state agency (Nevada Department of Wildlife, Sagebrush Ecosystem Technical Team, California Department of Fish and Wildlife) determines that	c. There are documented local variations (e.g., higher/lower elevations) and/or annual climatic fluctuations (e.g., early/late spring, long/heavy winter) that indicate the seasonal life cycle periods are different than presented, or that GRSG are not using the area during a given seasonal life cycle period. ii. Modifications are needed to address an immediate public health and safety concern in a timely manner (e.g., maintaining a road impacted by flooding).	*(See above.)*	from visibility and audibility to GRSG and its habitat. c. There are documented local variations that indicate the seasonal life cycle periods are different than presented. ii. Modifications are needed to address an immediate public health and safety concern in a timely manner (e.g., maintaining a road impacted by flooding).	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
the action, as proposed or otherwise restricted, does not adversely affect GRSG or its habitat. • OR GHMA (Winter and breeding, nesting, and early and late brood-rearing habitat): Additionally, the BLM Field Manager may modify the seasonal restrictions and use restrictions under the following conditions: ○ If portions of the area do not include winter habitat (lacking the principle habitat components of winter GRSG habitat, as defined in GRSG habitat indicators **Table 21-2**) or are outside the current defined winter habitat area, as determined by the BLM in discussion with the ODFW, and indirect impacts would be mitigated ○ If documented local variations (e.g., higher or lower elevations) or annual climate fluctuations (e.g., early or late spring, long or heavy winter) reflect a need to change the given dates to better protect GRSG in a given area and the proposed activity would not take place beyond the season being excepted	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• UT (breeding, nesting, early and late brood rearing, and winter habitat): Specific time and distance determinations would be based on site-specific conditions and may be modified due to documented local variations (e.g., higher/lower elevations) or annual climactic fluctuations (e.g., early/late spring, long and/or heavy winter) in order to better protect GRSG, in coordination with UDWR biologists. • WY PHMA (Core and Connectivity) and GHMA **Modification**: The authorized officer may modify the size and shape of the TLS area or the TLS criteria if an environmental record of review indicates the actual habitat suitability for seasonal Greater Sage-Grouse activities is greater or less than the stipulated area, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater Sage-Grouse, including (but not limited to) reproductive display, daytime loafing/staging activities, and nesting. • WY Winter Concentration Areas: **Modification**: The authorized officer may modify the size and shape of the TLS area or the TLS	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
criteria if an environmental record of review indicates the actual habitat suitability for seasonal Greater Sage-Grouse activities is greater or less than the stipulated area, or it is identified through scientific research or monitoring that the existing criteria are inadequate or overly protective for maintaining the function or utility of the site for the seasonal habitat, life-history, or behavioral needs of the Greater Sage-Grouse.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*
• CO: No **waivers** are authorized unless the area or resource mapped as possessing the attributes protected by the stipulation are determined during collaboration with Colorado Parks and Wildlife to lack those attributes or potential attributes. A 30-day public notice and comment period is required before waiver of a stipulation. Waivers would require BLM State Director approval. • MT/DK: Dillon: This stipulation may be waived if the authorized officer, in consultation with the Montana Fish, Wildlife and Parks, determines that the entire leasehold can be occupied without adversely affecting Sage Grouse Leks or the surrounding breeding habitat. Butte and Dillon: This stipulation may be waived if the authorized officer determines that the entire leasehold no longer contains sage	• CO, ID, MT/DK, OR, UT, WY: Same as Alternative 1. • NV/CA: In the 2019 ARMPA, WEMs for all the seasonal/timing stipulations refer the reader back to the same WEMs for the NSO.	No WEMs would be necessary, since all GRSG habitat management areas would be closed to new fluid mineral leasing.	**Waiver**: The Authorized Officer may consider and grant a **waiver** of the stipulation on an existing lease if the area that was mapped as a GRSG habitat management area (regardless of type) when the lease was issued is no longer mapped as such through the appropriate planning process (i.e., plan maintenance or amendment).	Same as Alternative 4.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
grouse winter/spring range or, if in coordination with the FWP and FWS, determines that the area is not critical for Sage Grouse. Butte: This stipulation may be waived if the authorized officer, in consultation with the Montana Fish, Wildlife and Parks and U.S. Fish and Wildlife Service, determines that the entire leasehold can be occupied without adversely affecting Sage Grouse Leks or the surrounding breeding habitat. North Dakota: This stipulation may be waived or reduced if circumstances change, or if the lessee can demonstrate that operations can be conducted without causing unacceptable impacts. Exceptions to this limitation in any particular year may be specifically approved in writing by the authorized officer. In all cases, the stipulation (including any Modification) will be designed to present the least restrictive measure for avoiding unacceptable adverse impacts. Billings: This stipulation may be waived if the AO, in consultation with Montana FWP and the USFWS, determines that the entire leasehold can be occupied without adversely affecting sage grouse leks or the surrounding breeding habitat, the lek is confirmed inactive (10 years with no males or sign of lek activity), or sage grouse are no longer considered BLM special status species and not listed by USFWS.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
HiLine: This stipulation may be waived if the AO determines that the entire leasehold no longer contains viable winter range. • NV/CA: (w/in 4 miles of active or pending leks in GHMA, winter habitat, early and late brood rearing habitat): The Authorized Officer may waive the stipulation where an environmental review and consultation with the appropriate state agency (Nevada Department of Wildlife, Sagebrush Ecosystem Technical Team, California Department of Fish and Wildlife) determines that the described lands do not contain GRSG or suitable habitat or are otherwise incapable of serving the requirements of GRSG and therefore no longer warrant consideration as a component necessary for their protection. • OR GHMA (Winter and breeding, nesting, and early and late brood-rearing habitat): No waivers. • UT (breeding, nesting, early and late brood rearing, and winter habitat): No waivers. • WY PHMA (Core only): **Waiver**: No waiver. • WY PHMA (Connectivity only), and GHMA: **Waiver**: This stipulation may be waived over the entire lease if, in coordination with the state wildlife agency, it is determined that the Greater Sage-Grouse lek	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
has been classified as unactive as determined by the state wildlife agency. Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manuals 1624 and 3101.) • WY Winter Concentration Areas: **Waiver**: No waiver.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

21.1.8 Renewable Energy Development and Associated Transmission

There have been very few published scientific studies on the impacts of wind development on GRSG (Lloyd et al., 2022), direct habitat loss and degradation from facilities and human disturbance are known impacts, and are similar to impacts from development of non-renewable energy resources. Roads account for most of the direct, permanent ground disturbance at wind facilities (Lloyd et al., 2022). Mortality from collision with turbine blades is infrequent (Lloyd et al. 2022). Indirect impacts include potential avoidance of tall structures (Pruett et al., 2009), disturbance due to noise (Blickley et al., 2012) and changes in habitat use by female GRSG (LeBeau et al., 2020). Habitat avoidance and changing habitat use may have compounding effects for extremely philopatric (species that return or stay at a particular location) species, such as GRSG. Increased numbers of known and novel predators may also be a concern, although research on changes in predator abundance at wind facilities is limited. Indirect impacts from solar energy development are anecdotal (Gerringer et al., 2022) and mostly unknown. Loss of habitat from clearing sites for solar panel installation is a direct impact, and can include hundreds to thousands of acres, depending on the scale of the solar development. Such direct habitat loss can also increase habitat fragmentation.

Impacts of transmission lines on GRSG vary with topography and habitat suitability. In general, the presence of transmission lines negatively impacted GRSG habitat selection (Gibson et al., 2018, Kohl et al., 2019, Lebeau et al., 2019, Kirol and Fedy 2023), demographic rates (Gibson et al., 2018) and survival rates (Lebeau et al., 2019). Long-term impacts to GRSG or their demographics are unknown. Ravens using powerline poles for perching and nesting significantly affected habitat use in proximity to powerlines out to a distance of 12.5 km in Nevada (Gibson et al. 2018), but lesser distances were reported in other studies (e.g., Boarman and Heinrich 1999, Bui et al. 2010).

The BLM is currently updating the BLM RMPs for solar energy development in the Solar Programmatic Environmental Impact Statement (PEIS). The is updating the BLM's RMPs related to solar energy development In that analysis of impacts the Solar PEIS considers existing management associated with the 2015 GRSG amendments as those direct current GRSG habitat management on BLM- administered lands. However, the Solar PEIS update defers to this GRSG planning effort to decide how solar energy development is conducted in GRSG habitat management areas.

The following range of alternatives allow for renewable energy development that will contribute to meeting administrative objectives while conserving GRSG habitats from known impacts and addressing potential indirect impacts.

Table 21-9, Comparison of Alternatives, Renewable Energy Development and Associated Transmission, presents management by alternative for this management issue.

Table 21-9. Comparison of Alternatives, Renewable Energy Development and Associated Transmission

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Wind and Solar				
• PHMA/IHMA (ID): ○ Except as noted below, PHMA in all states are Exclusion for wind and solar. ○ ID, NV/CA, and OR specify that the exclusion applies to utility scale wind and solar development. ○ WY is Avoidance for wind unless sufficiently demonstrated that development would not result in population declines. ○ WY does not specifically address solar but general surface disturbance limits would exclude solar near leks (0.6 miles) and minimize (e.g., disturbance cap, mitigation) elsewhere in PHMA. ○ ID IHMA is Avoidance for wind and solar. ○ OR is Avoidance for wind and solar in Lake, Harney, and Malheur Counties outside of SFAs. ○ UT includes an Exception for wind outside PHMA but w/in 5 miles of leks inside PHMA.	• PHMA/IHMA (ID): ○ Same as Alt 1, except NV/CA added exception criteria to the closure and UT changed to Avoidance for wind outside PHMA but w/in 5 miles of leks inside PHMA.	• PHMA: ○ All states: Exclusion.	• PHMA: ○ All states: Manage PHMA as exclusion areas for utility scale wind and solar, including testing and development (including all associated infrastructure [e.g., met towers, powerlines]). ○ Manage ID IHMA as exclusion areas within 3.1 miles from active leks (Cook et al., 2023; unless there are justifiable departures – see buffer appendix) and avoidance in the remainder of the IHMA. Infrastructure could be considered only if it can be demonstrated that as proposed or conditioned it would not impair habitat use by GRSG and will meet that the RMP GRSG goal and habitat objective. Additionally, do not allow surface use, occupancy, or placement of utility scale wind and solar facilities and associated infrastructure within one-half mile of PHMA to protect adjacent PHMA from indirect impacts from development in IHMA. Renewable energy decisions in MT/DK include state specific differences. See **Section 2.6.3** for allocations in those offices.	• PHMA: ○ All states except MT/DK: PHMA and IHMA (ID) would be avoidance areas for utility scale wind and solar energy testing and development (including met towers). Development in all states but ID would not be allowed in breeding and nesting habitats, or in limited/high value (e.g., winter, limited mesic) seasonal habitats unless one of the criteria below is met. In ID, development would not be allowed inside lek buffers (ID Buffers Appendix). ▪ The area is determined to be non-habitat or unsuitable, lacks the ecological potential to become marginal or suitable habitat, and does not provide important connectivity between habitat areas (as determined by a GRSG biologist using criteria such as the Habitat Assessment Framework and coordinated with appropriate state authority). The project should be designed to prevent indirect disturbance to or

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	*(See above.)*	disruption of adjacent seasonal habitats. ▪ Topography/areas of non-habitat create an effective barrier to impacts. ▪ Co-location of the proposed authorization with existing disturbance will result in no additional impacts to those already associated with the existing major infrastructure, including indirect disturbance to or disruption of adjacent seasonal habitats. o The remainder of PHMA/IHMA would be avoidance areas for utility scale wind and solar testing and development. Infrastructure could be considered only if it can be demonstrated that as proposed or conditioned (including disturbance cap and mitigation requirements) it would not impair habitat use by GRSG (as determined in coordination with state wildlife agency) and will meet that the RMP GRSG goal and habitat objective. Renewable energy decisions in MT/DK include state specific differences. See **Section 2.6.3** for allocations in those offices.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• GHMA: o CO, MT, ND and OR are Avoidance for wind and solar. o SD is Exclusion for solar in winter habitat and within 1 mile of leks. o SD and NV/CA are Avoidance for wind. o NV/CA and UT are Exclusion for solar but can co-locate with existing disturbances in CA. o ID and WY are open for wind and solar. o UT is open for wind.	• GHMA: o Same as Alt 1, except ID changed applying "RDFs and buffers" in GHMA to applying BMPs and NV/CA added exception criteria to the Avoidance for wind.	Other HMA types are not applicable to this alterative.	• GHMA: o All states: Manage GHMA in all states as avoidance areas for utility scale wind and solar testing and development.: ▪ Do not allow surface use, occupancy, or placement of utility scale wind and solar facilities including transmission facilities within one-half mile of PHMA (or 2 miles in CO) unless adjacent PHMA is protected from indirect impacts from development in GHMA. ▪ Surface use, occupancy, or placement of utility scale wind and solar facilities should be avoided in accordance with the lek buffer recommendations for tall structures in the lek buffer appendix (contained in the 2015 ARMP/ARMPAs) to minimize impacts to breeding birds unless local data suggest a larger buffer is needed. ▪ Surface use, occupancy or placement of utility scale wind and solar facilities should be avoided in limited/high value seasonal habitats and movement corridors between those areas to protect birds moving from	• GHMA (and SHMA in WY): Open with minimization measures and compensatory mitigation, to maintain habitat supporting GRSG populations consistent and concurrent with state agency habitat designations (e.g., restoration, connectivity, seasonal, or other), and to preclude negative impacts to any adjacent PHMA habitats. Renewable energy decisions in MT/DK include state specific differences. See **Section 2.6.3** for allocations in those offices.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	▪ PHMA to use GHMA seasonal habitats. ▪ Work with State and County governments to locate developments in areas of prior disturbance, including areas where invasive vegetation populations are dominant and areas of non-habitat. • Apply compensatory mitigation to offset habitat losses due to direct and indirect impacts (see mitigation section). Renewable energy decisions in MT/DK include state specific differences. See **Section 2.6.3** for allocations in those offices.	*(See above.)*
Major Rights-of-Way (ROWs)				
• PHMA/IHMA (ID): o All states are Avoidance for major ROWs (≥100 kV transmission and ≥24" pipeline). o OR, UT and WY encourage placement of new lines in designated corridors, or collocated with existing disturbance. o Except as noted below, all states are avoidance for smaller ROWs	• PHMA/IHMA (ID): o Same as Alternative 1, except NV/CA added exception criteria to the Avoidance.	• PHMA: o All states: Exclusion for major rights-of-way (≥100 kV transmission and ≥24" pipeline) outside of RMP designated corridors. o Within designated corridors, avoid PHMA, if possible. If not possible, locate major ROWs within designated corridors and compensate for impacts according to the mitigation strategy.	• PHMA/IHMA (ID): o All states (except MT/DK) are Avoidance for major ROWs (≥100 kV transmission and ≥24" pipeline). o Where development cannot be avoided it would not be allowed in breeding and nesting habitats, or in other limiting/high value seasonal habitats unless one of the following criteria is met: ▪ The ROW can be routed through non-habitat/unsuitable (as determined by a GRSG biologist using criteria such as the Habitat Assessment Framework	• PHMA/IHMA (ID): o All states (except MT/DK) are Avoidance for major ROWs (≥100 kV transmission and ≥24" pipeline). o Micro-siting (siting based on local data) is required to avoid placement near active leks or in connectivity corridors between seasonal habitats. o Areas where major ROWs cannot be avoided apply minimization measures (e.g., disturbance cap, seasonal constraints, tall structure limitations, RDFs, nest and perch deterrents, etc.). Residual direct and indirect impacts

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	and coordinated with State wildlife agencies) and lacks the ecological potential to become suitable habitat. ROWS shall not disrupt connectivity between habitat areas and should be designed to prevent indirect disturbance to or disruption of adjacent seasonal habitats (as disclosed in the environmental analysis). ▪ Co-location of the proposed authorization with existing ROW disturbance results in no additional impacts to those already associated with the existing major infrastructure, including construction, indirect disturbance to or disruption of adjacent seasonal habitats. ○ Additionally, where major ROWs cannot be avoided apply minimization measures (e.g., disturbance cap, seasonal constraints, tall structure limitations, RDFs, nest and perch deterrents, etc.). Residual direct and indirect impacts would be mitigated through compensatory mitigation. ○ Micro-siting is required to avoid disrupting connectivity corridors between seasonal habitats.	would be mitigated through compensatory mitigation. ○ Major ROWs that are located inside RMP designated utility/ROW corridors would not need to comply with disturbance cap (at either the HAF fine scale or project level) or compensatory mitigation requirements unless required by State regulations.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
GHMA – substantial variation by state: ○ CO, NV/CA, and OR GHMA are Avoidance for major ROWs. ○ ID and UT GHMA are open to major ROWs subject to minimization measures such as RDFs, and mitigation. ○ WY is open to major ROWs.	GHMA: • Same as Alt 1, except ID changed applying "RDFs and buffers" in GHMA to applying BMPs.	• Other HMA types are not applicable to this alterative.	GHMA: All states except MT/DK: Avoidance within breeding and nesting habitats and other limited seasonal habitats to meet the RMP GRSG goal and habitat objective. Additionally, any ROW should not be placed within one-half mile of PHMA or IHMA unless adjacent PHMA and IHMA are protected from indirect impacts. Outside those areas, open with compensatory mitigation requirements. Major ROW decisions in MT/DK include state specific differences. See **Section 2.6.3** for allocations in those offices.	GHMA (and SHMA in WY): All States except MT/DK: Open with minimization measures and compensatory mitigation, to maintain habitat supporting GRSG populations consistent with state agency habitat designations (e.g., restoration, connectivity, seasonal, or other), and to preclude negative impacts to adjacent PHMA habitats. Major ROW decisions in MT/DK include state specific differences. See **Section 2.6.3** for allocations in those offices.

21.1.9 Minimizing Threats from Predation

GRSG are a prey species and face a suite of non-specialist predators across their range (Hagen 2011, USFWS 2023). Where sagebrush habitats are intact nest success and adult survival rates are high (Hagen 2011), indicating that predators generally do not limit GRSG populations. However, highly fragmented sagebrush landscapes reduce protective cover and often provide subsidies for sustaining abnormally large populations of predators, and the establishment of novel predators (predators not typically found in sagebrush, Coates et al., 2020). One example is the common raven which has experienced population growth across sagebrush ecosystems due to anthropogenic development (Coates et al., 2020, Dinkins et al. 2021, USFWS 2023). Reduction, isolation, and fragmentation of native shrublands increase GRSG nest exposure to ravens (Lyon and Anderson 2003, Bui et al., 2010, Coates and Delehanty 2010), although research has not been able to determine if raven predation contributes to compensatory or additive GRSG mortality (Taylor et al., 2017) in some areas of the GRSG range ravens are now considered a hyperpredator – having an increased population and therefore increased predation impacts due to the availability of multiple anthropogenic subsidies (e.g., food, nesting substrates) within previously undisturbed sagebrush (Coates et al., 2020).

Where sagebrush habitats are diminished by anthropogenic subsidies and disturbances or other ecological disturbance (i.e., wildfire) predator management may be necessary to conserve local at-risk GRSG populations (Hagen 2011, USFWS 2023). The BLM has committed to work with APHIS and local predator management groups as needed. To address habitat concerns associated with increasing predator abundance, the BLM will minimize new infrastructure and other human subsidies associated with permitted activities to conserve intact landscapes and implement RDFs and BMPs to reduce risk where infrastructure is unavoidable. New anthropogenic developments shall consider their influence on increasing predator abundance, and subsequent impacts on GRSG and make appropriate design modifications. Where ravens have been documented as a concern (e.g., densities greater than 0.4 ravens/km^2; Coates et al., 2022), the BLM supports implementation of the strategy outlined by Dettenmaier et al. (2021) and adopted by the U.S. Fish and Wildlife Service (2023).

Table 21-10, Comparison of Alternatives, Minimizing Threats from Predation, presents management by alternative for this management issue.

Table 21-10. Comparison of Alternatives, Minimizing Threats from Predation

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
All states include some language related to reducing opportunities for avian predators (e.g., nest and perch deterrents, considering burying powerlines, etc.), though the location and except varies substantially between states (e.g., some include references in an objective, some in a management action, some in a Required Design Feature or Best Management Practice). NV/CA, UT, and WY include language encouraging coordinating with other partners on predator management issues. NV/CA, OR, UT, and WY include management precluding and/or minimizing subsidies for predators. CO, NV/CA, and UT include language related to habitat management to provide GRSG concealment from predators. UT includes a header section with management that addresses the threats from predation. WY includes management for monitoring predator populations.	Same as Alternative 1, except UT added language addressing corvid nests discovered during habitat treatments.	All states: Manage habitats to maintain, and as needed, restore healthy native vegetation conditions, especially with respect to providing adequate sagebrush, other shrub, and herbaceous vegetation cover on the landscape, to minimize occurrence and effectiveness of predators. The BLM will collaborate with appropriate state agencies, other landowners, federal agencies (e.g., USFWS, APHIS), and tribal governments in their efforts to minimize impacts from predators on GRSG where needs have been documented (e.g., reduced recruitment of GRSG from predation), including providing needed authorizations, to support predator management actions. Prior to implementation of control actions, data must be presented that demonstrates the targeted predators are limiting GRSG populations in a specified area. A strategy for monitoring removal efficacy shall be developed. Where infrastructure associated authorizations and activities in PHMA (and IHMA in Idaho) are not avoidable, apply or request, consistent with applicable law, minimization measures and BMPs to minimize threats from predators shown to pose a threat to GRSG. This includes, but is not	All states: Same as Alternative 3. Additionally, Alternative 4 would apply minimization measures and BMPs to new authorizations and activities in PHMA (and IHMA in Idaho) and GHMA to minimize threats from predators shown to pose a threat to GRSG, consistent with applicable law. This includes, but is not limited to stopping, slowing, and/or discouraging the incursion of new predators, increased levels of predators, or predators expanding into new areas and can be accomplished by including the following: • Avoiding new anthropogenic infrastructure into undisturbed habitats, • Eliminating or minimizing external food resources from anthropogenic sources (e.g., road killed animals, carcass dumps, trash resources from human activities associated with development or recreation). Where avoidance of new infrastructure is not feasible the project proponent shall develop a predator management plan that: o Outlines how the project will be designed to minimize increasing predator abundance,	All states: Same as Alternative 3. Additionally, Alternatives 5 and 6 would apply minimization measures and BMPs to new authorizations and activities in PHMA (and IHMA in Idaho) to minimize threats from predators shown to pose a threat to GRSG, consistent with applicable law. This includes, but is not limited to stopping, slowing, and/or discouraging the incursion of new predators, increased levels of predators, or predators expanding into new areas and can be accomplished by including the following: • Avoiding new anthropogenic infrastructure into undisturbed habitats, • Eliminating or minimizing external food resources from anthropogenic sources (e.g., road killed animals, carcass dumps, trash resources from human activities associated with development or recreation). Where avoidance of new infrastructure is not feasible the AO could require the project proponent to develop a predator management plan that: o Outlines how the project will be designed to minimize increasing predator abundance,

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	limited to stopping, slowing, and/or discouraging the incursion of new predators, increased levels of predators, or predators expanding into new areas and is accomplished : • Precluding new anthropogenic infrastructure if consistent with applicable law and subject to existing authorizations and valid existing rights. Where preclusion is not possible, avoid new anthropogenic infrastructure into undisturbed habitats, • Eliminating or minimizing external food resources from anthropogenic sources (e.g., road killed animals ASAP, carcass dumps, trash resources from human activities associated with development or recreation). Where avoidance of new infrastructure is not feasible the project proponent shall develop a predator management plan that: ○ Outlines how the project will be designed to minimize increasing predator abundance, ○ Details structure design to reduce or eliminate opportunities for raven and raptor perching and nesting (e.g., burying powerlines, locating structures out of line of site of breeding and nesting habitat, using tubular non-branching	○ Details structure design to reduce or eliminate opportunities for raven and raptor perching and nesting (e.g., burying powerlines, locating structures out of line of site of breeding and nesting habitat, using tubular non-branching material for structures, etc.), ○ Identifies predators to remove, with an estimate of predator abundance, • Includes a monitoring strategy to assess efficacy of the predator removal (e.g., number and location of removal) and GRSG population response. and ○ Explains how predator control programs will be developed and coordinated if they become necessary. ○ Is coordinated with the appropriate state agency and other federal agencies (e.g., USFWS, APHIS) as appropriate. • For existing development, reduce opportunities for raven and raptor perching and nesting through measures such as nest/perch deterrents (including regular maintenance).	○ Details structure design to reduce or eliminate opportunities for raven and raptor perching and nesting (e.g., burying powerlines, locating structures out of line of site of breeding and nesting habitat, using tubular non-branching material for structures, etc.), ○ Identifies predators to remove, with an estimate of predator abundance, • Includes a monitoring strategy to assess efficacy of the predator removal (e.g., number and location of removal) and GRSG population response. and ○ Explains how predator control programs will be developed and coordinated if they become necessary. ○ Is coordinated with the appropriate state agency and other federal agencies (e.g., USFWS, APHIS) as appropriate. • For existing development, reduce opportunities for raven and raptor perching and nesting through measures such as nest/perch deterrents (including regular maintenance).

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	○ material for structures, etc.), ○ Identifies predators to remove, with an estimate of predator abundance, • Includes a monitoring strategy to assess efficacy of the predator removal (e.g., number and location of removal) and GRSG population response. and • Explains how predator control programs will be developed and coordinated if they become necessary. • Is coordinated with the appropriate state agency and other federal agencies (e.g., USFWS, APHIS) as appropriate. • For existing development, reduce or prevent opportunities for raven and raptor perching and nesting through measures such as nest/perch deterrents (including a regular maintenance).	*(See above.)*	*(See above.)*

21.1.10 Livestock Grazing

Livestock grazing is the most widespread land use in the sagebrush ecosystem (Knick et al. 2011, Boyd et al. 2014). Well-managed public lands grazing done in accordance with the laws that guide livestock grazing management, (including but not limited to 43 CFR Part 4100, Taylor Grazing Act of 1934, FLPMA, and the Public Rangelands Improvement Act of 1978) and with consideration of local climatic conditions (e.g., drought) can be compatible with GRSG persistence (FWS 2015). In the 2015 USFWS not-warranted determination on GRSG, the agency determined that meeting Land Health Standards, including proper management of livestock numbers, season of grazing and application of adaptive management strategies minimized population level effects on the species (FWS 2015).

On BLM grazing allotments, grazing activities are managed through several mechanisms (permit terms and conditions, allotment management plans, annual pre-turnout authorization meetings, and ongoing monitoring) to ensure that grazing meets or move towards meeting Land Health Standards. Management for meeting land health standards avoids long-term and wide-spread improper grazing will be avoided. Table 3-7 shows that of the allotments with at least 15% PHMA, 5,140 allotments (53% of all allotments) are in Category A, meeting all standards or making significant progress toward meeting the standard, while 1,887 allotments (19% of all allotments) are in Categories B through F, representing different categories of not meeting land health standards. The remainder of the allotments do not have information on evaluations.

In some instances grazing activities may not meet or make significant progress toward meeting Land Health Standards. In such cases, improper grazing (defined as grazing at an intensity or in ways that impair ecosystem functions of the sagebrush ecosystem) can have localized adverse effects to GRSG habitats by altering the composition, productivity and structure of plants resulting in the loss of abundance or quality of GRSG food and cover (Boyd et al., 2014, Fleischner 1994). Improper grazing may also work synergistically with other threats, such as invasive plants and wildfire, increasing impacts from those sources. The USFWS found improper grazing by domestic livestock and free-roaming horses and burros can have negative impacts to sagebrush and GRSG at local scales (USFWS 2015) but previously did not find it was a principal factor affecting the status of the species (USFWS 2010).

Impacts from improper grazing associated with not meeting Land Health Standards are analyzed in **Chapter 4**. Areas experiencing these effects are generally spatially and temporally distinct, and are addressed through implementation-level corrective actions.

Livestock/range management actions were reviewed to determine if they address potential threats to GRSG at the RMP-level of decision-making. Alternatives 1 and 2 include many livestock grazing actions addressed by regulation, policy, or that duplicate actions already in the RMPs. As these actions would be implemented whether included in this amendment or not they are being considered for removal in Alternatives 4, 5, and 6. The actions from Alternatives 1 and 2 are summarized in the table below with the full text included in **Appendix 15**. Alternatives 4, 5, and 6 would focus on the threat to GRSG from improper livestock grazing and relocating or removing actions that are not needed in the RMP to implement.

Table 21-11, Comparison of Alternatives, Livestock Grazing, presents management by alternative for this management issue.

Table 21-11. Comparison of Alternatives, Livestock Grazing

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
There is substantial variation between the various states in the language and actions that address how domestic livestock grazing would be administered in GRSG HMAs. There are some consistent concepts across GRSG range, but there is substantial variability beyond these main concepts, and even in details associated with those main concepts. There are a number of other management actions that some states include that others don't, including addressing issues such as livestock trailing, placement of feed or mineral supplements, language encouraging coordination, prioritization of various other grazing-related actions, or suggestions of what could be considered during implementation of the grazing program in GRSG HMAs. See **Appendix 2** or **Appendix 15** for specific language by state.	All States: Same as Alternative 1, except: • UT: all actions addressing prioritization, or issues addressed through law, regulation or policy were removed, since they are addressed outside the RMP. • WY: clarifications were provided regarding grazing in riparian areas, management of range improvements, and prioritization (removed SFAs). Additionally, clarifications to applying GRSG objectives to land health standards and applying thresholds and responses were made. • ID: areas that met an adaptive management hard trigger would be prioritized for monitoring. Additionally, clarifications to applying the habitat objectives to land health standards were made. • NV/CA: prioritization in SFAs was removed. Additionally, clarifications to applying the habitat objectives to land health standards were made. • OR: Livestock grazing in the 13 key RNAs was returned to language that pre-dated the 2015 amendments. See **Appendix 2** or **Appendix 15** for specific language by state.	All states: Because PHMA would be unavailable for livestock grazing, no overarching livestock grazing objective would be needed.	All states: **Objective RM-1**: Specific to GRSG habitat, manage livestock grazing in a manner that 1) meets or makes progress toward meeting the Land Health Standard for special status species; 2) avoid direct adverse impacts to limiting GRSG habitats from livestock management range improvements; and 3) applies the guideline for grazing administration that addresses "restoring, maintaining, or enhancing habitats of...special status species to promote their conservation" (43 CFR Part 4180.2(e)(9).	All states: **Objective RM-1**: Specific to GRSG habitat, manage livestock grazing in a manner that 1) meets or makes progress toward meeting the Land Health Standard for special status species, and applies the guideline that addresses "restoring, maintaining, or enhancing habitats of...special status species to promote their conservation" (43 CFR Part 4180.2(e)(9) or subsequent changes to regulations or policy).

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
There is substantial variation between the various states in the language and actions that address how domestic livestock grazing would be administered in GRSG HMAs. There are some consistent concepts across GRSG range, including the following concepts in all states, unless noted otherwise: • GRSG management areas are available for livestock grazing, except in OR, where all or portions of 13 key Research Natural Areas (RNAs) would be unavailable, though not every state has a management action that explicitly states that. • Include/adjust permit terms and conditions needed to meet land health standards and GRSG habitat objectives, including suggestions for what the BLM could do on specific allotments if problems were identified. See **Appendix 2** or **Appendix 15** for specific language by state.	Same as Alternative 1, except as summarized under the row for Objective RM-1 above. See **Appendix 2** or **Appendix 15** for specific language by state.	All states: PHMA would be unavailable for livestock grazing.	**Management Action RM-1**: The presence of GRSG HMAs would not affect whether an area is available for livestock grazing; maintain existing areas designated as available or unavailable for livestock grazing. During grazing authorization renewals, Allotment Management Plan development, or other appropriate implementation-level planning, consider adjustments to active AUMs, timing, intensity, duration, and frequency of grazing are completed at the allotment scale based on site-specific conditions to meet or make progress towards meeting Land Health Standard for special status species. Additionally, temporary adjustments of timing, intensity, duration, and frequency of grazing can be made annually to livestock numbers, the number of AUMs, and season of use within the range of the terms and conditions and in accordance with applicable regulations. In managing livestock grazing, consider and apply where appropriate the livestock grazing best management practices and design features in **Appendix 15**.	Same as Alternative 4.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
There is substantial variation between the various states in the language and actions that address how domestic livestock grazing would be administered in GRSG HMAs, including addressing issues such as livestock trailing, placement of feed or mineral supplements, language encouraging coordination, prioritization of various other grazing-related actions, or suggestions of what could be considered during implementation of the grazing program in GRSG HMAs. Many actions are not decisions, but lists of items to consider during implementation. There are some consistent concepts across GRSG range, including the following concepts in all states,: • Prioritize monitoring (both field checks and land health assessments) and renewal of grazing in SFAs (as applicable) and PHMAs outside of SFAs. • Include/adjust permit terms and conditions needed to meet land health standards and GRSG habitat objectives, including suggestions for what the BLM could do on specific allotments if problems were identified. See **Appendix 2** or **Appendix 15** for specific language by state.	Same as Alternative 1, except as summarized under the row for Objective RM-1 above. See **Appendix 2** or **Appendix 15** for specific language by state.	Not applicable.	**Management Action RM-2**: (PHMA/IHMA, GHMA) During the land health assessment (LHA) process, use the criteria identified in the Sage-Grouse Habitat Assessment Framework (BLM-TR-6710-1 - Stiver et al. 2015 – as revised) and other BLM approved methodology to provide multiple lines of evidence (which are consistent with BLM Manual 1283) for determining whether vegetation structure, condition, and composition are meeting or making significant progress towards meeting the Land Health Standards (LHS) for BLM special status species – which includes GRSG. referencing appropriate ESD, associated State and Transition Model (STM) and existing ecological condition information. , For GRSG, the standard would generally be met when vegetation conditions provide for suitable or marginal GRSG habitat at the HAF site scale (see **Table 8-1**, **Appendix 8**), based on existing ecological condition, ecological potential, and existing vegetation information. Where the LHS for SSS habitat (including GRSG) is not being met – as indicated by an unsuitable site-scale HAF assessment relative to site potential – and existing livestock grazing is a significant causal factor (43 CFR Part 4180, BLM H-4180-1 or subsequent changes to regulations or policy),	Same as Alternative 4.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	adjustments to livestock grazing practices and activities will be made at the authorization, allotment or activity plan level and in accordance with applicable regulations (43 CFR Part 4180.2l or subsequent changes to regulations or policy). Any adjustments to grazing will be made based on current ecological potential according to ESD, associated STM and existing ecological state.	*(See above.)*
All the states include language related to thresholds and responses to address and respond to future conditions in new fully processed permits. The specificity of this language and when it is required varies by state. See **Appendix 2** or **Appendix 15** for specific language by state.	Same as Alternative 1, except as summarized under the row for Objective RM-1 above. See **Appendix 2** or **Appendix 15** for specific language by state.	Not applicable.	**Management Action RM-3:** In PHMA (and IHMA in ID) the NEPA analysis when fully processing grazing authorizations (I.e., permit or lease) shall include at least one alternative that includes specific thresholds and defined responses in the terms and conditions of the grazing authorization in the following circumstances, as workload capacity allows: • Where the special status species standard is not being met, specific to GRSG habitat suitability and current livestock grazing has been identified as a significant causal factor (43 CFR Part 4180, BLM H-4180-1 or subsequent changes to regulations or policy); • In high priority allotments (e.g., based on prioritization from IM 2018-024, as amended or superseded) in PHMA/IHMA; or • When changing grazing management on a grazing authorization (e.g., new season of use, rotation schedule, new	**Management Action RM-3:** In PHMA (and IHMA in ID) the NEPA analysis when fully processed grazing authorizations should consider including at least one alternative that considers specific thresholds and defined responses in the terms and conditions of the grazing authorization, where the special status species standard is not being met, specific to GRSG habitat suitability, and current livestock grazing has been identified as a significant causal factor (43 CFR Part 4180, BLM H-4180-1 or subsequent changes to regulations or policy), as workload capacity and priorities allow. One or more defined responses will allow the authorizing officer to implement adjustments to livestock grazing during the term of the authorization that have already been analyzed in a NEPA document. Thresholds specific to GRSG habitat would be developed to maintain or move

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	livestock type, etc.) to provide an alternative approach if the terms and conditions do not have the desired intent. One or more defined responses will allow the authorizing officer to implement adjustments to livestock grazing during the term of the authorization that have already been analyzed in a NEPA document. Thresholds specific to GRSG habitat will be developed to maintain or move PHMA/IHMA toward providing suitable GRSG habitat (**Table 8-1**, **Appendix 8**), designed to address the site-level HAF indicators that warranted the HAF assessment rating, and consider ecological site potential, and relevant locally specific conditions, and Land Health Standards (43 CFR 4180.2).	PHMA/IHMA toward providing suitable GRSG habitat (**Table 8-1**, **Appendix 8**), and be designed to address the site-level HAF indicators that warranted the HAF assessment rating, and consider ecological site potential, and relevant locally specific conditions, and Land Health Standards (43 CFR Part 4180.2 or subsequent changes to regulations or policy).

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
All states include guidance on how livestock grazing/range management infrastructure projects are addressed. Some states include actions for existing water projects, new water projects, existing non-water projects, and new non-water projects. All generally relate to limiting impacts from new and existing water and structural range improvements, See **Appendix 2** or **Appendix 15** for specific language by state.	Same as Alternative 1, except UT consolidated multiple actions into one, and WY clarified their action.	Not applicable.	**Management Action RM-4 (existing Range Improvement Projects):** During the grazing authorization renewal process, evaluate all existing livestock management range improvements with respect to their effect on GRSG and GRSG habitat. Consider removal or modification of projects that negatively affect GRSG or GRSG habitat. Functional projects needed for management of sensitive species habitat or other sensitive resources should be maintained but consider improving in a manner less impactful to GRSG (See **Appendix 15** for Livestock Grazing Management Best Management Practices and Design Features).	Same as Alternative 4.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
All states include guidance on how livestock grazing/range management infrastructure projects are addressed. Some states include actions for existing water projects, new water projects, existing non-water projects, and new non-water projects. All generally relate to limiting impacts from new and existing water and structural range improvements, See **Appendix 2** or **Appendix 15** for specific language by state.	Same as Alternative 1, except UT consolidated multiple actions into one, and WY clarified their action.	Not applicable.	**Management Action RM-5 (new Range Improvement Projects):** Design new range improvement projects (any activity or program relating to rangelands which is designed to improve forage, change vegetative composition, control patterns of use, provide water, stabilize soil and water conditions and provide habitat for livestock and wildlife) to enhance livestock distribution or management and to control the duration, timing and intensity of utilization, including application of new technologies such as virtual fencing. In PHMA, focus authorization of new water developments and structural range improvements (e.g., fences) to projects that have a nominal or incidental effects or that are beneficial to GRSG seasonal habitats. Any new structural range improvements should be placed along existing disturbance corridors or in the least suitable habitat, to the extent practical, and are subject to appropriate design features (**Appendix 15**).	Same as Alternative 4.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
All states include a management action related to fences in GRSG habitat management areas, though the level of detail varies state-to-state. See **Appendix 2** or **Appendix 15** for specific language by state.	Same as Alternative 1.	Not applicable.	**Management Action RM-6 (fences):** Identify fences in high-risk areas - especially within 1.2 miles of an active lek (Christiansen 2009; Stevens 2011) - or other areas identified as important seasonal habitats or areas of GRSG concentration (e.g., geophagy sites) in coordination with the state wildlife agency. Evaluate if the fence is needed and/or up to BLM fencing standards (BLM H 1741). If the fence is unnecessary, remove it. If the fence is needed to support management, mark fences (install reflective fence markers) in high risk or important areas (Christiansen 2009; Stevens 2011). Where marking fences does not reduce fence-related GRSG mortality, modify fences. Modification could include re-routing, altering construction materials, drop fencing, or limiting perch potential. New fences within high-risk areas would only be authorized if: • It is consistent with the overall RMP GRSG objective; • Local terrain features shield nearby habitat or reduce the habitat importance; • The fence is constructed to BLM standards and with high visibility markers to reduce GRSG strikes. Monitoring of existing fences to assess mortality risk is recommended in all GRSG habitats.	Same as Alternative 4.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
All states include language related to agency considerations if a permittee voluntarily relinquishes a permit or lease. See **Appendix 2** or **Appendix 15** for specific language by state.	Same as Alternative 1.	Not applicable.	**Management Action RM-7:** At the time a permittee or lessee voluntarily relinquishes grazing preference and the associated authorization, the BLM will consider whether to offer the permit for re-authorization to other grazing applicants or if the public lands where that permitted use was authorized shall be used for other resource management objectives. This does not apply to or impact grazing preference transfers, which are addressed in 43 CFR Part 4110.2-3. When a permittee or lessee voluntarily relinquishes grazing preference and associated grazing authorization, consider conversion of the allotment to a reserve common allotment that will remain available for use on a temporary, nonrenewable basis for the benefit of GRSG habitat. Authorize temporary nonrenewal permits in reserve common allotments to meet resource objectives elsewhere such as rest or deferment due to wildfire or vegetation treatments. Temporary use of reserve common allotments would not be allowed due to drought or overuse of allotments.	Same as Alternative 4.

21.1.11 Wild Horse and Burro Management

Grazing of wild horses and burros results in reduced plant diversity, altered soil characteristics, lower grass cover, lower grass density, fragmented and reduced shrub cover and increased abundance of cheatgrass (Beever et al. 2008, Beever and Brussard 2000, Coates et al. 2021), although impacts vary with elevation, density, and season and duration of use (Beever and Aldridge, 2011). The loss of shrub and grass cover can increase predation risk to nesting GRSG (Connelly et al., 2000). Wild horse and burros also negatively impact important mesic areas that provide GRSG brood-rearing habitats (Beever and Aldridge 2011). Unlike domestic livestock there is little if any direct management of wild horses and burros, such as fencing, lease deferral and pasture rest, potentially exacerbating their impacts on GRSG habitats at local scales. Recent research in Nevada predicted GRSG declines due to habitat alteration and loss from wild horses when appropriate management levels established for wild horse herds are exceeded (Coates et al., 2021). Therefore, management of wild horses and burros at appropriate management levels is a key component for GRSG planning.

At the RMP-level, the BLM identifies wild horse or burro Herd Areas, Herd Management Areas, and Herd Areas not designated as Herd Management Areas. This planning effort considers not designating wild horse and burro Herd Management Areas in areas that overlap PHMA under Alternative 3. Under alternatives 4, 5, and 6, changes focus on the few actions described below, but the rest of existing wild horse and burro actions would be unchanged. See **Appendix 2** for a description of which actions would be unchanged under Alternatives 4, 5 and 6 by state. Defining the appropriate management level (AML) and managing wild horse and burro populations in designated Herd Management Areas to the AML are implementation-level actions rather than RMP-level decisions. Such actions are dependent on local conditions and available resources to manage the populations using the available tools.

Table 21-12, Comparison of Alternatives, Wild Horse and Burro Management, presents management by alternative for this management issue.

Table 21-12. Comparison of Alternatives, Wild Horse and Burro Management

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
All states (where wild horses and burros overlap with GRSG): • Manage wild horse and burro populations within established appropriate management levels (AML). • Incorporate GRSG habitat objectives into wild horse and burro management (e.g., herd management area plans, AML) monitoring, and gather prioritization, with prioritization of such activities in SFAs, then PHMA, then GHMA. • CO, ID, NV/CA, OR, UT: Prioritize gathers in GRSG SFAs and PHMA unless removals are necessary in other areas to address higher priority issues, including herd health impacts.	Same as Alternative 1, except removal of references to SFAs for the states that removed them, and removal of the reference to GHMA in UT, which removed that HMA type under this alternative.	No new wild horse and burro herd management areas would be designated in areas that overlap PHMA. Where there are currently herd management areas, wild horses and burros would be removed. Because there would be no wild horse and burros herd management areas in PHMA, the wild horse and burro objectives and associated management actions associated with GRSG would be removed. These areas will be monitored and any wild horses or burros that re-establish in PHMA will be removed.	Same as Alternative 2, except references to GHMA in Utah would be retained and applied to GHMA as defined under this alternative.	Same as Alternative 4.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
ID, NV/CA, OR, UT, WY: Manage wild horse and burros herd management areas in GRSG habitat within established appropriate management level (AML) ranges to achieve and maintain GRSG habitat objectives. CO: Manage wild horse population levels within established AML.	Same as Alternative 1.	No wild horse and burro herd management areas would be designated in the Herd Areas that overlap PHMA, or portions of the Herd Areas, if the remaining areas outside PHMA could still support herd management areas. In those areas where there are currently herd management areas, wild horses and burros would be removed. Because there would be no wild horse and burros herd management areas in PHMA, the wild horse and burro objectives and associated management actions associated with GRSG would be removed. These areas will be monitored and any wild horses or burros that re-establish in PHMA will be removed	All States: • Manage wild horse and burros herd management areas in GRSG habitat (or portions of the herd management area overlapping or within GRSG habitat) within the low-end of the established AML ranges to achieve and maintain GRSG habitat objectives and achieve or make significant progress towards achieving LHS, considering the full suite of approaches to maintain AML, including temporary fertility control and non-reproducing, or partially non-reproducing herds.	All States: • Manage wild horse and burros herd management areas in GRSG habitat (or portions of the herd management area overlapping or within GRSG habitat) within the established AML ranges to achieve and maintain GRSG habitat objectives and achieve or make significant progress towards achieving LHS, considering the full suite of approaches to maintain AML, including temporary fertility control and non-reproducing, or partially non-reproducing herds.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
ID, NV/CA, OR, UT: In SFA (where applicable) and PHMA outside of SFA, assess and adjust AMLs through the NEPA process within HMAs when wild horses or burros are identified as a significant causal factor in not meeting land health standards, even if current AML is not being exceeded. CO: AML would be prioritized for all BLM HMAs within PHMA based on indicators that address vegetation structure/condition/composition and measurements specific to achieving GRSG habitat objectives. GRSG habitat requirements would be considered, and preference given to GRSG habitat unless site-specific circumstances warrant an exemption. WY: PHMA (core only) management objectives will be considered when evaluating AML.	Same as Alternative 1, except removal of references to SFAs for the states that removed them.	No wild horse and burro herd management areas would be designated in the Herd Areas that overlap PHMA, or portions of the Herd Areas, if the remaining areas outside PHMA could still support herd management areas. In those areas where there are currently herd management areas, wild horses and burros would be removed. Because there would be no wild horse and burros herd management areas in PHMA, the wild horse and burro objectives and associated management actions associated with GRSG would be removed. These areas will be monitored and any wild horses or burros that re-establish in PHMA will be removed	All States: • If GRSG site scale habitat objectives are not being met in PHMA and GHMA (and IHMA in Idaho), evaluate AMLs and adjust if necessary through the NEPA process where wild horse or burro use is identified as significant causal factor to not meeting LHS, or is a factor in the area not meeting the GRSG habitat objectives.	Same as Alternative 4.

21.1.12 Areas of Critical Environmental Concern

Areas of Critical Environmental Concern (ACECs) are designated where special management attention is needed to protect important historical, cultural, and scenic values, or fish and wildlife or other natural resources. To be analyzed in the EIS, potential ACECs must be evaluated and determined to meet two evaluation criteria – relevance and importance. The presence of GRSG meets the relevance criteria across the entire range. Importance evaluations considers substantial significance to include special worth, consequence, distinctiveness, or cause for concern. For the importance criteria to be met values must be more than locally significant.

An evaluation of importance for all GRSG habitats was conducted to determine if any habitat within the range of GRSG met the importance criteria. Evaluation criteria included population density (e.g., Doherty et al., 2016), lek and habitat persistence (e.g., Wann et al., 2022, Palmquist et al., 2021, Rigge et al. 2021), genetic uniqueness and connectivity (e.g., Cross et al, 2018, Row et al. 2018, Cross et al. 2023, Oyler-McCance et al., 2022), amount of existing habitat disturbance and habitat quality (e.g., Doherty et al., 2022). Areas identified with the above criteria are analyzed in this EIS to determine if they meet the third FLPMA required: the need for special management to protect and prevent irreparable damage.

The BLM also received multiple nominations for ACEC designations. Each of these nominations were reviewed using the criteria presented by the nominator(s) and the criteria listed above. Nominated areas that met the importance criteria based on the rangewide review listed above and subsequent local evaluations were moved forward for further consideration. Additional details associated with the ACEC evaluation process is available in **Appendix 5**. These evaluations will be updated and finalized following the public comment period.

ACEC designations are only presented for Alternatives 3 and 6. Management allocations within potential ACECs is targeted at maintaining the importance value for which they would be designated, which varied across the range of GRSG.

Table 21-13, Comparison of Alternatives, ACEC Management, presents management by alternative for this management issue.

Table 21-13. Comparison of Alternatives, ACEC Management

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
No new ACECs specific to management of GRSG were designated as part of the 2015 planning effort.	No new ACECs specific to management of GRSG were designated as part of the 2019 planning effort.	ACECs specific to the management of GRSG would be designated (Refer to **Map 2.3** and **state-specific ACEC** maps in **Appendix 5. Also** refer to **Appendix 5** for additional ACEC information and analysis). **Colorado:** Case Flats – 4,547 acres **Idaho:** Owyhee – 653,199 acres Shoshone Basin – 244, 935 acres Camas-Laidlaw – 457,724 acres Big Desert – 333,528 acres **Montana**: South Valley Phillips – 615,888 acres Carter Crook – 110,162 acres **Nevada/California**: Warm Springs – 89,539 acres North Fork O'Neil – 937,512 acres Grass-Kobeh Valley – 852,979 acres South Fork Dixie Flats – 122,395 acres Idaho Border – 49,019 acres Hays Canyon – 340,850 acres Vya-Massacre – 239,677 acres Montana Mountain – 314,370 acres Butte Long Valley – 606,293 acres Eureka North and South – 66,905 acres Monitor Valley – 173,507 acres Reese River – 85,000 acres Utah Border – 58,650 acres Buffalo Skedaddle – 182,213 acres Owyhee East - 487,122 acres Owyhee West - 704,650 acres **Oregon**: None identified. **Utah**: Rich – 132,924 acres Box Elder – 232,258	No new ACECs specific to management of GRSG would be designated.	Same as Alternative 4.	ACECs specific to the management of GRSG would be designated (Refer to **Map 2.3** and **state-specific ACEC** maps in **Appendix 5. Also** refer to **Appendix 5** for additional ACEC information and analysis). **Colorado:** Case Flats – 4,547 acres **Idaho:** Owyhee – 653,199 acres Shoshone Basin – 244, 935 acres Camas-Laidlaw – 457,724 acres Big Desert – 333,528 acres **Montana**: South Valley Phillips – 615,888 acres Carter Crook – 110,162 acres **Nevada/California**: Warm Springs – 89,539 acres North Fork O'Neil – 937,512 acres Grass-Kobeh Valley – 852,979 acres South Fork Dixie Flats – 122,395 acres Idaho Border – 49,019 acres Hays Canyon – 340,850 acres Vya-Massacre – 239,677 acres Montana Mountain – 314,370 acres Butte Long Valley – 606,293 acres Eureka North and South – 66,905 acres Monitor Valley – 173,507 acres Reese River – 85,000 acres Utah Border – 58,650 acres Buffalo Skedaddle – 182,213 acres Owyhee East - 487,122 acres Owyhee West - 704,650 acres **Oregon**: None identified. **Utah**: Rich – 132,924 acres Box Elder – 232,258

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
(See above.)	*(See above.)*	**Wyoming**: Golden Triangle/Little Sandy – 272,557 acres Carter-Crook (border w/MT) – 19,400 acres Sagebrush Focal Areas in South Central and Southwestern Wyoming – 33,166 acres Greater South Pass and Upper Green River Basin – 311,229 acres Under Alternative 3, the ACECs would have the same allocations as the rest of PHMA: • Locatable minerals –The BLM recommends all PHMA for withdrawal from location and entry under the Mining Law of 1872. The portion of the PHMA that is within the SFA boundaries from 2015 is already being analyzed for withdrawal in a separate NEPA document. Lands recommended for withdrawal would remain open for mineral location and entry under the Mining Law of 1872 unless and until the Secretary of the Interior withdraws them. In addition, In designated ACECs operators must submit a plan of operations and obtain BLM approval before beginning any operations causing surface disturbance greater than casual use (as defined in 43 CFR Part 3809.5). (see 43 CFR Part 3809.11(c)(3)). • Fluid minerals (including geothermal) – Closed to leasing • Non-Energy minerals – Closed to leasing • Saleable Minerals/Mineral Materials – Closed to saleable mineral sale/development, including sand and gravel and other common variety minerals. • Major ROWs – Exclusion area for major ROWs.	*(See above.)*	*(See above.)*	**Wyoming**: Golden Triangle/Little Sandy – 272,557 acres Carter-Crook (border w/MT) – 19,400 acres Sagebrush Focal Areas in South Central and Southwestern Wyoming – 33,166 acres Greater South Pass and Upper Green River Basin – 311,229 acres In addition to the management of the GRSG habitat management areas described in Alternative 5, apply the following management in the potential ACECs: • Locatable minerals –Available for mineral location. Based on federal regulations (43 CFR 3809.11(c)(3)), within In designated ACECs operators must submit a plan of operations and obtain BLM approval before beginning any operations causing surface disturbance greater than casual use (as defined in 43 CFR Part 3809.5). (see 43 CFR Part 3809.11(c)(3)). • Fluid minerals (including geothermal) – Open to leasing subject to major constraints (no surface occupancy stipulation). An exception could be considered to allow surface occupancy only if the criteria described under the NSO Exception #1 are met, but applicable to the entire ACEC area, not just in areas near to the lek(s) (see WEMs language). • Non-Energy minerals – Closed to new leases and expansion associated with existing operations (e.g., fringe leases).

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6
(See above.)	*(See above.)*	• Wind – Exclusion • Solar – Exclusion All management not included above would be same as described for PHMA.	*(See above.)*	*(See above.)*	• Saleable Minerals/Mineral Materials – Closed to new operations for all sale types except for free-use pits in order to support maintenance needs for existing local roads to ensure public safety. Even in these instances, new pits should avoid the ACEC; if avoidance is not possible, they would need to apply the minimization measures identified for PHMA (e.g., disturbance cap, noise reduction, seasonal limitations, etc.). • Major ROWs – Exclusion to major ROWs (≥100 kV transmission lines and ≥24" pipelines). Minor ROWs would be avoidance. Designated RMP ROW corridors in the ACECs would be open for new ROWs, but new ROWs within the corridor would require compensatory mitigation to offset direct and indirect impacts of the development. • Wind – Exclusion • Solar – Exclusion • No exceptions to the disturbance cap otherwise available in PHMA. All management not included above would be same as described for PHMA.

21.1.13 Adaptive Management

Implementing adaptive management can address unanticipated negative impacts to GRSG and its habitat before consequences become severe or irreversible. Adaptive management was identified by the U.S. Fish and Wildlife Service (FWS) as a key component of BLM land use plans "…to help ensure that implementation of allocative decisions and limitations on disturbance are effective at conserving sage-grouse and their habitats, and mitigation provisions where disturbance cannot be avoided. Like monitoring, adaptive management is a key element of complex long-term conservation strategies, particularly where there is uncertainty" (FWS, 2015).

Establishing thresholds for adaptive management is essential to identify when potential management changes are needed to continue meeting GRSG conservation objectives. "Soft" thresholds are indicators that management or specific activities may not be achieving the intended results of conservation actions or that unanticipated changes have occurred that have the potential to place habitats or populations at risk. "Hard" thresholds are indicators that management for species conservation is likely not achieving desired conservation results. Adaptive management thresholds are not specific to any one project, but rather identify anomalies in habitat and/or population status. For this planning effort adaptive management responses are directed to addressing habitat concerns on BLM lands and are limited to PHMA (and IHMA in Idaho) even though data are collected across the entire species' range. Local responses to thresholds reached in GHMA can be considered if deemed necessary by the BLM and the appropriate state agency.

Sagebrush habitat fragmentation, loss and disturbance have been identified as the primary influences on GRSG population trends (Knick and Hanser, 2011). GRSG population trends can provide valuable information about habitat conditions on BLM lands. Both the BLM and the States have a responsibility to use the best available information for assessing whether a habitat and/or population threshold (as described below) has been met, and to work together to address causes.

To accurately assess any anomalies or thresholds being met, and any necessary responses, monitoring of habitat and population trend should be conducted at the same scale. The BLM will use neighborhood clusters identified by USGS (Coates et al., 2021) to track habitat conditions, the same spatial scale used by USGS for population trend analyses. A neighborhood cluster generally represents a GRSG population unit and includes local aggregations of leks and seasonal habitats used by birds attending those leks based on state wildlife agency and research data. Habitat trends can also be monitored at smaller scales (e.g., lek level) as identified by state wildlife agency plans for GRSG, or at larger scales if local GRSG populations are known to consistently range outside of neighborhood clusters. (Note: Monitoring habitat for adaptive management purposes does not preclude the need to track habitat losses for conformance with the anthropogenic disturbance caps).

To assess sagebrush habitat availability, the BLM will use geospatial data, updated at a minimum biennially (e.g., RCMAP, LandFire, and multiple geospatial data sources for habitat degradation; see 2023 Monitoring Framework, **Appendix 7**). Additional data collected through the Habitat Assessment Framework (HAF) – a multi-scale assessment tool that provides data to evaluate sagebrush habitats for GRSG suitability (Stiver et al., 2015 and subsequent updates) may also be considered where available. HAF data can inform pre-existing habitat conditions and threshold analyses. Habitat baselines will be determined using geospatial data layers updated in the year prior to threshold assessment.

State wildlife agencies have primacy over GRSG populations and collect data essential for estimating population trends. Population data collected by States are important to the BLM for effective management of the species habitat. Population monitoring methods in previous adaptive management strategies varied

by state, and the metrics to measure trends varied widely. In most instances methods used were inadequate to establish when an anomaly in population trends could be linked to habitat management actions. Further, results were not comparable across political boundaries, creating challenges in determining effective habitat management responses and applying differential management to projects crossing state boundaries. Finally, none of the previous methods identified where habitat concerns, and not climatic conditions were contributing to trends.

The BLM's use of a population threshold as a proxy for habitat condition does not supersede the responsibility of the state for monitoring populations and identifying population areas of concern. The BLM must consider all available information regarding population threshold status. This includes state wildlife agency population trend analyses and annual population trend results published using the Hierarchical Population Monitoring Framework (currently the Targeted Annual Warning System procedures [TAWS]; Coates et al., 2021) or subsequent updates or revisions which provides a consistent and objective range-wide tool incorporating state lek count data and is able to identify if habitat conditions, not climatic conditions, are likely influencing populations. This model was developed with the cooperation of state wildlife agencies to provide an objective and consistent tool to alert land managers to potential habitat issues affecting population trends anywhere within the range of the species. The BLM will additionally use results from population trend analyses provided by state wildlife agencies in determining if habitat concerns may be affecting populations. If a soft or hard population trend threshold is identified by either source, the BLM will coordinate with the state wildlife agency to verify the trend as the first step in an initial causal factor analysis (see below).

Table 21-14, Comparison of Alternatives, Adaptive Management, presents management by alternative for this management issue.

Table 21-14. Comparison of Alternatives, Adaptive Management

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Every state has an adaptive management process. All the states include language to the effect of the following: • While there should be no expectation of hitting a hard trigger, if unforeseen circumstances were to occur that trip either a habitat or population hard trigger, more restrictive management would be required. • Hard triggers represent a threshold indicating that immediate action is necessary to stop a severe deviation from GRSG conservation objectives set forth in the BLM plans. • The BLM will also undertake any appropriate plan amendments or revision if necessary. While the adaptive management concept and the potential for changes in management are consistent across the GRSG range, there is no consistency in the specific triggers between states or the strategies associated with responding to those triggers. The metrics, thresholds, and timeframes and spatial scales vary state by state, as does the level of detail that explains each of these. Similarly, the responses associated with adaptive management triggers varies by state, with some prescribing specific actions and others identifying teams to develop a response.	Same as Alternative 1, though some states applied strategies to improve the process based on lessons learned during implementation between 2015 and 2019. This included the addition of "un-triggers" in some states, to allow management to return to what was in the RMP amendments if conditions improved, requiring timeframes for determining the cause of the trigger being met, or clarifying what management changes would apply. The differences between the states persisted, creating challenges for comparing range-wide trends by using adaptive management triggers, as well as identifying and addressing concerns in populations that cross state lines.	Habitat Adaptive Management Thresholds: • A soft habitat threshold is met when any single occurrence or combination of occurrences in PHMA/IHMA in a neighborhood cluster result in the loss of more than 5% of the area capable of supporting sagebrush in a given year (including wildfire). Where a neighbor cluster overlaps with more than one habitat designation (e.g., PHMA and GHMA) the percent habitat loss will be calculated on the PHMA/IHMA only. Baselines for calculating sagebrush loss will be determined by the sagebrush base layer delineated using LandFire data (detailed in **Appendix 7**) and from the most recent year prior to publication of the RODs. • A hard habitat threshold will be met when existing sagebrush extent, as described in the first bullet, within a neighborhood cluster drops below 65% of the area capable of supporting sagebrush (Aldridge et al., 2008; Connelly et al., 2000). • A hard habitat threshold will also be met if a soft habitat threshold is met in 4 consecutive years (≥5% decline in each of 4 consecutive years). A hard or soft habitat threshold can be reversed if restoration of sagebrush vegetation communities within the neighborhood cluster returns to the sagebrush conditions and/or habitat function prior to the events that resulted in meeting a habitat threshold. If the neighborhood cluster cannot be restored to original sagebrush conditions and/or habitat function due to ecological or disturbance limitations (e.g., intense fire killed soil microfauna, dense anthropogenic activities) restoration and/or habitat enhancement in adjacent neighborhood clusters can be considered to increase the number of GRSG supported in those areas. This will be done in coordination with appropriate state agencies. If enhancing habitats in adjacent areas does not reverse the threshold, and further assessment may be necessary to determine if the area in which the habitat threshold was met should still be considered GRSG habitat.		

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Population triggers vary by state. See **Appendix 2**, Existing GRSG Management, for specifics.	Population triggers vary by state. See **Appendix 2**, Existing GRSG Management, for specifics.	Population Trend Adaptive Management Thresholds: State wildlife agencies can alert the BLM when population thresholds (soft or hard) are met to initiate a causal factor analysis. The BLM will also review the annual results of TAWS in determining if population trends indicate potential habitat concerns. All population thresholds identified by TAWS will be confirmed with the state wildlife agency within 60 days (preferably less) of being identified at the neighborhood cluster scale by the model. If the state wildlife agency determines the TAWS model was in error, the data supporting reversal of the threshold will be documented. If there is disagreement in the analyses, BLM and the state will work together to identify the source of the error (in either agency's analysis). Interpretation of TAWS model results will be as follows: • A soft population trend threshold is equivalent to a TAWS watch (a 2 consecutive year, negative rate of population change at the neighborhood cluster that shows a population decline that is either different or more rapid than that of the associated climate cluster; Coates et al., 2021). • A hard population trend threshold is equivalent to a TAWS warning (a 2 out of 3 (fast) or 3 out of 4 (slow) consecutive year negative rate of population change at the neighborhood cluster that is either different or more rapid than those of the associated climate cluster; Coates et al., 2021). A hard or soft population trend threshold can be reversed if the following criteria are met: • Population trends at the neighborhood cluster trend realigns with the climate cluster trend as indicated by the TAWS model (i.e., no longer a TAWS "watch" or "warning"); OR • There are sufficient numbers of GRSG (abundance) to allow for recovery of population numbers to those present at or before the threshold was met, based on local growth rates determined by the state wildlife management agency, and BLM has the concurrence of the state wildlife management agency; OR • The state wildlife management agency can demonstrate the TAWS model incorrectly identified a watch or warning. If a habitat or population threshold is met the BLM, along with state wildlife management personnel and other stakeholders with		Same as Alternatives 3 and 4 except new authorizations can be considered during the rapid assessment period. Project level NEPA will specifically evaluate if any new permitted activity could contribute to any cause identified during the rapid assessment.

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	knowledge of local conditions will initiate an assessment as soon as alerted to a threshold being hit to determine the causal factor(s). Causal Factor Analysis (CFA) teams will include at a minimum the local BLM biologist, BLM state sage-grouse lead, and a representative from the state wildlife agency. Additional subject matter experts and other affected parties can be added as necessary for individual site-specific analyses. Causal factor analyses will occur within the time periods described below and will be used to inform the adaptive management response, if needed. The analysis shall be detailed in a written report that includes descriptions of existing land uses, landownership patterns, history of population and habitat trends in the area, condition of the habitat, cause(s) of habitat and/or population decline, recommendations of management actions to address the potential causes of decline, and the data and expertise used to reach conclusions presented in the report. The report will be submitted to the local BLM manager, the BLM state sage-grouse lead in the state(s) the threshold was met, and the BLM national sage-grouse coordinator as well as all members on the CFA team as soon as the analyses are complete. An annual review of habitat and population information between the BLM and associated state wildlife agency is encouraged even if no thresholds are identified.		*(See above.)*
Habitat and population adaptive trigger responses vary by state. See **Appendix 2**, Existing GRSG Management, for specifics.	Habitat and population adaptive trigger responses vary by state. See **Appendix 2**, Existing GRSG Management, for specifics.	Adaptive Management Responses: When any adaptive management threshold is met, (and population thresholds confirmed with the state wildlife agency) a rapid assessment to identify "obvious" causes will be completed within 60 days (or less). Obvious causes are those easily identified such as a large wildfire. If the rapid assessment identifies the cause, a formal CFA will not be needed. No new permitted activities will be authorized until the rapid assessment is completed and documented. Existing permitted activities can continue unless those activities are causing mortality to GRSG or direct loss or degradation of occupied GRSG habitat. If an obvious causal factor cannot be identified in the rapid assessment, a l CFA to identify potential causes of the adaptive management threshold being met will be completed within 6 months of the rapid assessment. If a soft threshold is met, new permitted activities can be considered during the completion of the CFA as long as those activities do not result in mortality of GRSG or GRSG habitat loss and degradation. However, if a soft threshold is met and the CFA is not completed within the above time frame, no new permitted activities will be authorized until a CFA is completed, as legally allowed. New		—

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	authorizations, or reauthorization of existing permits can then be considered if similar activities were not contributing to factors resulting in meeting either a population or habitat threshold. Project level NEPA will specifically evaluate if the new permitted activity could result in the threshold being sustained or met again. If a hard threshold is met no new proposed permitted activities will be authorized until a CFA is completed. Project level NEPA will then specifically evaluate if the new permitted activity could result in additional or cumulative impacts to GRSG. The CFA team can alter the level of the threshold met (soft to hard, or hard to soft) based on their review and if supported by local data. For example, habitat loss of 5 percent results in a soft threshold, but if the loss is of limited crucial habitat (e.g., the only winter or mesic habitat in the neighborhood cluster) the CFA team can request hard threshold management responses be implemented. Similarly, a local assessment of habitat loss meeting a hard threshold may be reversed if the loss is of marginal areas, or areas documented as not supporting GRSG. These threshold reversals must be supported by data and fully detailed in a written report. Final determination of the reversal will be made by the authorizing officer, in consultation with the local CFA team. The CFA team can expand the analysis and management response to adjacent neighborhood clusters based on their review. For example, migratory populations that utilize multiple neighborhood clusters may require increased protection during other seasonal habitats and use areas to reverse population declines. If the CFA identifies the cause for habitat or population declines BLM will modify any permitted activity identified as a causal factor to meeting a threshold, as legally allowable, on BLM lands in coordination with the permit holder. Monitoring of the affected habitat or population (or both if appropriate) will be necessary to assess the efficacy of the modification. For new authorizations project level NEPA will specifically evaluate if the proposed new activity could result in contributing to sustaining the threshold or result in the threshold being met again. New authorizations may be limited to restrictions identified in Alts. 3 or 4 for the specific resource, as determined necessary by local information.		*(See above.)*

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6

(See above.)	*(See above.)*	Exceptions to limitations imposed for exceeding thresholds include:
		• Renewal of existing activities that require a permit if:
		  ○ The activity is scheduled within 60 days of when a threshold is met and identified, and
		  ○ The project proponent can show significant negative economic impacts (i.e., documented loss of income equivalent to the income potential of the event), and The renewal can only be considered if it does not result in known impacts to habitats or populations.
		• Activities essential for human health and safety in a current or likely catastrophic event (e.g., repair of dams, emergency vehicle access).
		• ES&R activities essential to restoration after a wildfire.
		• Grazing permits that will expire within the same year the threshold is identified. A permit or lease to extend the current grazing practice for less than 10 years may be renewed until the causal factor analysis is completed. If grazing is not determined as a causal factor to an adaptive management threshold, grazing permit or lease renewal can proceed normally. If grazing is a contributing cause to an adaptive management threshold, the terms and conditions of the grazing permit or lease will need to be examined and based on the outcome, would need to appropriately be modified to reduce or eliminate the impact.
		• Continuing the terms and conditions for livestock grazing when a permit or lease has expired or was terminated due to a grazing preference transfer in accordance with Section 402(c)(2) of the FLPMA as amended by Public Law No. 113-291.
		
		BLM will work with proponents identified in the above exceptions to reduce potential impacts on GRSG habitats.
		
		If the neighborhood cluster in which a population trend threshold is met is 50% or greater GHMA, lek level threshold TAWS analyses should be conducted to determine which leks are contributing to the trend deviation. If meeting the threshold is the result of lek attendance declines entirely within GHMA new permits can be considered prior to completing a CFA if that activity is not in conflict with any GHMA designation identified by the state wildlife agency (restoration, connectivity, seasonal, or other), and if that
				(See above.)

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	activity will not negatively impact habitats or populations in the adjacent PHMA. If a reduction in the ability for the habitat to support GRSG occurs as a result of habitat impacts, additional restrictions may be necessary to preclude further habitat losses. Local responses to thresholds in GHMA can be considered if deemed necessary by the BLM and the appropriate state agency. A similar analysis will be conducted if a neighborhood cluster covers mixed landownerships. The lek level cluster will determine the landownership that is contributing to the threshold. If the threshold is the result of habitat conditions on non-BLM administered lands, new authorizations can be considered if the activity will not negatively impact habitats or populations in the adjacent lands or contribute to indirect or cumulative impacts. The restrictions from meeting soft or hard habitat or population trend thresholds will be removed once the criteria for reversing the threshold, described above are met.		*(See above.)*
Habitat triggers vary by state. See **Appendix 2**, Existing GRSG Management, for specifics.	Habitat triggers vary by state. See **Appendix 2**, Existing GRSG Management, for specifics.	Habitat Threshold due to Wildfire: An assessment of impact on affected GRSG habitat will be conducted within 60 days (or less) by BLM staff and appropriate state agency personnel of the event to determine the actual extent of habitat loss (which can include an assessment of burn severity – did the wildfire burn hot enough to kill the sagebrush) within the wildfire perimeter. This will be done in addition to any BLM ESR review. No new discretionary authorizations that would result in additional habitat loss within PHMA or IHMA in affected neighborhood clusters will be authorized until the assessment of habitat impacted is completed (this can include the initial 60-day rapid assessment if the results indicate the threshold can be reversed). If the assessment indicates wildfire severity is such that habitat services (the ability of the area to provide food, cover, water, and connectivity at the time just prior to the wildfire) for GRSG within the wildfire perimeter remain and the area can support the same abundance of GRSG that was present prior to the wildfire the threshold will be considered reversed. If habitat assessment determines the PHMA (and IHMA) influenced by the wildfire can no longer support GRSG populations at levels prior to the wildfire, new infrastructure projects or permits may be deferred if consistent with applicable law (such as the Mining Law of 1872), and valid existing rights until an assessment demonstrates the habitat can support GRSG at the levels that existed prior to the wildfire event have been restored. Authorizations may be considered if the proposed project will have no direct or indirect impact to GRSG or their habitats. The associated determination must be documented in a report to the BLM state sage-grouse lead, the BLM state director and the National BLM GRSG coordinator. If the wildfire event precludes restoration to GRSG habitat permanently, further assessment may be necessary to determine if the area in should still be considered GRSG habitat.		

Summary of Alternative 1	Summary of Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
No similar action.	No similar action.	Inconclusive CFAs: If no cause for a habitat or population decline can be determined the BLM may consider implementing additional restrictions on existing or new authorizations in the area, consistent with permits/surface use rights in coordination with the permit holder and the state wildlife management agency. This is to reduce disturbance until either a causal factor can be determined through additional monitoring and analyses, or the population declines cease. The state wildlife agency can provide data that supports limiting these potential restrictions made solely on population threshold data (vs. habitat data) if they can demonstrate the population analyses are incorrect. New authorizations must disclose a threshold has been met and consider the proposed activity's potential cumulative impact to either the habitat or population trend (dependent on which threshold has been met). Any restrictions will be determined by the authorizing officer, with the documented biological rationale from BLM field biologists. Any disagreement between BLM staff will be elevated to the BLM State Director for resolution. New permits in an area where the CFA is inconclusive cannot be authorized until the full CFA analyses is completed and reports submitted.		

21.2 STATE-SPECIFIC CIRCUMSTANCES

Though this EIS is range-wide in its scope, there are also state-specific circumstances that will be considered. Such state specific circumstances may warrant consideration at the state level rather than at a range wide level. This could include the following:

- Differences in management tools or approaches specific to a given state – such as Research Natural Areas present in Oregon, Important Habitat Management Areas in Idaho, or Restoration Habitat Management Areas in Montana. These tools are limited to those given states, and adjustments to their management, if considered, would only be applicable in those states.
- Ecological and topographic differences such as the differences between the sweeping prairies of eastern Montana and Wyoming compared to the basin and range of the Great Basin, or the high mountain valleys in Idaho and Utah, or the areas with substantial differences in elevation and vegetation associated with the plateaus associated with the Colorado Plateau in Utah and Colorado.
- Different management situations in different states such as the presence of state-run management tools such as mitigation banks, regulatory state plans, etc.

Issues or management differences between states are not based on preference, but rather on specific circumstances that fall into the above categories. And are focused on issues, topics, and actions that would help meet the purpose and need of improving GRSG conservation. Through the alternative development process all states identified at least one state-specific circumstance. However consideration of non-habitat in the habitat management areas during implementation identified by one state became a cross-cutting topic after discussion with agency staff and cooperating agencies. The following sections present the alternatives associated with state-specific circumstances.

21.2.1 Colorado

Most state-specific circumstances in Colorado are a result of different planning approaches in the 2015 and 2019 NWCO GRSG ARMPAs (plans). The BLM will also clarify management decisions that have been unclear since implementation of the 2015 plan.

Colorado has variable topography leading to naturally fragmented habitats, affecting ecology and plant communities, and therefore differences between GRSG population areas. Significant elevational changes may fall within standard lek buffer distances in some Colorado GRSG populations (e.g., Parachute Piceance Roan (PPR) population). Colorado typically does not see large wildfires in sagebrush ecosystems or conversion to agriculture to the same degree as other states.

Prior to the current planning process, the BLM and the State of Colorado adopted refined habitat management area maps. The multi-year (2016-2019), collaborative mapping process refined previously mapped areas to remove non-habitat in habitat management areas or expand areas with documented GRSG use. The re-mapping effort incorporated state-specific, timely research and mapping tools. See **Appendix 3** for a summary of the Colorado habitat management area mapping strategy. The state specific circumstances for the State of Colorado being addressed in this effort include the following: 1) management scale, 2) application and use of lek buffers, 3) consistency across resource uses, and 4) integration of lessons learned during implementation.

Management Scale

Colorado manages populations and sub-populations by Management Zone (MZ) which are biologically driven units delineated by GRSG use, topographic and other natural features, differences in ecological potential, and differences in issues affecting GRSG (Colorado Greater Sage-grouse Steering Committee 2008). The BLM uses the CO MZs to calculate project-scale disturbance and density caps rather than the density and disturbance methodology used by many other states. The MZs are geographically consistent with the areas used by Colorado Parks and Wildlife (CPW) but have different numbering (e.g.- BLM MZ 2 is the same area as CPW MZ 1). For ease of communication, the BLM intends to adjust the MZ numbering during this planning effort to be more consistent with the CPW naming convention.

Lek Buffers

Clarification of Lek Activity Periods

The BLM will clarify the activity period for the leks being included in management allocations and decisions. Both the 2015 and 2019 plans included allocations and management decisions based on the distance from "active" leks using CPW's definition, which is an area used by two or more displaying males in two of the last five years in larger populations and one or more males in any of the last five years in small populations (Colorado Greater Sage-grouse Steering Committee 2008). There are inconsistencies between the CPW definition and the WAFWA definition, which describes an active lek as a lek that has 2 or more males counted during two or more years within the last 10 years (Cook et al. 2022, Connelly et al. 2000). Because GRSG populations generally follow 9- to 10-year population cycles (Rich 1985, Fedy and Aldridge 2011, Fedy and Doherty 2011), the BLM will use a lek definition that better captures the fluctuation of population dynamics. The BLM will analyze use of the "occupied" lek definition from the 2015 and 2019 plans, which is defined as a lek that has been active during at least one strutting season within the past 10 years. CPW concurs with the approach.

The clarification of lek activity periods results in an increase to the amount of BLM-managed lands within the corresponding buffer distances. According to the Colorado 2022 lek count data from CPW, 276 leks are classified as active using the 5-year activity timeframe. The total number of leks with activity in the last 10 years increases to 445 leks. Using the 2015 and 2019 plan definitions, approximately 571,375 acres of BLM-managed lands were within 1-mile of an active lek (CPW, 5-year timeframe). With the clarification, approximately 811,215 acres are within 1-mile of an occupied lek, representing a 42% increase in BLM-managed lands that are subject to more intensive management decisions for the protection of leks, nesting, and early brood-rearing habitat.

Distance of Buffer

In the 2015 plan, fluid mineral leasing was closed within 1-mile of an active lek compared to a 0.6 mile. In coordination with CPW, the BLM increased the previous stipulation area (i.e.- 0.6-mile buffer NSO) to a 1-mile closure to provide protection for leks and nesting and early brood rearing habitat in the closest proximity to leks. The 2019 plan amended the decision from a 1-mile closure to a 1-mile NSO with a different set of waiver, exception, and modification (WEM) criteria than the rest of PHMA (also NSO) but maintained the 1-mile closure around an active lek. The 1-mile standard was subsequently incorporated into the State of Colorado oil & gas regulations (CO Code § 34-60-101, 2022). The BLM will analyze the 1-mile lek buffer distance as the minimum threshold in Colorado under Alternatives 1 and 2 (No Action alternatives), and 5.

Allocations/Management Decisions within 1-mile Buffer

The 2019 plan amended the decision from a 1-mile closure to a 1-mile NSO with a different set of WEM criteria than the rest of PHMA (also NSO). To reconcile the difference between the 2015 and 2019 plans, the BLM will analyze PHMA as being open to fluid mineral leasing subject to NSO. WEMs will include additional criteria within 1-mile of occupied leks rather than being limited to active (CPW) leks. This clarification would allow for PHMA to remain NSO with the distinction of more intensive management within 1-mile of a lek requiring the use of one NSO stipulation.

Allocations for GHMA

In the 2015 and 2019 plans, Colorado included a NSO stipulation within 2-miles of active leks in GHMA. Because of the lek status clarification above, the BLM will analyze the change between an NSO around active leks versus occupied leks in Alternative 4. The BLM will also analyze using a Controlled Surface Use (CSU) stipulation within 2-miles of occupied leks in Alternative 5 and a CSU within 1-mile of PHMA in Alternative 6 instead of the NSO to assess the impacts of different stipulation types.

CSU stipulations are applied at the leasing phase and allow the BLM to carefully consider site-specific factors during implementation that provide the appropriate level of protection and restrictions. Common CSU measures include relocating operations by more than 200 meters (656 ft) or deferring the action for more than 60 days to avoid or minimize impacts.

Alternative 4 would increase the acreage of GHMA with NSO stipulations compared to Alternatives 1 and 2. Under Alternative 5, the same amount of acreage under major stipulation (NSO) in Alternative 4 would be under moderate stipulation (CSU). Alternative 5 would allow for more flexibility in development while maintaining the BLM's ability to apply site-specific criteria for GRSG habitat protection. Alternative 6 also analyzes CSU stipulations but would be applied in GHMA within 1 mile of PHMA. This would allow for increased flexibility while allowing the BLM to consider the indirect effects that development in GHMA may have on all PHMA, not just where leks occur.

Consistency Across Resources

The BLM will analyze use of more consistent criteria for management actions such as fluid mineral permitting and ROW authorizations. Many fluid mineral permits include both an Application for Permit to Drill (APD) and a ROW (e.g.- an access road to a well pad begins off-lease and crosses on-lease). Under the 2015 and 2019 plans, the authorization would be subject to two varying sets of siting criteria. By using consistent criteria, the BLM intends to ease plan conformance and coordination across resource uses.

Lessons Learned

The BLM is including clarifications to several management decisions because of lessons learned during implementation of the previous GRSG plans. The BLM will clarify management decisions in the Fluid Mineral and Land and Realty sections. Lessons learned primarily involve administrative clarifications and remedies and are not likely to impact GRSG habitat, other resources, or resource uses.

Table 21-15. Colorado State-Specific Circumstances – Fluid Minerals (MR)

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Unleased Fluid Minerals				
MD MR-1: No new leasing 1 mile from active leks in ADH.	**MD MR-1:** One mile from active leks: Open to leasing subject to **NSO-1.** See Appendix B (Existing Management) for WEM criteria.	No new leasing in PHMA. Upon expiration or termination of existing leases, prohibit issuance of new leases or reinstatement of leases in PHMA.	No similar action (see line below)	No similar action (see line below)
MD MR-2: No Surface Occupancy (NSO) without waiver or modification in PHMA. See Appendix B (Existing Management) for exception criteria.	**MD MR-2:** (one mile from active leks to the remainder of PHMA): Open to leasing subject to No Surface Occupancy (**NSO-2**) with waivers, exceptions, or modifications in PHMA. See Appendix B (Existing Management) for WEM criteria.	No similar action (Alternative 3 is closed to new leasing)	PHMA will be open to fluid mineral leasing subject to No surface occupancy with waivers, exceptions, or modifications (WEMs). See range-wide WEM criteria.	PHMA will be open to fluid mineral leasing subject to No surface occupancy with waivers, exceptions, or modifications (WEMs). See range-wide WEM criteria, but the exception distance for Colorado will be 1 mile from occupied leks.
MD MR-3: In GHMA, any new leases would include **TL** stipulations to protect GRSG and its habitat. The following stipulation would apply: **GRSG TL-46e:** No activity associated with construction, drilling, or completions within 4 miles from active leks during lekking, nesting, and early brood-rearing (March 1 to July 15). Authorized Officer could grant an exception, modification, or waiver in consultation with the State of Colorado.	Same as Alternative 1 (no change made in 2019).	No similar action (Alternative 3 is closed to new leasing)	In PHMA & GHMA, any new leases would include TL stipulations to minimize impacts to GRSG during lekking, nesting, and early brood-rearing. The following stipulation would apply: No activity associated with construction, drilling, or completions within 4 miles of occupied leks during lekking, nesting, and early brood-rearing (March 1 to July 15). The Authorized Officer could grant an exception, modification, or waiver in coordination with the State of Colorado.	Same as Alternative 4

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6	
				Alt 5	**Alt 6**
MD MR-4: No Surface Occupancy (NSO) within 2 miles of active (CO definition) leks in GHMA. See Appendix B (Existing Management) for WEM criteria.	Same as Alternative 1 (no change made in 2019).	No similar action (Alt 3 is closed to new leasing)	GHMA will be open to fluid mineral leasing subject to **No Surface Occupancy (NSO)** within 2 miles of **active*** (WAFWA active, CO occupied) leks. See range-wide WEM criteria.	GHMA will be open to fluid mineral leasing subject to **Controlled Surface Use (CSU)** within 2 miles of **active*** leks. See CSU criteria below. See range-wide WEM criteria.	GHMA will be open to fluid mineral leasing subject to **Controlled Surface Use (CSU)** in GHMA within 1 mile of PHMA. See CSU criteria below. See range-wide WEM criteria.
No similar action	No similar action	No similar action	No similar action	**Controlled Surface Use (CSU):** Apply CSU constraints on surface use, occupancy, placement of permanent tall structures, and surface-disturbing activities in *[GHMA within 2 miles of occupied leks for Alt 5/GHMA within 1 mile of PHMA for Alt 5a*] that would decrease breeding/nesting habitat availability or functionality, or that create new perching/nesting opportunities for avian predators. Surface use including infrastructure and surface-disturbing activities may require special design, construction, and implementation measures. The actual required measures will be based on the purpose, nature, and extent of the surface occupancy including infrastructure and total surface disturbance, the affected seasonal habitat, and the feasibility of relocating the project. A tall structure is any man-made		

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	*(See above.)*	structure that provides for perching/nesting opportunities for predators (e.g., raptors, ravens) that may naturally be absent, or that decreases the use of an area. A determination as to whether something is considered a tall structure would be made based on local conditions such as existing vegetation or topography. Examples of measures and limitations include: 1) Relocate operations more than 200 meters (656 feet) to areas outside of habitat, to areas of existing disturbance, or to areas where site-specific topography mitigates project impacts; 2) Defer activities longer than 60 days to avoid seasonal habitat use periods; 3) Modify project design to discourage avian predator perching; 4) Limit or relocate placement of tall structures to reduce impacts of project infrastructure; 5) Limit activity associated with construction, drilling, or completions to certain seasons or times of day; 6) Minimize noise using the best available technology to dampen or direct noise away from breeding or nesting habitat. Modify access routes to avoid important areas or habitats.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
MD MR-5: Disturbance on new leases would be limited to 3 percent in PHMA (biologically significant unit) (see Appendix E, Methodology for Calculating Disturbance Caps) and would limited to 1 disturbance per 640 acres calculated by Colorado MZ. The following Lease Notice (LN) would apply: **GRSG LN-46e**: Any lands leased in PHMA are subject to the restrictions of 1 disturbance per 640 acres calculated by biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ) to allow clustered development.	Same as Alternative 1 (no change made in 2019).	No similar action (Alt 3 is closed to new leasing)	Disturbance on new leases would be limited to 3 percent in PHMA (biologically significant unit) and would be limited to 1 disturbance per 640 acres calculated by Colorado MZ. The following Controlled Surface Use (CSU) would apply: Any lands leased in PHMA are subject to the restrictions of 3 percent disturbance and 1 disturbance per 640 acres calculated by Fine Scale and proposed project analysis area (Colorado MZ) to allow clustered development.	Disturbance on new leases would be limited to 3 percent in PHMA (biologically significant unit) and would be limited to 1 disturbance per 640 acres calculated by Colorado MZ. The following Controlled Surface Use (CSU) would apply: Any lands leased in PHMA are subject to the restrictions of 3 percent disturbance and 1 disturbance per 640 acres calculated by biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ) to allow clustered development.
MD MR-7: (PHMA) Allow geophysical exploration within PHMA to obtain information for existing federal fluid mineral leases or areas adjacent to state or fee lands within PHMA. Allow geophysical operations only using helicopter-portable drilling, wheeled or tracked vehicles on existing roads, or other approved methods conducted in accordance with seasonal TLs and other restrictions that may apply. Geophysical exploration shall be subject to seasonal restrictions that preclude activities in breeding, nesting, brood-rearing, and winter habitats during their season of use by GRSG.	Same as Alternative 1 (no change made in 2019).	Same as Alternative 1	(PHMA) Allow geophysical exploration within PHMA to obtain information for existing federal fluid mineral leases or areas adjacent to state or fee lands within PHMA. Allow geophysical operations with the application of reasonable measures that minimize impacts to GRSG and GRSG habitat (e.g., helicopter-portable drilling, wheeled or tracked vehicles on existing roads) and are in accordance with seasonal TLs and other applicable restrictions. Geophysical exploration shall be subject to seasonal restrictions that preclude activities in breeding, nesting, brood-rearing, and winter habitats during the season of use by GRSG.	Same as Alternative 4

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Leased Fluid Minerals				
MD MR-8: Within 1 mile of active leks, disturbance, disruptive activities, and occupancy are precluded. If it is determined that this restriction would render the recovery of fluid minerals infeasible or uneconomic, considering the lease as a whole, or where development of existing leases requires that disturbance density exceeds 1 disturbance per 640 acres and/or the 3 percent disturbance cap (see Appendix E, Methodology for Calculating Disturbance Caps), use the **criteria*** below to site proposed lease activities to meet GRSG habitat objectives and require mitigation as described in Appendix F (Greater Sage-Grouse Mitigation Strategy).	Same as Alternative 1 (no change made in 2019).	—	Within 1 mile of occupied leks, disturbance, disruptive activities, and occupancy are precluded. If it is determined that this restriction would render the recovery of fluid minerals infeasible or uneconomic, considering the lease as a whole, or where development of existing leases requires that disturbance density exceeds 1 disturbance per 640 acres and/or the 3 percent disturbance cap, use the **criteria*** below to site proposed lease activities to meet GRSG habitat objectives and require mitigation.	Same as Alternative 4, but with siting criteria from Alternatives 5 and 6 (see below)
MD MR-9: In PHMA and within 4 miles of an active lek, the **criteria*** below would be applied to guide development of the lease or unit that would result in the fewest impacts possible to GRSG. **Criteria*:** • Location of proposed lease activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat • An evaluation of the potential threats from proposed lease activities that may affect the	Same as Alternative 1 (no change made in 2019).	In PHMA and GHMA, the **criteria*** below would be applied to guide development of the lease or unit that would result in the fewest impacts possible to GRSG. Additionally, both PHMA and GHMA would be classified as PHMA under this alternative. 1) The location of the proposed authorization is determined to be nonhabitat, lacks the ecological potential to become habitat, does not provide important connectivity between habitat areas, and the project includes design features to prevent indirect	Same as Alternative 3, but both PHMA and GHMA would not be classified as PHMA.	In PHMA and GHMA, the **criteria*** below would be applied to guide development of the lease or unit that would result in the fewest impacts possible to GRSG. 1) The location of the proposed authorization is determined to be nonhabitat, lacks the ecological potential to become habitat, does not provide important connectivity between habitat areas, and the project includes design features to prevent indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
local population as compared to benefits that could be accomplished through compensatory or off-site mitigation • An evaluation of the proposed lease activities, including design features, in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors. This is particularly likely in Colorado MZ 17, which has an atypical GRSG habitat featuring benches with GRSG habitat interspersed with steep ravines To authorize an activity based on the criteria above, the environmental record of review must show no significant direct disturbance, displacement, or mortality of GRSG.	*(See above.)*	disturbance to or disruption of adjacent seasonal habitats that would impair their biological function. 2) Topography/areas of non-habitat create an effective barrier to impacts. 3) By co-locating the proposed authorization with existing disturbance, impacts would be minimized or similar to impacts associated with the existing infrastructure. 4) The proposed location would be undertaken as an alternative to a similar action occurring on a nearby parcel (for example, due to landownership patterns), and authorizing the activity on the parcel in question would have less of an impact on GRSG or its habitat than on the nearby parcel; this criterion must also include measures sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. If the criteria above do not apply but it can be demonstrated that the direct and indirect impacts of the proposed activity would be offset through compensatory mitigation, the authorized officer may consider permitting the action. The environmental record of review must demonstrate the following: 1) As the first step in mitigating impacts to GRSG, efforts to avoid impacts by locating the	*(See above.)*	2) Topography/areas of non-habitat create an effective barrier to impacts. 3) By co-locating the proposed authorization with existing disturbance, impacts would be minimized or similar to impacts associated with the existing infrastructure. 4) The proposed location would be undertaken as an alternative to a similar action occurring on a nearby parcel (for example, due to landownership patterns), and authorizing the activity on the parcel in question would have less of an impact on GRSG or its habitat than on the nearby parcel; this criterion must also include measures sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. In addition to meeting one of the criteria above, applicable minimization measures including Disturbance Caps, Timing Limitations, Design Features, or other site-specific constraints would be included as Conditions of Approval (COAs) on the authorized activity. If the criteria above do not apply but it can be demonstrated that the direct and indirect impacts of the proposed activity would be offset through compensatory mitigation, the authorized officer may consider permitting the action. The environmental record

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	proposed project in areas outside the NSO areas or in areas of non-habitat shall be documented. 2) As the second step in mitigating impacts to GRSG, efforts to minimize impacts by applying project design features shall be documented (e.g., use of RDFs, buffer distances, seasonal limitations, etc.). The compensation project must be completed and habitat functionality documented before the authorization is granted to ensure the offset in impacts will occur.	*(See above.)*	of review must demonstrate why avoidance is not attainable. To grant the activity based on compensatory mitigation, the compensation project must be planned, funded, and approved by the operator, BLM, surface owner, in coordination with the State of Colorado prior to construction, surface occupancy, or surface disturbing activities.
MD MR-10: Based on site-specific conditions, prohibit construction, drilling, and completion within PHMA within 4 miles of a lek during lekking, nesting, and early brood-rearing (March 1 to July 15). In consultation with the State of Colorado, this TL may be adjusted based on application of the **criteria*** above.	Same as Alternative 1 (no change made in 2019).	Prohibit construction, drilling, and completion within PHMA during lekking, nesting, and early brood-rearing (March 1 to July 15).	Based on site-specific conditions, prohibit construction, drilling, and completion in PHMA or GHMA within 4 miles of an occupied lek during lekking, nesting, and early brood-rearing (March 1 to July 15). In coordination with the State of Colorado, this TL may be adjusted based on application of the **criteria*** above.	Same as Alternative 4, but with siting criteria from Alternatives 5 and 6 (see above)

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6	
				Alt 5	**Alt 6**
No Similar action	No Similar action	No Similar action	No Similar action	No Similar action	In the Case Flats ACEC, any new leases would include TL stipulations to minimized impacts to GRSG during winter concentration. The following stipulation would apply: No activity associated with construction, drilling, or completions during the winter concentration period (December 1 to March 15). The Authorized Officer could grant an exception, in consultation with the State of Colorado, if the environmental record of review shows no significant direct or indirect disturbance, displacement, or mortality of GRSG. No modifications or waivers would be authorized.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
MD MR-14: For future actions in ADH, require a full reclamation bond specific to the site in accordance with 43 CFR Parts 3104.2, 3104.3, and 3104.5. Ensure bonds are sufficient for costs relative to reclamation (Connelly et al. 2000; Hagen et al. 2007) that would result in full restoration of the lands to the condition it was found prior to disturbance. Base the reclamation costs on the assumption that contractors for the BLM will perform the work.	Same as Alternative 1 (no change made in 2019).	Same as Alternative 1	In PHMA and GHMA, require a full reclamation bond specific to the site in accordance with 43 CFR Parts 3104.2, 3104.3, and 3104.5. Ensure bonds are sufficient for costs relative to reclamation that would result in full restoration of the lands to the condition prior to disturbance. Base the reclamation costs on the assumption that contractors for the BLM will perform the work.	Same as Alternative 4

Table 21-16. Colorado State-Specific Circumstances – Solid Minerals (MR)

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Nonenergy Leasable Minerals				
MD MR-20: Existing nonenergy mineral leases: Apply the following conservation measures as conditions of approval (COAs) where applicable and feasible: • Preclude new surface occupancy on existing leases within 1 mile of active leks (Blickley et al. 2012; Harju et al. 2012). • If the lease is entirely within 1 mile of an active lek, require any development to be placed in the area of the lease least harmful to GRSG based on vegetation, topography, or other habitat features (Appendix G, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations). • Preclude new surface disturbance on existing leases within 2 miles of active leks within PHMA. If the lease is entirely within 2 miles of an active lek, require any development to be placed in the area of the lease least harmful to GRSG based on vegetation, topography, or other habitat features (Appendix G, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations). • Limit permitted disturbances to 1 disturbance per 640 acres average across the landscape in PHMA. Disturbances may	Same as Alternative 1 (no change made in 2019).	Existing nonenergy mineral leases: Apply the following conservation measures as conditions of approval (COAs) where applicable and feasible: • Preclude new surface occupancy on existing leases within 1 mile of occupied leks (Blickley et al. 2012; Harju et al. 2012). • If the lease is entirely within 1 mile of an occupied lek, require any development to be placed in the area of the lease least harmful to GRSG based on vegetation, topography, or other habitat features (Appendix G, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations). • Preclude new surface disturbance on existing leases within 2 miles of occupied leks within PHMA. If the lease is entirely within 2 miles of an occupied lek, require any development to be placed in the area of the lease least harmful to GRSG based on vegetation, topography, or other habitat features (Appendix G, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations). • Limit permitted disturbances to 1 disturbance per 640 acres average across the landscape in PHMA. Disturbances may	Same as Alternative 3.	Same as Alternative 3.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
not exceed 3 percent in PHMA (see Appendix E, Methodology for Calculating Disturbance Caps) in any biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ). GRSG TL-47-51 – Based on site-specific conditions, prohibit surface occupancy or disturbance within PHMA within 4 miles of a lek during lekking, nesting, and early brood-rearing (March 1 to July 15).	*(See above.)*	not exceed 3 percent in PHMA in any biologically significant unit (Colorado populations) and proposed project analysis area (Colorado MZ). GRSG TL-47-51 – Based on site-specific conditions, prohibit surface occupancy or disturbance within PHMA within 4 miles of an occupied lek during lekking, nesting, and early brood-rearing (March 1 to July 15).	*(See above.)*	*(See above.)*

Table 21-17. Colorado State-Specific Circumstances – Lands and Realty (LR)

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Lands and Realty (LR)				
MD LR-1: Manage areas within PHMA as avoidance areas* for BLM ROW permits. (See Appendix G, Stipulations Applicable to Fluid Mineral Leasing and Land Use Authorizations.) ***GRSG PHMA ROW Avoidance.** ROWs may be issued after documenting that the ROWs would not adversely affect GRSG populations based on the following criteria: • Location of proposed activities in relation to critical GRSG habitat areas as identified by factors, including, but not limited to, average male lek attendance and/or important seasonal habitat. • An evaluation of the potential threats from proposed activities that may affect the local population as compared to benefits that could be accomplished through compensatory or off-site mitigation An evaluation of the proposed activities in relation to the site-specific terrain and habitat features. For example, within 4 miles from a lek, local terrain features such as ridges and ravines may reduce the habitat importance and shield nearby habitat from disruptive factors.	Same as Alternative 1 (no change made in 2019).	Manage areas within PHMA as exclusion areas for BLM ROW permits, except for designated corridors.	Manage areas within PHMA as avoidance areas* for BLM ROW permits. ***ROW Avoidance Criteria:** ROWs may be issued if it can be demonstrated that the proposed authorization would have no adverse impacts on GRSG or its habitat based on at least one of the following: 1) The location of the proposed authorization is determined to be nonhabitat, lacks the ecological potential to become habitat, does not provide important connectivity between habitat areas, and the project includes design features to prevent indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function. 2) Topography/areas of non-habitat create an effective barrier to impacts. 3) By co-locating the proposed authorization with existing disturbance, impacts would be minimized or similar to impact associated with the existing infrastructure. 4) The proposed location would be undertaken as an alternative to a similar action occurring on a nearby parcel (for example, due to landownership patterns), and authorizing the ROW on the	Manage areas within PHMA as avoidance areas* for BLM ROW permits, except for designated corridors, which would be open to ROW permits. ***ROW Avoidance Criteria:** ROWs may be issued if it can be demonstrated that the proposed authorization would have no adverse impacts on GRSG or its habitat based on at least one of the following: 1) The location of the proposed authorization is determined to be nonhabitat, lacks the ecological potential to become habitat, does not provide important connectivity between habitat areas, and the project includes design features to prevent indirect disturbance to or disruption of adjacent seasonal habitats that would impair their biological function. 2) Topography/areas of non-habitat create an effective barrier to impacts. 3) By co-locating the proposed authorization with existing disturbance, impacts would be minimized or similar to impact associated with the existing infrastructure. 4) The proposed location would be undertaken as an alternative to a similar action occurring on a nearby parcel (for example, due to

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	parcel in question would have less of an impact on GRSG or its habitat than on the nearby parcel; this criterion must also include measures sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. In addition to meeting one of the criteria above, applicable minimization measures including Disturbance Caps, Timing Limitations, Design Features (Appendix XX- Design Features), or other site-specific constraints would be included as Terms & Conditions of the ROW. If the **criteria*** above do not apply but it can be demonstrated that the direct and indirect impacts of the proposed activity would be offset through compensatory mitigation, the authorized officer may consider permitting the action. The environmental record of review must demonstrate the following: 1) As the first step in mitigating impacts to GRSG, efforts to avoid impacts by locating the proposed project in areas outside the NSO areas or in areas of non-habitat shall be documented. 2) As the second step in mitigating impacts to GRSG, efforts to minimize impacts by applying project design features shall be documented (e.g., use of RDFs, buffer	landownership patterns), and authorizing the ROW on the parcel in question would have less of an impact on GRSG or its habitat than on the nearby parcel; this criterion must also include measures sufficient to allow the BLM to conclude that such benefits will endure for the duration of the proposed action's impacts. In addition to meeting one of the criteria above, applicable minimization measures including Disturbance Caps, Timing Limitations, Design Features (Appendix XX- Design Features), or other site-specific constraints would be included as Terms & Conditions of the ROW. If the **criteria*** above do not apply but it can be demonstrated that the direct and indirect impacts of the proposed activity would be offset through compensatory mitigation, the authorized officer may consider granting a ROW. The environmental record of review must demonstrate why avoidance is not attainable. To grant a ROW based on compensatory mitigation, the compensation project must be completed prior to construction, surface occupancy, or surface disturbing activities. Applicable minimization measures including Disturbance Caps, Timing Limitations, Design Features (Appendix XX- Design Features), or other site-specific constraints

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	*(See above.)*	*(See above.)*	distances, seasonal limitations, etc.). 3) The compensation project must be completed and habitat functionality documented before the authorization is granted to ensure the offset in impacts will occur. The compensation necessary to grant this authorization must provide the offsetting benefit to the population being impacted by the potential development.	would be included as Terms & Conditions of the ROW.
MD LR-2: Manage areas within GHMA as avoidance areas* for major (transmission lines greater than 100 kilovolts and pipelines greater than 24 inches) and minor BLM ROW permits (see avoidance criteria above).	Same as Alternative 1 (no change made in 2019).	No similar action	Manage areas within GHMA as avoidance areas* BLM ROW permits (see avoidance criteria above).	Manage areas within GHMA as avoidance areas* for BLM ROW permits, except for designated corridors, which would be open to ROW permits (see avoidance criteria above).
No similar action	No similar action	No similar action	In PHMA and GHMA, If the ROW authorization is the off-lease component of an action that occurs on-lease (e.g.- a road beginning off-lease that crosses on-lease would require both a ROW and subject to the conditions of the APD), ensure that the conditions for each authorization are consistent for mitigation, reclamation, and design features, as appropriate.	Same as Alternative 4

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
MD LR-3: No new roads or above-ground structures would be authorized within 1 mile of an active lek. Above-ground structures are defined as structures that are located on or above the surface of the ground, including but not limited to: roads, fences, communication towers, and/or any structure that would provide perches. Above-ground structures would only be authorized if: 1. It is consistent with the overall objective of the RMP Amendment; 2. The effect on GRSG populations or habitat is nominal or incidental; 3. Allowing the exception prevents implementation of an alternative more detrimental to GRSG or similar environmental concern, and; Rigid adherence to the restriction would be the only reason for denying the action.	Same as Alternative 1 (no change made in 2019).	No similar action	No new tall structures would be authorized within 1 mile of an occupied lek. Tall structures are defined as any man-made structure that provides for perching/nesting opportunities for predators (e.g., raptors, ravens) that may naturally be absent, or that decreases the use of an area. A determination as to whether something is considered a tall structure would be made based on local conditions such as existing vegetation or topography. Tall structures include but are not limited to: communication towers, meteorological towers, power lines, and transmission lines. Tall structures would only be authorized if it can be demonstrated that the proposed authorization would have no adverse impacts on GRSG or its habitat based on the **ROW Avoidance Criteria*** above. Additionally, if tall structures cannot be buried (i.e.- power lines), require perch deterrents.	Same as Alternative 4, but with ROW avoidance criteria from Alternatives 5 and 6

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
MD LR-4: PHMA and GHMA are designated as avoidance areas for high-voltage transmission line ROWs, except for the transmission projects specifically identified below. All authorizations in these areas, other than the following identified projects, must comply with the conservation measures outlined in this ARMPA, including the RDFs and avoidance criteria presented in this document. The BLM is currently processing applications for the TransWest and Energy Gateway South Transmission Line projects, and the NEPA review for these projects is well underway. Conservation measures for GRSG are being analyzed through the projects' NEPA review process, which should achieve a net conservation benefit for the GRSG.	Same as Alternative 1 (no change made in 2019).	No similar decision	No similar decision	No similar decision
MD LR-6: Prohibit surface occupancy and surface-disturbing activities associated with BLM ROW within 4 miles from active leks during lekking, nesting, and early brood-rearing (March 1 to July 15). (See special stipulations applicable to **GRSG PHMA ROW TL**.)	Same as Alternative 1 (no change made in 2019).	No similar decision	In PHMA and GHMA, prohibit surface occupancy and surface-disturbing activities associated with BLM ROW within 4 miles of occupied leks during lekking, nesting, and early brood-rearing (March 1 to July 15).	Same as Alternative 4
MD LR-8: (PHMA) In PHMA, or within 4 miles of an active lek, for ROW renewals, where existing facilities cannot be removed, buried, or modified, require perch deterrents.	Same as Alternative 1 (no change made in 2019).	No similar decision	(PHMA and GHMA) In PHMA and GHMA, for ROW renewals, where existing facilities cannot be removed, buried, or modified, require perch deterrents.	Same as Alternative 4
MD LR-9: (PHMA) Reclaim and restore ROWs considering GRSG habitat requirements.	Same as Alternative 1 (no change made in 2019).	—	(PHMA and GHMA) Reclaim and restore ROWs considering GRSG habitat requirements.	Same as Alternative 4

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
MD LR-10: (PHMA) Designate new ROW corridors in GRSG PHMA only where there is a compelling reason to do so and location of the corridor within PHMA will not adversely affect GRSG populations due to habitat loss or disruptive activities.	Same as Alternative 1 (no change made in 2019).	No similar decision	(PHMA and GHMA) Designate new ROW corridors in GRSG PHMA and GHMA only where there is a compelling reason to do so and location of the corridor within PHMA will not adversely affect GRSG populations due to habitat loss or disruptive activities.	Same as Alternative 4

21.2.2 Idaho

In addition to Idaho's three-tier habitat approach, state specific circumstances are a result of specific language unique from 2015 and 2019, and clarifying 2015 implementation management decisions. State specific circumstances for the State of Idaho include 1) management of saleable minerals/mineral materials – specifically consideration of new free use pits in PHMA, 2) application and use of lek buffers (see **Appendix 19**), and 3) application of renewable energy management to nuclear and hydropower developments in addition to wind and solar.

Table 21-18. Idaho State-Specific Circumstances – Mineral Resources (MR)

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Saleable Minerals/Mineral Materials				
MD MR 11: PHMA are closed to new mineral materials sales. However, these areas remain "open" to free use permits and the expansion of existing active pits only if the following criteria are met: • the project area disturbance cap is not exceeded within a BSU; • the activity is subject to the provisions set forth in the mitigation framework [Appendix F in the 2015 ARMPA]; • all applicable required design features are applied; and • the activity is permissible under the Idaho exception and development criteria (MD SSS 29 and MD SSS 30 in the 2015 ID ARMPA) IHMA: All IHMA will be open to mineral materials development, consistent with the Idaho Anthropogenic Disturbance Criteria (MD SSS 30 in the 2015 ID ARMPA), and subject to RDFs, and buffers. Sales from existing community pits within IHMA will be subject to seasonal timing restrictions (Appendix C in 2015 ARMPA). GHMA: All GHMA will be open to mineral materials development, subject to RDFs and buffers. Sales from existing community pits within GHMA will be subject to seasonal timing restrictions (Appendix C in 2015 ARMPA).	**MD MR 11:** PHMA: All PHMA will be closed to new mineral materials development, but continued use of existing pits will be allowed. New free use permits and the expansion of existing free use permits may be considered only if the following criteria are met: • the project area disturbance cap is not exceeded within a BSU; • the activity is subject to the provisions set forth in the mitigation framework [Appendix F in the 2015 ARMPA]; • all applicable required design features are applied; and • the activity is permissible under the Idaho exception and development criteria (MD SSS 29 and MD SSS 30 in the 2019 ID ARMPA) IHMA: All IHMA will be open to mineral materials development, consistent with the Idaho Anthropogenic Disturbance Criteria (MD SSS 30 in the 2019 ID ARMPA), and subject to RDFs, and buffers. GHMA: All GHMA will be open to mineral materials development, subject to best management practices, as described in Appendix C (in 2019 ARMPA).	**MD MR 11:** PHMA—All PHMA will be closed to new mineral materials development.	**MD MR 11:** PHMA—All PHMA will be closed to new mineral materials development but continued use of existing pits will be allowed. New free use permits and the expansion of existing pits may be considered only if the following criteria are met: a. The disturbance cap is not exceeded in a within a fine-scale HAF; b. The activity is subject to the provisions set forth in the mitigation framework (Appendix F in the 2019 ARMPA); c. All applicable RDFs are applied; and d. The activity is permissible under the Idaho exception and development criteria (MD SSS 29 and MD SSS 30 in the 2019 ID ARMPA). In order to support maintenance needs for existing local roads and ensure public safety, exceptions to criteria b) and d) listed above may be granted for new free-use permits in areas with existing anthropogenic disturbance. IHMA—All IHMA will be open to mineral materials development, consistent with the Idaho Anthropogenic Disturbance Criteria (MD SSS 30 in the 2019 ID ARMPA) and subject to RDFs and buffers. GHMA—All GHMA will be open to mineral materials development, subject to BMPs as described in Appendix C (in the 2019 ID ARMPA).	**MD MR 11:** Same as Alternative 4

Table 21-19. Idaho State-Specific Circumstances – Special Status Species (SSS)

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Anthropogenic Disturbance				
Appendix B. Buffers (in the 2015 ID ARMPA). {The management action associated with the buffers is MD SSS 35; the details on buffer sizes and how to apply them is in the appendix.}	**Appendix B. Buffers** (in the 2019 ID ARMPA) {The management action associated with the buffers is MD SSS 35; the details on buffer sizes and how to apply them is in the appendix.}	**Appendix B. Buffers** (see proposed changes in the Idaho Buffers Appendix Alternative Language (**Appendix 19**). Modified from Appendix B referenced in Alt 1 to apply to active or pending active leks, with no buffer exceptions.	Same as Alternative 3.	**Appendix B. Buffers** (see proposed changes in the Idaho Buffers Appendix Alternative Language (**Appendix 19**). Modified from Appendix B referenced in Alt 2 to apply to active and pending leks and providing buffer exception for IHMA/GHMA.

Table 21-20. Idaho State-Specific Circumstances – Renewable Energy (Wind and Solar) (RE)

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Industrial Solar, Wind, Nuclear, and Hydropower Development				
MD RE 1: PHMA: Designate and manage PHMA as exclusion areas for utility scale (20 MW) wind and solar testing and development, nuclear and hydropower energy development. IHMA: Designate and manage IHMA as avoidance areas for wind and solar testing and development, nuclear and hydropower development. GHMA: Designate and manage GHMA as open for wind and solar testing and development and nuclear and hydropower development subject to RDFs and buffers.	**MD RE 1:** PHMA: Designate and manage PHMA as exclusion areas for utility scale (20 MW) wind and solar testing and development, nuclear and hydropower energy development. IHMA: Designate and manage IHMA as avoidance areas for wind and solar testing and development, nuclear and hydropower development. GHMA: Designate and manage GHMA as open for wind and solar testing and development and nuclear and hydropower development	Same as cross-cutting language for wind and solar described above, but with the additional application to nuclear and hydropower energy development.	Same as Alternative 3.	Same as Alternative 3.

21.2.3 Montana/Dakotas

GRSG in Montana range across most of the state, with about 1,000 confirmed active sage-grouse leks. GRSG in North and South Dakota have limited distributions and small population sizes. These differences resulted in variable factors being considered for identifying HMAs (in cooperation with state natural resource entities) (see **Appendix 3**, GRSG HMA State-by-State Mapping Strategies). Factors include differences in the amount of the population in GHMA, HMAs to address different seasonal movement strategies, and addressing cross-state populations. These differences also require consideration of different management approaches at a local level (state specific circumstances) in contrast to range-wide approaches (cross-cutting issues) considered in this EIS/RMPA.

GRSG planning efforts completed in 2015 were initiated while plan revisions were ongoing for multiple other plans in the region. The 2015 effort resulted in updated GRSG management in seven plans. However, the Butte Field Office (BFO) and the Upper Missouri River Breaks National Monument (UMRBNM) were not included due to minor amounts of habitat (BFO) and protections provided by inclusion of GRSG as an object and value of the UMRBNM proclamation. Subsequently, the Lewistown Field Office completed a plan revision in 2021, and the North Dakota Field Office is currently undergoing a plan revision. Montana-Dakotas BLM offices were not part of the GRSG plan amendments completed in 2019.

While concepts and approaches are generally consistent between the plans, separate planning efforts resulted both wording and management action inconsistencies. State-specific circumstances address: 1) measures to improve consistency between the nine Field Offices (RMPs) for sage-grouse management; 2) incorporating unique circumstances of peripheral populations and accounting for the higher proportion of sage-grouse leks found in GHMA in Montana; and 3) applying 2021 Plan Evaluation recommendations and lessons learned from implementation of the 2015 plans.

Increasing Consistency between Montana-Dakotas BLM Plans and State Conservation Approaches

BLM's review of the seven Montana-Dakotas plans included in the 2015 planning effort identified varying management recommendations. While some of these differences are simply minor wording differences, other inconsistencies include the omission or inclusion of actions not included in neighboring plans. These differences also include numerous stipulations for oil and gas leasing in HMAs and occupied GRSG habitat. Among offices, there are varying objectives for GRSG management under the sensitive status species sections or may contain objectives listed as management action in different plans. Furthermore, BLM identified differences in buffer distances for ROW avoidance around leks, variation in protections for winter range, and several other differences in management among HMAs between offices.

The BLM examined these inconsistencies to determine if they are justified using the following criteria: 1) Biological circumstances between offices that warrant distinction; 2) Wording differences that create inconsistent interpretation and management; 3) Whether specific management objectives and actions were needed within BFO and the UMRBNM, and; 4) Relationships with the state GRSG conservation plans from North Dakota, South Dakota, and Montana.

The action alternatives below strive to provide better consistency among BLM offices and partner natural resource entities. They are intended to provide clear and consistent direction to applicants and partners for cross-office boundary projects and simplify the coordination among field offices. Other potential changes including monitoring, adaptive management, and implementation tracking would be streamlined to increase internal efficiencies and improve coordination with partners.

Addressing Variations in HMAs and Peripheral Populations

In Montana, general habitat, and BLM GHMA, contains a larger proportion of leks relative to these habitat types than many other states (see **Appendix 3**, GRSG HMA State-by-State Mapping Strategies). To meet objectives for GRSG and be more consistent with state management approaches, more restrictive GHMA management is presented for some resources in the alternatives below. The Montana-Dakotas BLM is considering crucial winter range in stipulations and maintains lek-based buffers for ROWs in GHMA (including utility scale renewable energy projects). Peripheral populations present unique challenges to management approaches. The population spanning the Montana and North Dakota Border (Cedar Creek Anticline area) has specific objectives considered to address ongoing development in the area, restoration needs, and cross-state and cross organizational GRSG management in this mixed-ownership area. In Montana, this area is considered as an RHMA in most alternatives to reflect the desire for long-term restoration. In North Dakota, GRSG range is PHMA, but specific objectives and management are considered to address restoration and habitat enhancement, including protecting historical leks (those active in 2010) similar to currently active leks. This is intended to conserve the landscape to provide opportunities for restoration. GRSG in northern Montana and Canada exhibit unique migratory behavior, moving from breeding habitat in silver sage communities to winter south in Wyoming Big Sagebrush dominated communities. To capture these migratory pathways and protect stopover sites the BLM identified connectivity areas, called CHMA, based on the State of Montana connectivity areas (see **Appendix 3**, GRSG HMA State-by-State Mapping Strategies). While the revised GRSG HMAs in the action alternatives and the Pryor Mountain Wild Horse Range overlap by just over 300 acres in the Billings Field Office, GRSG and wild horse use do not overlap due to physical barriers. Therefore, this topic is not addressed in detail.

2015 Plan Evaluations and Lessons Learned

Implementation of the 2015 plans (including 2021 plan evaluations) has identified areas of potential misunderstanding that are included as cross cutting issues in alternatives in this EIS. The BLM Montana-Dakotas has also identified opportunities, unique to the region, including cross-boundary coordination with other natural-resource management entities. Additionally, new local and range-wide research provides updated information to consider for GRSG management action adjustments. As a result, the state-specific alternative below incorporates the following new information. The Dillon FO was previously included in a combined Idaho-SW Montana amendment. However, that amendment included management unique to Idaho, but not applicable in Montana including Wild Horse and Burro management, use of the Fire and Invasives Assessment Tool, and incorporation of Key Habitat references. The Montana-Dakotas BLM also considers options to remove the distinction between major and minor rights of way, both for consistency with state management and to address specific impacts of the proposed disturbance or disruption of ROW actions relative to GRSG. Lastly, the revised guidance on conservation buffer distances, project screens, and design features provides a common approach for analyzing different program and project types that result in similar impacts.

The remainder of this section includes the alternatives related to the applicable management actions. Columns for Alternatives 1 and 2 have been merged, since the BLM RMPs in the Montana/Dakota State Office did not amend any plans in 2019.

Table 21-21. Montana State-Specific Circumstances – Special Status Species (GRSG): Goals and Objectives

Alternative 1 Summary	Alternative 2 Summary	Alternative 3	Alternative 4	Alternatives 5 and 6
Special Status Species (GRSG): Goals and Objectives				
Goal: Maintain and/or increase GRSG abundance and distribution by conserving, enhancing, or restoring the sagebrush ecosystem upon which populations depend, in cooperation with other conservation partners. (Language varies between plans) **Objective**: Sage-grouse management will utilize the 2005 Management Plan and Conservation Strategies for Sage-Grouse in Montana – Final for overall guidance and direction. (Various inclusion of BLM and state GRSG plans) West Nile Virus: When developing or modifying water developments, use applicable RDFs (see RDF/BMP appendix from each RMP) to mitigate potential impacts from West Nile virus. (Various inclusion as goal, objective, or management action, in different program areas)		Apply the cross-cutting GRSG goal, Habitat Objectives, etc. In addition, retain existing goals and objectives, but edit or add to ensure the following direction is contained: **Goal:** (see cross-cutting issue). **Objective**: Maintain, improve, and restore sagebrush habitats to increase habitat availability and quality for GRSG, sagebrush obligates and other sagebrush dependent species. **Objective**: Manage GRSG through collaborative, coordinated efforts that utilize cooperative planning and implement and monitor activities to achieve desired conditions and to maximize the utilization of available funding opportunities. Coordination efforts can include: adjacent landowners, federal and state agencies, local governments, tribes, communities, other agencies, nongovernmental organizations, and other interested parties/stakeholders. **All HMAs MA**: Greater sage-grouse management will be consistent with current adopted BLM conservation strategies, will utilize GRSG conservation plans, as revised or updated, from partners such as WAFWA (e.g., Sagebrush conservation strategy; Remington et al. 2021), USFWS (e.g., Greater Sage-grouse (Centrocercus urophasianus) Conservation Objectives: Final Report; USFWS 2013), and state wildlife or habitat management agency action, management, or conservation plans (e.g., MT EO 2015, MT SGWG 2005, SD GF&P 2022, ND G&F 2014), and the best available science. **All HMAs MA**: Assess and modify as needed water features to reduce the risk of potential impacts from West Nile Virus or other disease outbreaks (see RDF/BMP appendix from each RMP).		

Table 21-22. Montana State-Specific Circumstances – Special Status Species (GRSG): Cedar Creek Anticline RHMA Objectives

Alternative 1 Summary	Alternative 2 Summary	Alternative 3	Alternative 4	Alternatives 5 and 6
Special Status Species (GRSG): Goals and Objectives				
Objective 1: Strive for proponents to develop area-wide Habitat Recovery Plans. **Objective 2**: Strive for no net loss of GRSG habitat. **Objective 3:** Strive for the restoration of previously disturbed landscapes in a manner which increases or improves the quality and quantity of GRSG habitat.		**Objective 1:** Develop and implement an area-wide habitat restoration plan. The plan will identify restoration opportunities, including short term actions that can reduce disturbance and threats to sage-grouse (conifer encroachment, duplicative roads, infrastructure removal, etc.), habitat restoration (areas to increase sagebrush cover and understory plants), and longer-term actions to put in place as development is completed. **Objective 2**: Manage for no net loss of GRSG habitat, subject to valid existing rights, and maintained connectivity with North Dakota GRSG habitat. **Objective 3:** Strategically target restoration, as possible with partners across jurisdictions, in disturbed landscapes in a manner which increases or improves the quality and quantity of GRSG habitat.		

Table 21-23. Montana State-Specific Circumstances – Special Status Species (GRSG): North Dakota Specifics

Alternative 1 Summary	Alternative 2 Summary	Alternative 3	Alternative 4	Alternatives 5 and 6
Special Status Species (GRSG): Goals and Objectives				
Objective SSS-1.1 through Objective SSS-1.4: These objectives cover disturbance cap, delineate PHMA and GHMA, and identify the Habitat Objectives **Objective SSS-1.5:** No similar objective		**Objective SSS 1.1-1.4:** See cross-cutting language for HMAs, disturbance, and habitat objectives above. **Objective SSS-1.5** (New): Maintain the existing distribution of occupied GRSG habitat while taking strategic opportunities to enhance existing habitat and expand occupied habitat through restoration actions that remove the primary threats found on BLM managed surface acres (e.g., conifer encroachment, infrastructure, etc.) in North Dakota. **MA SSS-X** (New): Develop a MOU and/or restoration plan between interested partners such as the Forest Service, State of North Dakota USFWS, NRCS and other conservation partners and adjacent states (Montana, South Dakota) to establish a cooperative approach regarding implementation of sage-grouse conservation measures, proposed management changes, mitigation, site-specific monitoring, adaptive management, and addressing threats to GRSG. The MOU/plan will identify responsibilities, roles and interaction to maximize the party's individual conservation efforts.		

Table 21-24. Montana State-Specific Circumstances – Vegetation: GRSG Objectives and Actions

Alternative 1 Summary	Alternative 2 Summary	Alternative 3	Alternative 4	Alternatives 5 and 6
Vegetation: GRSG Objectives and Actions				
All HMAs: Various objectives and management actions **PHMA (Goal, Objective, or MA):** The desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush canopy cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6). (Slight variations between plans, no quantitative objective for Butte and UMRBNM) **PHMA**: Make re-establishment of sagebrush cover and desirable understory plants (relative to ecological site potential) a high priority for restoration efforts in PHMA. Prioritize areas for juniper removal to benefit GRSG habitat. (Slight variation between plans, juniper not only issue in MT/Dak). **MA (All HMAs):** Conifers encroaching into sagebrush habitats will be removed, in a manner that considers tribal cultural values. Treatments will be prioritized closest to occupied sage-grouse habitats and near occupied leks, and where juniper encroachment is phase 1 or phase 2. Use of site-specific analysis and principles like those included in the Fire and Invasives Assessment Tool (FIAT) report (Chambers, et al. 2014) and other ongoing modeling efforts to address conifer encroachment will help refine the location for specific priority areas to be treated. (Slight variations between plans, no FIAT analysis for MT/Dak) **PHMA:** Treatment actions (Slight variations between plans)		**Retain existing objectives and management actions, but edit or add to ensure the following direction is contained:** **VEG OBJ-X (PHMA):** The desired condition is to maintain all lands ecologically capable of producing sagebrush (but no less than 70%) with a minimum of 15% sagebrush canopy cover or as consistent with specific ecological site conditions. The attributes necessary to sustain these habitats are described in Interpreting Indicators of Rangeland Health (BLM Tech Ref 1734-6). **VEG OBJ-Y (PHMA):** Make re-establishment of sagebrush cover and desirable understory plants (relative to ecological site potential) a high priority for restoration efforts in PHMA. Prioritize areas for conifer removal to benefit GRSG habitat. **MA (All HMAs):** Remove conifers encroaching into sagebrush habitats, in a manner that considers tribal and cultural values, as well as other key resources (e.g., other SSS, including T&E, species, soils, etc.). Prioritize treatments closest to occupied GRSG habitats and near occupied leks, and where encroachment is phase 1 or phase 2. Use of site-specific analysis and tools will help refine the location for specific areas to be treated. **VEG MA-X (PHMA):** Treatments that conserve, enhance or restore GRSG habitat will be allowed as well as treatments that benefit other resources and do not adversely affect GRSG or their habitat.	

Table 21-25. Montana State-Specific Circumstances – Special Status Species: Surface Disturbing Activities in GRSG Habitat Objective

Alternative 1 Summary	Alternative 2 Summary	Alternative 3	Alternative 4	Alternatives 5 and 6
Special Status Species: Surface Disturbing Activities in GRSG Habitat Objective				
All HMAs: In undertaking BLM management actions and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the United States geological Survey (USGS) Report (see Appendix B, GRSG Conservation Buffer). [*Minor variations between plans, including if buffers are referenced, or not, in different program areas*] (Plans variable in including additional language such as: • Conduct implementation and project activities, including construction and short-term anthropogenic disturbances consistent with seasonal habitat restrictions described in Appendix C. • Other resource uses within PHMA may be allowed pending project level environmental review provided that Mitigation, BMPs Guidelines, standard operating procedures (SOP), and RDFs are implemented, Impacts are evaluated as described in the GRSG Effects Analysis Process (Appendix I) and the project does not exceed the disturbance cap (Appendix E) and the goals for sage-grouse and sage-grouse habitat are not compromised.)		**Objective:** Limit overall surface disturbance and disruption that impacts GRSG habitat through factors such as the reduction, co-location, and siting of activities and occupancy, and the restoration and enhancement of habitat. Uses in HMAs should be neutral or beneficial to GRSG as determined by analysis for projects. Consider general management practices as well as specific approaches and management for each program area when considering projects in all HMAs. **Management Action (all HMAs):** For all activities, in undertaking BLM management actions and consistent with valid existing rights and applicable law in authorizing actions, the BLM will assess impacts to seasonal habitat and apply conservation measures and the mitigation hierarchy. Analyses for any individual action will apply best available science and consider the type and location of activities during implementation-level project analysis. BLM will apply applicable BMPs, design features, and COAs (see applicable appendices in existing plans) as needed and demonstrated through project analysis.		

Table 21-26. Montana State-Specific Circumstances – Wind, Solar, and Associated ROWs

Alternative 1 Summary	Alternative 2 Summary	Alternative 3	Alternative 4	Alternatives 5 and 6
Utility Scale Solar and Wind (>20 MW and/or based on power supply to a community)				
PHMA: Exclusion **RHMA**: • Exclusion (Elk Basin, Cedar Creek, South Carter County, West Decker) • Avoidance (Outside Elk Basin in Billings) **GHMA**: • Avoidance • Exclusion (SD in winter habitat and within 1 mile of leks) **CHMA**: No similar action (No specific action in Butte. UMRBNM is Exclusion.)		**PHMA**: Exclusion **RHMA**: No similar action **GHMA**: No similar action **CHMA**: Avoidance	**PHMA**: Exclusion **RHMA**: • Exclusion (Cedar Creek, West Decker) • Same as GHMA (Billings) **GHMA**: • Exclusion o Within 3.3 km (2 miles) of active leks o UMRBNM o Crucial winter habitat • Avoidance o >2 miles from active leks **CHMA**: Avoidance	**PHMA**: • Exclusion o Within 3.3 km (2 miles) of active leks o UMRBNM o North Dakota o Crucial winter habitat • Avoidance o >2 miles from active leks **RHMA**: • Exclusion (Cedar Creek, West Decker) • Same as GHMA (Billings) **GHMA**: • Exclusion o UMRBNM o Crucial winter habitat • Avoidance o Within 3.3 km (2 miles) of active leks o Wind in HiLine per existing management actions • Open, subject to GRSG LUP objectives o >2 miles from active leks **CHMA**: Same as GHMA

Alternative 1 Summary	Alternative 2 Summary	Alternative 3	Alternative 4	Alternatives 5 and 6
Rights of Way				
Major **PHMA**: Avoidance **RHMA**: Avoidance **GHMA**: Avoidance **Minor** **PHMA**: Avoidance (Dillon open w/ RDFs and Buffers) **RHMA**: • Billings – Avoidance • Miles City – Allowed with design features **GHMA**: • Avoidance (South Dakota within 2 miles of leks) • Open (Dillon, Billings, Lewistown, HiLine, Miles City, North Dakota, and outside 2 miles from lek in South Dakota) (Corridors exist in UMRBNM, HiLine, and Billings, no specific action in Butte, UMRBNM avoidance) **Definitions**: Major: 100 kilovolts and over for overhead transmission lines, 24 inches and over in width for pipelines. Minor: other ROWs and land use authorizations/permits, such as smaller infrastructure and communication sites and towers.		**PHMA**: • Avoidance in currently designated corridors • Exclusion (otherwise) **CHMA**: Avoidance	**PHMA**: • Exclusion: o Surface disturbing or disruptive activities within 2km (1.2 miles) of active leks (in ND – occupied leks in 2010) o Crucial winter range • Avoidance o In existing corridors or ROWs o Rest of PHMA **RHMA**: Same as PHMA **GHMA**: Avoidance **CHMA**: Avoidance	**PHMA**: • Exclusion: o Surface disturbing or disruptive activities within 1km (0.6 miles) of active leks (in ND – active leks and those occupied in 2010) o Crucial winter range • Avoidance o In existing corridors or ROWs o Rest of PHMA **RHMA**: Same as GHMA **GHMA**: • Avoidance o Within 2 km (1.2 miles) of active leks o Crucial winter range • Open, subject to GRSG LUP objectives o >1.2 miles from active leks **CHMA**: Open

Table 21-27. Montana State-Specific Circumstances – Minerals

Alternative 1 Summary	Alternative 2 Summary	Alternative 3	Alternative 4	Alternatives 5 and 6
Minerals				
All HMAs: Where the federal government owns the mineral estate in PHMA and GHMA, and the surface is in nonfederal ownership, the federal government will apply the same stipulations, Conditions of Approval (COAs), and/or conservation measures and mineral RDFs if the mineral estate is developed on BLM administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. Where the federal government owns the surface and the mineral estate is in non-federal ownership in PHMA and GHMA, the federal government will apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee. (Language and inclusion varies, silent on other HMAs)		**All HMAs**: Where the federal government owns the mineral estate in GRSG HMAs, and the surface is in nonfederal ownership, the federal government will apply the same stipulations, Conditions of Approval (COAs), and/or conservation measures and mineral RDFs as if the mineral estate is developed on BLM administered lands in that management area, to the maximum extent permissible under existing authorities, and in coordination with the landowner. Where the federal government owns the surface and the mineral estate is in non-federal ownership in GRSG HMAs, the federal government will apply appropriate surface use COAs, stipulations, and mineral RDFs through ROW grants or other surface management instruments, to the maximum extent permissible under existing authorities, in coordination with the mineral estate owner/lessee.		

Alternative 1 Summary	Alternative 2 Summary	Alternative 3	Alternative 4	Alternatives 5 and 6
Oil and Gas (including Geothermal)				

PHMA:
• Open with Major stipulations (NSO)
• No WEMs in SFAs
RHMA:
• Open with Major stipulations (NSO in West Decker and South Carter)
• Open with Major stipulations (0.6 m NSO from leks in Billings)
• Open with moderate (CSU for Billings and Cedar Creek, but language varies)
• Open with Minor (TL w/in 3 miles of a lek in Billings)
GHMA:
• Open with Major stipulations (0.6 m NSO from leks in Billings, Lewistown, HiLine, Miles City, South Dakota)
• Open with Major stipulations (NSO in winter range in Billings and South Dakota)
• Open with moderate (CSU for crucial winter range in HiLine)
• Open with moderate (CSU for Dillon, North Dakota, HiLine, Miles City, and South Dakota, but language and distances vary)
• Open with Minor (TL varies by office including winter range, lek buffers, etc.)
Other:
• LN – GRSG Habitat and compensatory mitigation (some offices)
• ¼ mile lek NSO (Butte)
• Winter/spring TL (Butte)
• Geothermal is based on O&G where explicit decisions do not exist
UMRBNM: Closed
		PHMA: Closed
		CHMA: Open with Major Stipulations (NSO)
			All HMAs:
			• TL (Breeding and Winter)
			PHMA:
			• Open with Major Stipulations (NSO)
			• CSU for Disturbance/Density
			• Closed (UMRBNM)
			RHMA:
			• Open with Major stipulations (NSO in West Decker)
			• Open with moderate (CSU for Cedar Creek)
			• Billings-Musselshell (same as GHMA)
			GHMA:
			• Open with Major stipulations (NSO)
			  ○ 0.6 m from active leks
			  ○ Crucial winter range
			• Open with moderate (CSU for all GHMA)
			• Closed (UMRBNM)
			CHMA: Open with CSU
				HMAs: Same as 4

Nonenergy Leasable Minerals				
PHMA: Closed **RHMA**: Language/inclusion varies **GHMA**: Language/inclusion varies (No specific action in Butte, Miles City, and Billings, and UMRBNM Withdrawn)		**PHMA**: Closed **CHMA**: Open	**PHMA**: Closed **RHMA**: Closed **GHMA**: • UMRBNM (Withdrawn) • Other offices open **CHMA**: Open	**HMAs**: Same as 4

Alternative 1 Summary	Alternative 2 Summary	Alternative 3	Alternative 4	Alternatives 5 and 6
Saleable Minerals/Mineral Materials				
PHMA: • Lewistown (Open to new for both free and commercial use with guidelines) • Other offices closed (Open for new free use permits & expansion of existing) **RHMA**: Language/inclusion varies **GHMA**: Language/inclusion varies (No specific action in Butte, UMRBNM withdrawn)		**PHMA**: Closed **CHMA**: Open	**PHMA**: • Closed UMRBNM • Other offices closed (Open for new free use permits & expansion of existing) **RHMA**: Closed (Open for new free use permits & expansion of existing) **GHMA**: • UMRBNM (Withdrawn) • Other offices open **CHMA**: Open	**HMAs**: Same as 4
Locatable Materials				
PHMA: • The BLM recommended all SFAs for withdrawal from location and entry under the Mining Law of 1872. The proposed withdrawal itself is being analyzed in a separate NEPA document. Lands recommended for withdrawal would remain open for mineral location and entry under the Mining Law of 1872 unless and until the Secretary of the Interior withdraws them. • Withdrawn (UMRBNM) **RHMA**: Same as PHMA, but without the SFA recommendation for withdrawal. **GHMA**: Same as RHMA. (No specific action in Butte, UMRBNM withdrawn)		**PHMA**: • The BLM recommended all SFAs for withdrawal from location and entry under the Mining Law of 1872. The proposed withdrawal itself is being analyzed in a separate NEPA document. Lands recommended for withdrawal would remain open for mineral location and entry under the Mining Law of 1872 unless and until the Secretary of the Interior withdraws them. • UMRBNM (Withdrawn) **CHMA**: Open	**PHMA**: • Withdrawn (UMRBNM) **RHMA**: Same as PHMA **GHMA**: • UMRBNM (Withdrawn) • Other offices same as PHMA **CHMA**: Same as PHMA	**HMAs**: Same as 4

Table 21-28. Montana State-Specific Circumstances – Fire and Fuels

Alternative 1 Summary	Alternative 2 Summary	Alternative 3	Alternative 4	Alternatives 5 and 6
Fire and Fuels				
All HMAs: If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address: • why alternative techniques were not selected as a viable options; • how GRSG goals and objectives will be met by its use; • how the COT Report objectives will be addressed and met; • a risk assessment to address how potential threats to GRSG habitat will be minimized Prescribed fire as vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect GRSG habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality. (Slight variations between plans)		**All HMAs**: If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address: • why alternative techniques were not selected as a viable options; • how GRSG goals and objectives will be met by its use; • how the COT Report objectives will be addressed and met; • a risk assessment to address how potential threats to GRSG habitat will be minimized Prescribed fire as vegetation or fuels treatment shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect GRSG habitat in PHMA (e.g., creation of fuel breaks that will disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Prescribed fire in known winter range shall only be considered after the NEPA analysis for the Burn Plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.		

Table 21-29. Montana State-Specific Circumstances – Field Office Specific Actions

Alternative 1 Summary	Alternative 2 Summary	Alternative 3	Alternative 4	Alternatives 5 and 6
Dillon FO Objectives and Management Decisions				
Fire and Invasives Tool (FIAT): MDs including SSS MD 5, 6, 37; VEG Objective 2, VEG MD 2, 8, and 9; and MD FIRE 3, 5, 7, 9-13, 20, 21, and 33. Key Habitat References: MDs including as SSS MD 8, 9, 17, 18, 13, 41, and 42 Wild Horse and Burro Section		Remove or modify Management Actions to clarify the FIAT does not apply to SW Montana (geographic scope ended at Idaho border) Remove MDs with key habitat management actions (key habitats are an ID specific GRSG habitat effort). Remove MDs or clarify these only apply to WH&B's in Idaho (no WH&B HMAs in Dillon)		

21.2.4 Nevada/California

As noted in **Appendix 3** (GRSG HMA State-by-State Mapping Strategies) Nevada and California states developed their HMAs using a habitat prioritization model based on an intersection of seasonal habitat selection patterns and indices of space use to prioritize areas with varied relevance to GRSG. This model was initially developed for 2015 and is periodically updated with additional field data and advances in mapping products. An update of this model provided the base for HMA delineation in the 2019 planning effort. The model is currently being updated again and will incorporate GRSG survival metrics, which allow for the identification of population source areas. The latest version will be incorporated into this EIS following publication. The identification of source areas is unique to the States of Nevada and California, and the alternatives consider this draft data in both HMA identification and several management actions within this document. The role wildfire and invasive grasses play in the health of GRSG habitat in Nevada and California resulted in considering adjustments to several management actions focused on addressing these threats compared to the 2015 and 2019 decisions. Decisions being considered for amendment for these states are development of non-energy leasable minerals on lands where mining operations are currently authorized under 43 CFR Subpart 3715, 3802, or 3809, adjustment of allocation exception language considered in 2019, and clarification of application of perch deterrents and lek buffers to newly discovered leks.

Table 21-30. Nevada/California State-Specific Circumstances – Special Status Species

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Special Status Species				
MD SSS 1: In PHMAs and GHMAs, work with the proponent/applicant, whether in accordance with a valid existing right or not, and use the following screening criteria to avoid effects of the proposed human activity on GRSG habitat. A. First priority—locate project/activity outside PHMAs and GHMAs B. Second priority—if the project/activity cannot be placed outside PHMAs and GHMAs, locate the surface-disturbing activities in non-habitat areas first, then in the least suitable habitat for GRSG I. In non-habitat, ensure the project/activity will not create a barrier to movement or connectivity between seasonal habitats and populations C. Third priority—collocate the project/activity next to or in the footprint of existing infrastructure	Same as Alternative 1 (no change made in 2019). A.	**MD SSS 1:** In PHMAs and GHMAs, work with the proponent/applicant, whether in accordance with a valid existing right or not, and use the following screening criteria to avoid effects of the proposed human activity on GRSG: A. First priority—locate project/activity outside PHMAs and GHMAs while avoiding and/or minimizing direct and indirect impacts to GRSG and/or their habitat; B. Second priority—if the project/activity cannot be placed outside PHMAs and GHMAs, locate and adjust the project/activity to: a. avoid and/or minimize indirect impacts to lekking and source areas (e.g., PHMA+ in Coates et al. HMA manuscript in review; See **Appendix 3**) by using topography and/or other available methods to negate or reduce auditory and visual intrusions; AND b. locate direct impacts (i.e., surface-disturbing activities) in non-habitat areas first, then in the least suitable habitat for GRSG without creating a barrier to movement or connectivity between GRSG seasonal habitats and populations. C. Third priority—collocate the project/activity next to or in the footprint of existing infrastructure.		

Table 21-31. Nevada/California State-Specific Circumstances – Fire and Vegetation

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Fire and Vegetation Actions				
Not included	Not included	**MD VEG X (new):** Use collaborative planning efforts (e.g., Cooperative Range Improvement Agreement, Local Area Working Groups, Shared Stewardship, etc.) to develop and implement habitat restoration and enhancement projects. Projects of this type will use expertise and ideas from entities such as local landowners, local GRSG working groups, permitted land users, and other federal, state, county, and private organizations. Input from interested partners will be solicited by BLM and considered in development of restoration projects.		
Objective Fire 3: Protect post-fire treatments in SFA first, followed by PHMAs outside of SFA, and then GHMAs from subsequent wildfires.	**Objective Fire 3:** Protect post-fire treatments in PHMAs first, followed by GHMAs from subsequent wildfires.	**Objective FIRE 3**: Protect post-fire treatments, source areas (e.g., see **Appendix 3**), or areas that are vulnerable to invasive annual grass conversion, including areas essential for connectivity, in PHMAs first, followed by similar areas in GHMAs from subsequent wildfires. Incorporate the best available science in the prioritization of post-fire treatments.		
Not included	Not included	**MD FIRE X (new):** Prioritize actions (pre-suppression, suppression, and rehabilitation) that support the persistence of GRSG source areas (e.g., see **Appendix 3**). Use the best available science (e.g., Doherty et al. 2022, Ricca and Coates 2020, Stringham et al. 2016, etc.) to identify habitats essential for maintaining current GRSG populations.		
MD FIRE 23: If prescribed fire is used in GRSG habitat, the NEPA analysis for the Burn Plan will address: • Why alternative techniques were not selected as a viable option • How GRSG goals and objectives will be met by its use • How the COT report objectives will be addressed and met • A risk assessment to address how potential threats to GRSG habitat will be minimized. Allow prescribed fire as a vegetation or fuels treatment, and it shall only be considered after the NEPA analysis for the burn plan has addressed the four bullets outlined above. Prescribed fire can be used to meet specific	Same as Alternative 1 (no change made in 2019).	**MD FIRE 23:** Use prescribed fire designed to reduce wildfire risk or improve GRSG habitat, only when there is no other feasible means to achieve the same or similar result. The NEPA analysis for project implementation will address: • Why alternative techniques were not selected as a viable option • How GRSG goals and objectives will be met by its use • How the COT report objectives, as updated, will be addressed and met • A risk assessment to address how potential threats to GRSG habitat will be minimized. Prescribed fire shall only be considered after the NEPA analysis for the project has addressed the four bullets outlined above. Prescribed fire can be used to meet specific fuels objectives that will protect GRSG habitat in PHMAs (e.g., creation of fuel breaks, burning slash piles from conifer reduction treatments, burning high-elevation late brood-rearing habitat (e.g., restore senescent vegetation, etc.), used as a component with other treatment methods to combat annual grasses and restore native plant communities, etc.). Avoid prescribed broadcast burns in known GRSG winter habitat.		

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
fuels objectives that will protect GRSG habitat in PHMAs (e.g., creation of fuel breaks that would disrupt the fuel continuity across the landscape in stands where annual invasive grasses are a minor component in the understory, burning slash piles from conifer reduction treatments, used as a component with other treatment methods to combat annual grasses and restore native plant communities). Allow prescribed fire in known winter range, and it shall only be considered after the NEPA analysis for the burn plan has addressed the four bullets outlined above. Any prescribed fire in winter habitat will need to be designed to strategically reduce wildfire risk around and/or in the winter range and designed to protect winter range habitat quality.	*(See above.)*	*(See above.)*		
MD FIRE 25: Design fuels treatments through an interdisciplinary team process to expand, enhance, maintain, and protect PHMAs and GHMAs. Fuel reduction techniques, such as prescribed fire and chemical, biological (including targeted grazing), and mechanical treatments, are acceptable. Use green strips and fuel breaks, where appropriate, to protect seeding from subsequent fires.	Same as Alternative 1 (no change made in 2019).	**MD FIRE 25:** Design fuels treatments such as, but not limited to, conifer or annual invasive grass removal through an interdisciplinary team process to expand, enhance, maintain, and protect PHMAs and GHMAs. Fuel reduction techniques, such as mechanical, chemical, and biological (including prescribed and targeted grazing) treatments and prescribed fire (see MD FIRE 23), are acceptable. Use green strips and fuel breaks, where appropriate, to protect treatment areas from subsequent fires. Use the best available science (e.g., Doherty et al. 2022, Ricca and Coates 2020, Stringham et al. 2016, etc.) to identify habitats essential for maintaining current GRSG populations.		

Table 21-32. Nevada/California State-Specific Circumstances – Non-Energy Minerals

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Non-Energy Minerals				
MD MR 25: Manage PHMAs as closed to new non-energy leasable mineral leasing (see Appendix A; Figure 2-7).	**MD MR 25:** Manage PHMAs as closed to new non-energy leasable mineral leasing, unless the new non-energy leasable mineral lease meets one of the allocation exception criteria outlined in MD SSS 5 (see Appendix A; Figure 2-7).	**MD MR 25:** Manage PHMA as closed to new non-energy leasable mineral leasing.	**MD MR 25:** Manage PHMAs as closed to new non-energy leasable mineral (e.g., phosphate, sodium, potassium, sulfur, etc.) leasing, unless the new non-energy leasable mineral lease meets one of the allocation exception criteria outlined in MD SSS 5 (see Appendix A; Figure 2-7, in the 2019 NV/CA ARMPA) or the new non-energy leasable mineral has coincident occurrence within existing disturbance and is subject to a non-competitive lease. No additional direct or indirect impacts shall result from extraction of the new non-energy leasable mineral.	

Table 21-33. Nevada/California State-Specific Circumstances – Allocation Exception Criteria

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Allocation Exception Criteria				
{*MD SSS 5 in the 2015 NV/CA ARMPA addressed designation and management of SFAs. In the 2019 effort the SFAs were removed. This management action number was then used for the Allocation Exception Criteria. In this effort, SFAs are addressed as a cross-cutting topic in the HMA actions above. The management number here is less important than the management being considered. Under the 2015 NV/CA ARMPA, there was no specific action that provided exception criteria for allocations.*} **MD SSS 5:** Designate SFA, as shown on Figure 1-3 (of the NV/CA 2015 ARMPA) (2,797,400 acres). SFA will be managed as PHMAs, with the following additional management: • Recommended for withdrawal from the General Mining Act of 1872, subject to valid existing rights	**MD SSS 5 (Allocation Exception Criteria):** In PHMA, GHMA, and OHMA, the State Director may grant an exception to the allocations and stipulations described in Table 2-1 (of the 2019 NV/CA ARMPA): Comparative Summary of Alternatives if one of the following applies (in coordination with NDOW, SETT, and/or CDFW): i. The location of the proposed activity is determined to be unsuitable (by a biologist with GRSG experience using methods such as Stiver et. al. 2015, as revised) and lacks the ecological potential to become marginal or suitable habitat; and will not result in direct, indirect, or cumulative impacts on GRSG and its habitat. Management allocation decisions will not apply to those areas	**MD SSS 5 (Allocation Exception Criteria):** In PHMA, GHMA, and OHMA, the State Director (in coordination with NDOW, SETT, and/or CDFW) may grant an exception to the allocation decisions (described in Table 2-1: Summary of Allocation Decisions by GRSG Habitat Management Areas, in the 2019 NV/CA ARMPA and potentially amended through this planning effort in **Section 2.5.2**) if one of the following applies: i. {Consideration of non-habitat is removed from this section and addressed in **Section 2.5.2**, Criteria-Based Management for Non-Habitat within GRSG Habitat Management Areas. See that section for comparable language for these alternatives.} ii. The proposed activity will be authorized to address federal, state, or local government public health and safety concerns, specifically as they relate to preventing an emergency or responding to a catastrophic event such as a flood, wildfire, or earthquake. iii. The proposed activity is determined to be a routine administrative function conducted by federal, state or local governments, including renewal or reauthorization of prior existing uses, valid existing rights and existing infrastructure (i.e., rights-of-way for roads) or expansion of existing county or local government infrastructure that serves a public purpose and will have no adverse impacts on GRSG and its habitat, or is in compliance with BLM mitigation policy, CEQ regulations (40 CFR Part 1508.1(s) and the State's mitigation policy (NAC 232.400-480). iv. Exceptions to non-disposal or exchange of lands that are identified for retention in Appendix A, Figure 2-12 (in the 2019 NV/CA ARMPA) could be considered if (a) the lands in question are identified for disposal through previous planning efforts or address a Congressional Acts (e.g., the respective Lincoln and White Pine County Conservation, Recreation, and Development Acts) and are in conformance with State law (e.g., NAC 232.400-480), or (b) the agency can demonstrate that the disposal, including land exchanges, will have no adverse direct, indirect or cumulative impacts on GRSG and its habitat.	

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• Managed as NSO, without waiver, exception, or modification, for fluid mineral leasing • Prioritized for vegetation management and conservation actions in these areas, including, but not limited to land health assessments, wild horse and burro management actions, review of livestock grazing permits/leases, and habitat restoration (see specific management sections).	determined to be unsuitable if the area has passed a threshold and lacks the ecological potential to become marginal or suitable habitat. ii. The proposed activities impacts will be offset to result in no adverse impacts on GRSG or its habitat, through use of the mitigation hierarchy and the State's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law). In cases where exceptions may be granted for projects with a residual impact, voluntary compensatory mitigation consistent with the State's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law) will be one mechanism by which a proponent achieves the Approved RMPA goals, objectives, and exception criteria. When a proponent volunteers compensatory mitigation as their chosen approach to address residual impacts, the BLM will incorporate those actions	*(See above.)*		

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	into the rationale used to grant an exception. The final decision to grant a waiver, exception, or modification will be based, in part, on criteria consistent with the State's GRSG management plans and policies. iii. The proposed activity will be authorized to address public health and safety concerns, specifically as they relate to federal, state, local government and national priorities. iv. Renewals or re-authorizations of existing infrastructure in previously disturbed sites or expansions of existing infrastructure that do not result in direct, indirect, or cumulative impacts on GRSG and its habitat. v. The proposed activity is determined to be a routine administrative function conducted by federal, state or local governments, including prior existing uses, authorized uses, valid existing rights and existing infrastructure (i.e., rights-of-way for roads) that serve a public purpose and will have no adverse impacts on GRSG and its habitat, consistent with the State's mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of	*(See above.)*		

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
(See above.)	Nevada regarding compensatory mitigation, consistent with federal law). vi. Exceptions to non-disposal or exchange of lands that are identified for retention in Appendix A, Figure 2-12 could be considered if (a) they are identified for disposal through previous planning efforts or address a Congressional Acts (e.g., the respective Lincoln and White Pine County Conservation, Recreation, and Development Acts), (b) the agency can demonstrate that the disposal, including land exchanges, will have no adverse direct, indirect or cumulative impacts on GRSG and its habitat, or (c) adverse impacts on GRSG or its habitat will be offset, through use of voluntary compensatory mitigation, consistent with the States' mitigation policies and programs, such as the State of Nevada's Executive Order 2018-32 (and any future regulations adopted by the State of Nevada regarding compensatory mitigation, consistent with federal law).	*(See above.)*		

Table 21-34. Nevada/California State-Specific Circumstances – Lek Buffers

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Lek Buffers				
MD LR 17: Within 4 miles of active and pending leks in GRSG habitat, require ROW, permit, and lease holders to retrofit those portions of power lines and other utility structures with nesting and perch- deterring devices. Do this during the renewal and amendment process if adverse effects, such as increased nest predation, on GRSG populations have been documented. This requirement shall be predicated on research and monitoring studies specific to power lines or other utility structures.	Same as Alternative 1 (no change made in 2019).	**MD LR 17:** Within 4 miles of active and pending leks, require ROW, permit, and lease holders to retrofit those portions of power lines and other utility structures with nesting and perch- deterring devices. Do this during the renewal and amendment process. Monitor and maintain perch-deterring effectiveness through the life of the structures following guidance from scientifically accepted protocols.		
Concept not included.	Concept not included.	**MD SSS 18 (new**) – (insert after MD SSS 17, then move subsequent MDs down a number): If an Active or Pending Active lek is identified in an area outside of PHMA or GHMA lek buffer-distances will be applied as described in Appendix B (of the 2019 NV/CA ARMPA) to avoid direct and indirect impacts to lek activity and habitat. Active or Pending Active leks not included in the HMA model will be added when the model is updated.		

21.2.5 Oregon

State specific circumstances for the State of Oregon include management of 18 Areas of Critical Environmental Concern/Research Natural Areas (ACEC/RNA) as "Key RNAs" or "Key ACECs", as well as management of saleable minerals/mineral materials in GRSG HMAs. This amendment effort is limited to RMP-level actions needed to provide guidance for subsequent implementation-level actions. The land use allocation will be identified in the ROD, but if public lands are disposed of or devoted to a public purpose which precludes livestock grazing, a site-specific NEPA and a site-specific decision process pursuant to the Taylor Grazing Act and 43 C.F.R. 4100.4-2 is necessary to cancel permits and/or removal of livestock from these areas.

Key ACECs/RNAs

The 2015 Oregon GRSG ARMPA designated the entirety of fifteen (15) existing Areas of Critical Environmental Concern/Research Natural Areas (ACEC/RNAs) as "Key RNAs" and all of three additional ACECs as "Key ACECs" (see 2015 ARMPA Special Designations Objective SD 4 and Table 2-6). The 2015 Oregon ARMPA also allocated all or portions of thirteen Key RNAs as unavailable to livestock grazing. Two ACEC/RNAs are already unavailable to livestock grazing; Foster Flat in Three Rivers Field Office under the 1992 Three Rivers RMP and Guano Creek-Sink Lakes in Lakeview Field Office by a 1998 act of Congress. The three ACECs and fifteen ACEC/RNAs were designated in various, underlying district Resource Management Plans (RMPs) prior to the 2015 amendment.

During the 2019 GRSG RMP amendment process, BLM Oregon proposed and analyzed a reversal of the 2015 decision to make all or portions of the 13 key RNAs (excluding the two ACEC/RNAs allocated as unavailable to livestock grazing under the 1992 Three Rivers and 2003 Lakeview RMPs) available to livestock grazing. However, the 2019 GRSG ARMPA retained the Key RNA designations, along with the applicable Management Objectives and Management Direction (BLM OR 2019 FEIS; Pages 2-8 and 2-9). **Table 21-35** below displays, as Alternatives 1 and 2 respectively, the 2015 and 2019 estimated acreages available or unavailable to livestock grazing, along with anticipated changes to the number of Animal Unit Months (AUMs) affected by the availability/unavailability decisions.

Alternatives 3, 4, 5, and 6 are based upon changed habitat management area boundaries. In 2022, ODFW informed BLM that they were going to update core and low density HMA s. The timeline outlined by ODFW for updating and approving Core- and Low-Density areas was inconsistent with the EIS analysis process. Therefore, after coordination with the state, BLM used ODFW's published methodology and data up through the 2022 field season to estimate likely core habitat and draft PHMA map.

Under Alternative 3, all proposed PHMA and GHMA from Alternative 4 would become PHMA and be allocated as unavailable to livestock grazing, including all of the 13 key RNAs. The mapping process referenced above became the basis for BLM's proposed PHMA and GHMA designations in Alternative 4. This alternative would retain the 2015 decision that makes all or portions of the 13 key RNAs as unavailable to livestock grazing. Alternatives 5 and 6 propose management clarifications and changes to areas unavailable to livestock grazing. The updated Key RNAs and revised portions allocated as unavailable to livestock grazing would continue to be managed over the long term to meet the objectives established by the 2015 ARMPA and to reflect a diversity of vegetative communities that are representative of important GRSG habitat needs.

Under Alternatives 5 and 6, modifications to areas allocated as unavailable to livestock grazing in the 13 key RNAs are based on district-generated, site-specific information. The proposed modifications vary by individual Key RNA and reflect site specific vegetation or habitat conditions in those areas (**Table 21-35**

below). In most cases, the Key RNA designation and objectives to provide opportunities for research and serve as a broad spectrum of vegetation communities across GRSG habitat are retained. Additionally, the BLM is proposing eliminating or modifying certain portions or all of areas within Key RNAs that were allocated as unavailable to livestock grazing, to avoid resource conflicts. These conflicts include but are not limited to constructing fences in proximity to cultural sites, within 1.2 miles of an occupied or pending lek (a conformance violation of the 2015 ARMPA) or within existing designated Wilderness Study Areas. Under Alternatives 5 and 6, and depending on the specific Key RNA, the area presently allocated as unavailable to livestock grazing under the 2015 ARMPA may be reallocated to livestock grazing or the size and/or location of the area excluded from grazing may be modified.

The alternatives below present the range of alternatives for management of the Key RNAs/Key ACECs.

Table 21-35. Oregon Key RNAs – Summary of Estimated Acres and AUMs by Alternative[1]

RNA Name	District	Total Acres of the Key RNA	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternatives 5 and 6	
			Key RNA Acres Available for Livestock Grazing	Key RNA Acres / estimated AUMs Unavailable for Livestock Grazing	Key RNA Acres / estimated AUMs Available for Livestock Grazing	Key RNA Acres Unavailable for Livestock Grazing	Key RNA Acres Available for Livestock Grazing	Key RNA Acres / estimated AUMs that would continue to be Unavailable for Livestock Grazing	Key RNA Acres Available for Livestock Grazing	Key RNA Acres / estimated AUMs that would continue to be Unavailable for Livestock Grazing	2015 Key RNA Acres that would become Available for Livestock Grazing	Key RNA estimated Acres / estimated AUMs that would become Unavailable for Livestock Grazing
Black Canyon	Vale	2,600 [2]	0	2,600/260	2,600/260	0	0	2.600/260	0	2,600/260	2,600	0/0
Dry Creek Bench	Vale	1,637	1,015	622/52	1,637/52	0	0	1,637/52	1,015	622/52	622	0/0
East Fork Trout Creek	Burns	361	57	304/47	361/47	0	0	361/0 [9]	57	304/0	57 [3]	304/0 [3]
Fish Creek Rim	Lakeview	8,725	5,966	2,750/110	8,725/110	0	0	8,725/110	5,966	2,750/110	8,621	95/4 [4]
Foley Lake	Lakeview	2,228	959	1,269/51	2,228/51	0	0	2,228/51	959	1,269/51	1,342	797/33 [4]
Foster Flat	Burns	2,687	0	2,687	0	2,687	0	2,687	0	2,687	0	2,687
Guano Creek–Sink Lakes	Lakeview	11,185	0	11,185	0/0	11,185	0	11,813	0	11,813	0	11,813 [5]
Lake Ridge	Vale	3,872	3,091	778/74	3,872/74	0	0	3,872/74	3,091	778/74	778	13/0 [6]
Mahogany Ridge [7] (southern unit only)	Vale	444	527	155/27	155/27	0	0	140/27	527	140/27	15	140/0
North Ridge Bully Creek	Vale	1,569	1,405	164/19	1,569/19	0	0	1,569/19	1,405	164/19	164	0/0
Rahilly-Gravelly	Lakeview	18,678	10,396	8,282/586	18,678/586	0	0	18,678/586	10,396	8,282/586	16,653	2,025/144

RNA Name	District	Total Acres of the Key RNA	Alternative 1		Alternative 2		Alternative 3		Alternative 4		Alternatives 5 and 6	
			Key RNA Acres Available for Livestock Grazing	Key RNA Acres / estimated AUMs Unavailable for Livestock Grazing	Key RNA Acres / estimated AUMs Available for Livestock Grazing	Key RNA Acres Unavailable for Livestock Grazing	Key RNA Acres Available for Livestock Grazing	Key RNA Acres / estimated AUMs that would continue to be Unavailable for Livestock Grazing	Key RNA Acres Available for Livestock Grazing	Key RNA Acres / estimated AUMs that would continue to be Unavailable for Livestock Grazing	2015 Key RNA Acres that would become Available for Livestock Grazing	Key RNA estimated Acres / estimated AUMs that would become Unavailable for Livestock Grazing
South Bull Canyon [8]	Vale	770	21	749/116	749/116	0	0	749/116	43	749/116	492	257/0
South Ridge Bully Creek	Vale	621	224	397/61	621/61	0	0	621/61	224	397/61	397	0/0
Spring Mountain	Vale	996	0	996/153	996/153	0	0	996/153	0	996/153	995	0/0
Toppin Creek Butte [9]	Vale	3,998	1,133	2865/216	3,998/216	0	0	2,865/216	1,133	2,865/216	2,626	239/0
Totals		60,362	24,996	35,803/1,772	46,775/1,772	13,872	0	59,532/1,772	24,996	36,416/1,772	35,403	18,370/288

Notes:

1 – Acreage estimates and AUM estimates/calculations have been updated from the 2015 ARMPA ROD .

2 – Black Canyon ACEC/RNA acres were reduced by 40 acres to reflect corrections in GIS of the boundary.

3 – The Oregon 2015 ARMPA estimated that 47 AUMs may be removed based strictly on the change in acreage. The 2019 RMPA used the same estimate of 47 AUMs. Alternatives 1 and 2 reflect the numbers from the prior EISs. This key RNA has been excluded from the allotment and pasture through an administrative process; no change to permitted AUMs is necessary because the remaining pasture can support the estimated 47 AUMs associated with the key RNA made unavailable to livestock grazing.

4 – Estimated AUMs for Alternatives 5 and 6 associated with the area allocated as 'unavailable to livetock grazing' would be absorbed in portions of the associated pasture and/or allotment in which the Key RNA exists. Site-specific monitoring would inform if AUMs cannot be absorbed, with site-specific NEPA and grazing decisions to implement any reductions in AUMs as a result of implementing removal of livestock from those areas allocated as unavailable to livestock grazing as a result of this alternative.

5 – The 2015 and 2019 estimates of acres used the Guano Creek Wilderness Study Area boundary. The Guano Creek-Sink Lakes ACEC/RNA is much smaller and contained entirely within the larger WSA boundary. The corrected acres reflect just the ACEC/RNA portion that is, and would continue to be, unavailable to livestock grazing use under all alternatives.

6 – Lakeridge key RNA would become available for livestock grazing, however a 13-acre area adjacent to the 2015 ARMPA identified Lakeridge key RNA and still within the ACEC/RNA would be available for research and would be unavailable to livestock grazing.

7 – Mahogany Ridge ACEC/RNA is divided into two "Parcels", totaling 622 acres. The southern parcel is 476 acres; the Key RNA is located solely in the southern parcel and totals 155 acres. In Alternatives 5 and 6, OR/WA BLM proposes 140 acres be retained as Key RNA and allocated as unavailable to livestock grazing. 15 acres would be outside of the Key RNA under this alternative and reallocated to available to livestock grazing.

8 – South Bull Canyon data has been revised based on district specific information resulting from assessments made during the closure process. The entire ACEC/RNA acreage is 770 of which 749 acres were designated as Key RNA (and allocated as unavailable to livestock grazing). The acres that would be allocated as available to livestock grazing under Alternatives 5 and 6 is the proposed new exclosure (and retention of unavailable allocation) subtracted from the 2015 Key RNA (749 minus 257 = 492)

9 – Exception criteria would be have to be met for construction of exclosure fencing within WSA or increased management presence would be needed.

Table 21-36. Oregon State-Specific Circumstances – Research Management Areas

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Research Natural Areas				
Objective SD 4: Manage key RNAs, or large areas within the RNAs, as undisturbed baseline reference areas for the sagebrush plant communities they represent that are important for Greater Sage-grouse. Manage key RNAs for minimum human disturbance allowing natural succession to proceed.	**Objective SD 4:** Manage the Foster Flat and Guano Creek–Sink Lakes RNAs as undisturbed baseline reference areas for the sagebrush plant communities they represent that are important for Greater Sage Grouse. Minimize human disturbance in all 15 key RNAs, allowing natural ecological processes to proceed.	**Objective SD 4:** Manage Key RNAs, or large areas within the RNAs, as baseline reference areas for sagebrush plant communities they represent that are important to Greater Sage-grouse. Active or passive restoration actions are allowed within Key RNAs to support maintenance or improvement of identified vegetation communities and to meet GRSG habitat objectives.		
MD LG 1: All or portions of key RNAs will be unavailable to grazing (see **Table 21-35** above). Determine whether to remove fences, corrals, or water storage facilities (e.g. reservoirs, catchments, ponds).	**MD LG 1** is deleted. Livestock grazing management in the 13 key RNAs returns to being governed by applicable district RMPs as amended by the 2015 Oregon Greater Sage-Grouse ROD/ARMPA goals, objectives, and management decisions.	**MD LG 1:** All, some, or none of key RNAs will be unavailable to livestock grazing (see **Table 21-35** above). Determine whether to remove, modify or construct additional fences, corrals, or water storage facilities (e.g. reservoirs, catchments, ponds). New proposed water-related range improvements (springs, pipelines, troughs, etc.) may be authorized where existing critical water development is no longer accessible as a result of implementing areas within the Key RNAs as unavailable to livestock grazing.		
All or part of Key RNAs identified would be closed to all disturbance types, including livestock grazing, OHV, minerals development, and lands and realty actions. The reason for these closures would be for research-related activities, including studying vegetative communities important to GRSG that do not contain land disturbing activities, as well as studying the effects of climate change on these vegetative communities.	RNAs remain subject to management to promote the key characteristics of the RNAs, including regulation of grazing, to maintain and promote the key characteristics of the RNAs.	Key RNAs and all PHMA areas allocated as unavailable to livestock grazing.	Key RNAs and areas allocated as unavailable to livestock grazing to facilitate the ability to compare un-grazed vegetation types to grazed vegetation types.	

Table 21-37. Oregon State-Specific Circumstances – Saleable Minerals/Mineral Materials

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Saleable Minerals/Minerals Management				
MD MR 14: PHMA are closed to new mineral material sales. However, these areas remain "open" to free use permits and the expansion of existing active pits, only if the following criteria are met: • The activity is within the Oregon PAC (also called BSU, and is the same footprint as PHMA) and project area disturbance cap. • The activity is subject to the provisions set forth in the mitigation framework in Appendix F (in the 2015 OR GRSG ARMPA). • All applicable required design features are applied and the activity is permissible under screening criteria (see SSS 13 in the 2015 OR GRSG ARMPA). Federal Highway Act material sites are a ROW and not subject to mineral sale requirements. See ROW section for management (MD LR 7 in the 2015 OR GRSG AMPRA).	Same as Alternative 1 (no change made in 2019).	**MD MR 14:** PHMA are closed to new mineral material sales.	Same as Alt 1, with the following addition: If BLM's NEPA analysis determines that the use or expansion of an existing, authorized material site (up to the entire footprint of the existing authorized area) could be implemented without significant impacts (i.e., upon completion of an Environmental Assessment, BLM determines that a FONSI is applicable) and the applicable area has not met the disturbance cap, BLM is authorized to implement without further analysis or mitigation.	

21.2.6 Utah

The BLM will address GHMA management as a Utah state-specific circumstance. HMA management in Utah is a result of different approaches to planning in the 2015 and 2019 Utah GRSG RMP amendments. In the BLM's 2019 GRSG ARMPA, the BLM increased habitat management area alignment with the State of Utah's Sage-Grouse Management Areas (SGMAs) and prioritized the importance of management prescriptions on PHMA. This was to focus protection on seasonal habitats that support over 95 percent of GRSG populations in Utah, and removed GHMA designation and management. .

The state-specific circumstances for the State of Utah being addressed in this effort is the result of the 2019 amendment effort. The remainder of this section includes management alternatives specific to GHMA in Utah under alternatives 4, 5 and 6. Refer to **Appendix 2** for specific language from the 2015 and 2019 amendments, and **Appendix 3** for additional information on the Utah approaches for identifying habitat management areas.

Table 21-38. Utah State-Specific Circumstances – General Habitat Management Areas

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Special Status Species (SSS)				
MA-SSS-5: In GHMA, apply the following management to meet the objective of a net conservation gain for discretionary actions that can result in habitat loss and degradation: A- Existing Management: Implement GRSG management actions included in the existing RMPs and project specific mitigation measures associated with existing decisions. B- Net Conservation Gain: In all GRSG habitat, in undertaking BLM management actions, and, consistent with valid existing rights and applicable law, in authorizing third-party actions that result in habitat loss and degradation, the BLM will require and ensure mitigation that provides a net conservation gain to the species, including accounting for any uncertainty associated with the effectiveness of such mitigation. This will be achieved by avoiding, minimizing, and compensating for impacts by applying beneficial mitigation actions. Exceptions to net conservation gain for GRSG may be made for vegetation treatments to benefit Utah prairie dog. Mitigation will be conducted according to the mitigation	**MA-SSS-5:** No similar action.	**MA-SSS-5:** No similar action.	**MA-SSS-5:** In GHMA, apply the following management to meet a minimum standard of no net loss for discretionary actions that can result in habitat loss and degradation: A- Existing Management: Same as Alternative 1. B- Net Conservation Gain: Apply a minimum standard of no net loss consistent with cross-cutting language. Refer to Mitigation in **Table 21-4**. C- Buffers: In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will assess and address impacts within the lek buffer-distances identified in the US Geological Survey Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239; Manier et al. 2014) in accordance with Appendix B, Applying Lek-Buffer Distances (Utah 2019 ARMPA). D- Required Design Features/Best Management Practices: Same as Alternative 1.	**MA-SSS-5:** Same as Alternative 4

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
framework contained in Appendix F (Utah 2015 ARMPA). C- Buffers: In undertaking BLM management actions, and consistent with valid and existing rights and applicable law in authorizing third-party actions, the BLM will apply the lek buffer-distances identified in the US Geological Survey Report Conservation Buffer Distance Estimates for Greater Sage-Grouse – A Review (Open File Report 2014-1239; Manier et al. 2014) in accordance with Appendix B (Utah 2015 ARMPA). D- Required Design Features/Best Management Practices: In GHMA, apply the fluid mineral RDFs that are associated with GHMA identified in Appendix C (Utah 2015 ARMPA) when authorizing/permitting site-specific fluid mineral development activities/projects. The applicability and overall effectiveness of each RDF cannot be fully assessed until the project level when the project location and design are known. Because of site specific circumstances, some RDFs may not apply to some projects and/or may require slight variations. All variations in RDFs will require that at least one of the following be demonstrated in the NEPA analysis associated with the project/activity:	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
• A specific RDF is documented to not be applicable to the site-specific conditions of the project/activity (e.g. due to site limitations or engineering considerations). Economic considerations, such as increased costs, do not necessarily require that an RDF be varied or rendered inapplicable; • An alternative RDF, state-implemented conservation measure, or plan-level protection is determined to provide equal or better protection for GRSG or its habitat; • A specific RDF will provide no additional protection to GRSG or its habitat.	*(See above.)*	*(See above.)*	*(See above.)*	*(See above.)*
MA-SSS-6 <u>Sage-Grouse Management Outside PHMA/GHMA</u> Proposed projects within State of Utah SGMA and USFWS priority areas for conservation (PAC), as well as adjacent to PHMA outside these areas, will consider impacts on GRSG and implement measures to mitigate impacts when preparing site-specific planning and environmental compliance documents. Outside of PHMA, prior to site-specific authorizations, the BLM will evaluate habitat conditions and may require surveys to determine if the project area contains GRSG habitat (FLPMA, 43 United States Code (USC) 1701 Sec. 201 (a); BLM Manual	**MA-SSS-6:** <u>Sage-Grouse Management Outside PHMA</u> Outside PHMA, implement GRSG management actions included in the RMPs and project-specific mitigation measures associated with decisions that predated the 2015 amendments. Proposed projects within State of Utah SGMA and USFWS PACs, as well as adjacent to PHMA outside these areas, will consider impacts on GRSG and may implement measures to mitigate impacts on GRSG populations within adjacent PHMA when preparing site-specific planning and environmental compliance documents.	**MA-SSS-6:** Same as Alternative 2.	**MA-SSS-6**: Same as Alternative 2 but applying management to areas outside GHMA based on amended GHMA boundaries.	**MA-SSS-6:** Same as Alternative 4.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
6840.04 D3; BLM-M-6840.04 E2). Surveys will be required prior to authorizing discrete anthropogenic disturbances within 4 miles of an occupied lek that is located in PHMA, but only in existing sagebrush. If an area is determined to be GRSG habitat (e.g., nesting, brood-rearing, winter, transition), mitigation will be considered as part of the project level NEPA analysis and will be attached as conditions of approval to new discretionary actions, if deemed necessary to protect the habitat (BLM Manual 6840.04 D 5). Measures that may be considered include those identified in Appendix C. (Utah 2015 ARMPA) Outside of PHMA, but within SGMAs and PACs, avoid removal of sagebrush and minimize development that creates a physical barrier to GRSG movement; these areas may be used by GRSG to connect to other populations or seasonal habitat areas. Exceptions shall be made for vegetation treatments to benefit Utah prairie dog, where the landscape will be managed for both species. Outside of PHMA, but within SGMAs and PACs, consider noise and permanent structure stipulations around leks. Outside PHMA, portions of State of Utah opportunity areas (see	Outside of PHMA, but within SGMAs and PACs, avoid removal of sagebrush and minimize development that creates a physical barrier to GRSG movement; these areas may be used by GRSG to connect to other populations or seasonal habitat areas. Exceptions shall be made for vegetation treatments to benefit Utah prairie dog, where the landscape will be managed for both species. Outside of PHMA, but within SGMAs and PACs, consider noise and permanent structure stipulations around leks. Outside PHMA, after analyzing the impacts using the buffer distances identified in Appendix B (Utah 2019 ARMPA) from a lek that is located in PHMA, portions of State of Utah opportunity areas will be managed with the following allocations: • Fluid minerals will be open for leasing with CSU stipulations (noise and tall structures). • Lands ROWs, permits, and leases will be avoided, applying avoidance criteria for noise and tall structures. Avoid siting wind energy development in opportunity areas within the buffer distances identified in Appendix B (Utah 2019 ARMPA) from occupied GRSG leks that are in PHMA, if the lek buffer analysis as identified in Appendix B (Utah 2019	*(See above.)*	*(See above.)*	*(See above.)*

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Utah 2015 Final EIS Map 2.4) within 4 miles of a lek that is located in PHMA will be managed with the following allocations: • Fluid minerals will be open for leasing with CSU stipulations (noise and tall structures). • Lands ROWs, permits, and leases will be avoided, applying avoidance criteria for noise and tall structures. Do not site wind energy development in opportunity areas within 5 miles from occupied GRSG leks that are in PHMA. Outside of PHMA, avoid and minimize effects from discrete anthropogenic disturbances in areas that have been treated with the intent of improving or creating new GRSG habitat. Evaluate conditions in the treated area to determine if it is providing habitat for GRSG and if additional measures are necessary to protect the habitat.	ARMPA) shows that siting wind energy development in opportunities areas will impact lek persistence within PHMA. Outside of PHMA, avoid and minimize effects from discrete anthropogenic disturbances in areas that have been treated with the intent of improving or creating new GRSG habitat. Evaluate conditions in the treated area to determine if it is providing habitat for GRSG and if additional measures are necessary to protect the habitat. Outside of PHMA, provide that acres of GRSG seasonal habitat (based on best available maps, then confirmed to be regularly used by GRSG Grouse to sustain one or more seasonal habitat requirements through coordination with the appropriate State of Utah agency and through on-the-ground information) that is lost to habitat degradation actions (Appendix C, Table C.2 of the Utah 2015 ROD/ARMPA) are replaced by creating/improving GRSG habitat within PHMA.	*(See above.)*	*(See above.)*	*(See above.)*

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Changes to Other Sections/Management Actions				
The following management actions include a reference to GHMA, usually just pointing to the GHMA polygons or in a prioritization approach (see **Appendix 2**, Utah existing GRSG management): • MA-SSS-1 • MA-FIRE-8 • MA-LG-1 • MA-LG-5 • MA-WHB-2 • Objective MR-1 • MA-MR-20 • MA-MR-24 • MA-RE-1	No GHMA in Utah under these alternatives, so no similar action.		Same as Alternative 1, but with the inclusion of the changes by alternative described in the rangewide alternatives (**Section 2.5**), including the updated GHMA boundaries described under Alternatives 4, 5 and 6.	
The following management actions include a reference to GHMA, only include a reference to GHMA that references application of MA-SSS-5. • MA-MR-1 • MA-MR-4 • MA-MR-14 • MA-MR-16 • MA-MR-23 • MA-LR-7	No GHMA in Utah under these alternatives, so no similar action.		Same as Alternative 1, by applying the amended MA-SSS-5 language described above and the updated GHMA boundaries described under Alternatives 4, 5, and 6.	

21.2.7 Wyoming

Wyoming's Alternatives 5 and 6 are considering Stewardship Habitat Management Areas (SHMA) in addition to PHMA and GHMA. The SHMA designation is being applied in northeastern Wyoming where private landowners worked with the State of Wyoming to establish management objectives and approaches.

The remainder of this section includes the alternatives related to the applicable management actions associated with SHMA. Because these areas are only being considered under Alternative 5 and 6, there is no corresponding actions under Alternatives 1-4.

Table 21-39. Wyoming State-Specific Circumstances – Additional Habitat Management Area

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Habitat Management Area Alignments				
Not applicable	Not applicable	Not applicable	Not applicable	Stewardship Habitat Management Areas (SHMAs) as defined for Wyoming are GRSG habitats that are generally characterized by large percentages of private land, existing disturbance and prior and existing rights, and fragmented landscapes but that continue to support substantial populations of GRSG, provide important connections between populations, and are important for maintaining GRSG populations. Management in SHMA is consistent with GHMA restrictions.
Major Land Use Allocations				
Not applicable	Not applicable	Not applicable	Not applicable	Allocations in SHMA same as GHMA restrictions as proposed for Alternatives 5 and 6 in the cross-cutting topics above.
Fluid Mineral Leasing/Development				
Not applicable	Not applicable	Not applicable	Not applicable	Fluid mineral leasing/development in SHMA same as proposed for Alternatives 5 and 6 in the cross-cutting topics above.
Waivers, Exceptions, and Modifications (WEMs)				
Not applicable	Not applicable	Not applicable	Not applicable	WEMs in SHMA same as those proposed for active leks in GHMA for Alternatives 5 and 6 in the cross-cutting topics above.
Mitigation				
Not applicable	Not applicable	Not applicable	Not applicable	Mitigation in SHMA same as proposed for Alternatives 5 and 6 in the cross-cutting topics above.
Wind/Solar and Major ROWs				
Not applicable	Not applicable	Not applicable	Not applicable	Wind/Solar and Major ROWs in SHMA same as proposed for GHMA in Alternatives 5 and 6 in the cross-cutting topics above.
Adaptive Management				
Not applicable	Not applicable	Not applicable	Not applicable	Adaptive management in SHMA same as proposed for GHMA.
Application of Habitat Objectives				
Not applicable	Not applicable	Not applicable	Not applicable	Application of Habitat objectives in SHMA same as proposed for Alternatives 5 and 6 in the cross-cutting topics above.
Disturbance Caps				
Not applicable	Not applicable	Not applicable	Not applicable	Not applicable (disturbance caps in SHMA same as current GHMA)
Threats from Predation				
Not applicable	Not applicable	Not applicable	Not applicable	Threats from predation in SHMA same as proposed for PHMA for Alternatives 5 and 6 in the cross-cutting topics above.
Livestock Grazing				
Not applicable	Not applicable	Not applicable	Not applicable	Livestock grazing in SHMA same as proposed for PHMA for Alternatives 5 and 6 in the cross-cutting topics above.
Wild Horse and Burro Management				
Not applicable	Not applicable	Not applicable	Not applicable	Wild horse and burro management in SHMA same as proposed for PHMA for Alternatives 5 and 6 in the cross-cutting topics above.

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternatives 5 and 6
Additional Management Considerations				
Not applicable	Not applicable	Not applicable	Not applicable	In partnership with appropriate Federal and State Agencies and landowners and their representatives, encourage the development and implementation of landowner-led conservation benefit agreements in SHMA that focus on ensuring the long-term viability of GRSG populations in the area, and at a minimum identify key habitats and linkages, potential threats to GRSG and its habitat, appropriate conservation measures, and an avoid/minimize/compensate strategy that identifies mitigation opportunities within the boundaries of SHMA.
Not applicable	Not applicable	Not applicable	Not applicable	Because the functional movement (i.e., movements that result in genetic connectivity) of GRSG likely occurs among leks, encourage the establishment of conservation benefit agreements that include management measures specific to maintaining active leks in SHMAs.
Not applicable	Not applicable	Not applicable	Not applicable	Support research that identifies habitat conditions that promote or limit the movement of GRSG through a landscape to better inform management of SHMAs. Research supported by BLM and partners should be actionable.
Not applicable	Not applicable	Not applicable	Not applicable	Encourage the development and implementation of invasive vegetation – including encroaching native species – management strategies in SHMA. Strategies should be inclusive of all private and public land managers and include, but not be limited to: engagement of all pertinent stakeholders, inventory and monitoring requirements, prioritization approaches, treatment and removal options, restoration (to include site-specific management of livestock), responses to wildfire, and an adaptive management framework.
Not applicable	Not applicable	Not applicable	Not applicable	Work with the appropriate State and Federal agencies to establish wildfire response in SHMA at the same priority as protection of property.
Not applicable	Not applicable	Not applicable	Not applicable	To minimize impact of predators to GRSG, encourage the development of a predator management plan in SHMA. Plans should include, but not be limited to: coordination requirements with appropriate State and Federal agencies if implementation of the plan becomes necessary, assessments of habitat conditions and relationships with predator populations and impacts to GRSG, anthropogenic structure design details to reduce opportunities for corvid and raptor perching and nesting, disposal options for anthropogenic food subsidies, approaches for addressing predation from domestic pets, descriptions of concurrent management actions required to address GRSG survival concerns long-term (for example, habitat enhancement), and monitoring requirements.

Appendix 22

Draft RMPA/EIS Public Outreach and Responses to Substantive Public Comments

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Appendix 22. Draft RMPA/EIS Public Outreach and Responses to Substantive Public Comments

This appendix details the BLM's public comment period on the Draft RMPA/EIS and summarizes and provides responses to all substantive public comments received.

22.1 Draft RMPA/EIS Comment Process

Section 202 of the Federal Land Policy Management Act, as amended, the National Environmental Policy Act (NEPA), as amended, the Council on Environmental Quality NEPA implementing regulations at 40 CFR 1500, the Department of the Interior NEPA Implementing regulations at 43 CFR 46, and BLM's Resource Management Planning (RMP) regulations at 43 CFR 1610.2 all guide public involvement in the BLM's RMP and NEPA processes. All comments received before reaching a decision must be considered to the extent feasible. Specifically, for Environmental Impact Statements (EIS), agencies must respond to all substantive written comments submitted during the public comment period (40 CFR 1503.4). Non-substantive comments are reviewed and considered by the BLM, but only substantive comments are responded to. To merit a written response, comments must be in writing (including paper or electronic format), substantive, and timely.

22.1.1 Public Comment Period

BLM published a Notice of Availability (NOA) of Draft RMPA/EIS in the *Federal Register* on March 14, 2024, on the same day as the Environmental Protection Agency's NOA in the *Federal Register*, initiating a 90-day comment period that ended on June 13, 2024. As required by the BLM RMP regulations in place at the time of publication at 43 CFR 1610.7-2, the comment period also included a 60-day comment period on the Areas of Critical Environmental Concern (ACECs) being considered[1]. The BLM accepted written comments by mail, fax, email, and through an online comment form on the BLM's National NEPA Register (https://eplanning.blm.gov/eplanning-ui/project/2016719/510).

During the comment period, the BLM held two virtual public meetings and eleven in-person meetings throughout the planning areas (see **Table 22-1**, Public Meeting Summary).

Table 22-1. Public Meeting Summary

Meeting Date	Location	Meeting Time
April 9, 2024	Virtual/Zoom	1:00-3:00pm MT
April 11, 2024	Billings, MT	6:00-8:00pm MT
April 16, 2024	Reno, NV	6:00-8:00pm PT
April 17, 2024	Craig, CO	6:00-8:00pm MT
April 17, 2024	Lakeview, OR	6:00-8:00pm PT

[1] The 43 CFR 1610.7-2 regulations have been revised since the Draft RMPA/Draft EIS was issued. Under the revised regulations, the public comment and review period for ACECs is not specified in the regulation and would follow the same public comment and review period as specified and required for the associated RMP, RMP revision, or applicable RMP amendment.

Meeting Date	Location	Meeting Time
April 18, 2024	Cheyenne, WY	5:00-7:00pm MT
April 18, 2024	Boise, ID	5:00-7:00pm MT
April 18, 2024	Ontario, OR	6:00-8:00pm MT
April 22, 2024	Rock Springs, WY	5:00-7:00pm MT
April 23, 2024	Worland, WY	5:00-7:00pm MT
April 23, 2024	Salt Lake City, UT	6:00-8:00pm MT
April 24, 2024	Casper, WY	5:00-7:00pm MT
April 25, 2024	Virtual/Zoom	6:00-8:00pm MT

The BLM received a total of 39,307 comment letter submissions during the comment period, including approximately 6,000 individual comments. Most comment submissions were form letters, as detailed below.

BLM received some submissions past the close of the comment period, during the development of the GRSG Proposed RMPA/Final EIS. To the extent practicable, the BLM has considered these submissions received; however, late submissions are not addressed in the response to comments and are not summarized in this report.

22.1.2 Review of Public Comments

The BLM recognizes that commenters invested considerable time and effort to submit comments on the Draft RMPA/EIS. The agency utilized a systematic comment analysis method to ensure all timely comments were considered, as directed by CEQ, DOI NEPA regulations, and BLM's RMP regulations.

Table 22-2 summarizes the 39,307 comment letters by submittal type, and Table 22-3 summarizes comment submissions by delivery type. The BLM received most comment submissions via email, followed by those submitted through the National NEPA Registers (**Table 22-3**). The BLM also received hard-copy submissions at the scheduled public meetings and via mail.

Table 22-2. Comment Submissions, by Type

Submission Type	Number of Submissions
Unique submissions	557
Form letters	38,715
"Form plus" submissions	35
Total	**39,307**

Table 22-3. Comment Submissions, by Delivery Type

Delivery Type	Number of Submissions
BLM's National NEPA Register	845
Email	38,447
Hard-copy submission	15
Total	**39,307**

The BLM diligently considered each comment letter. The comment analysis process involved determining whether a comment was substantive or not substantive. According to the BLM NEPA Handbook (H-1790-1), a substantive comment does one or more of the following:

- Questions, with a reasonable basis, the accuracy of the information or analysis in the EIS
- Questions, with a reasonable basis, the adequacy of the information or analysis in the EIS
- Presents reasonable alternatives other than those in the Draft EIS that meet the purpose and need of the proposed action and address significant issues
- Questions, with a reasonable basis, the merits of an alternative or alternatives
- Causes changes in or revisions to the proposed action
- Questions, with a reasonable basis, the adequacy of the planning process itself

The BLM's NEPA handbook further specifies that substantive comments include comments on the adequacy of the analysis, comments that identify new impacts, alternatives, or mitigation measures, and disagreements of significance determinations. Comments that failed to meet the above description were considered and identified as not substantive.

On receipt, each comment letter was assigned an identification number and logged into a database that allowed the BLM to organize, categorize, and respond. Comments from each letter were coded to appropriate categories, based on content. The categories generally follow the sections presented in the Draft RMPA/EIS, though some related to the planning process or editorial concerns.

Some comments received throughout the comment analysis process expressed personal opinions or preferences, had little relevance to the adequacy or accuracy of the Draft RMPA/EIS, or represented commentary on management actions that are outside the scope of this NEPA analysis. These comments did not provide specific information to assist the BLM in making a change to the existing action alternatives, did not suggest new alternatives, and did not take issue with methods used in the Draft RMPA/EIS. These comments were considered and identified as not substantive. The BLM read, analyzed, and considered all comments of a personal or philosophical nature and all opinions, feelings, and preferences for one element or one alternative over another. However, because such comments were not substantive, the BLM has not prepared a written response to them.

Comments that recommended additional studies, data, or scientific literature to be incorporated into the analysis were reviewed by subject matter experts; new information and citations were incorporated into the Proposed RMP Amendment/Final EIS, as appropriate. Comments requesting editorial changes to the document were also reviewed and incorporated, as appropriate. The Proposed RMPA/Final EIS was technically edited and revised to fix typos, missing references, definitions, and acronyms, and to provide other clarifications as needed. Section 22.5 provides a list of all agencies, organizations, industry groups, and Tribal entities who submitted unique comments on the Draft RMPA/EIS and the topics addressed in their correspondence. Copies of these letters will also be posted to the project's National NEPA Register eplanning page at https://eplanning.blm.gov/eplanning-ui/project/2016719/510.

22.1.3 How this Appendix is Organized

This appendix is split up into two main sections: Rangewide Comment Responses and State-Specific Comment Responses. The Rangewide Comment Responses includes summaries and responses for categories of comments received that apply mostly rangewide. The State-Specific Comment Responses

section contains a summary of comments received specific to a particular state in the planning area and responses to those comments.

22.2 RANGEWIDE COMMENT RESPONSES

22.2.1 ACECs and RNAs

Summary: The BLM should clarify the information they would like to receive regarding the Areas of Critical Environmental Concern (ACECs) considered in the Draft RMPA/EIS.

Response: As stated in the announcements at the beginning of the public comment period in March 2024, comments are most useful that provide the BLM feedback concerning the adequacy and accuracy of the proposed alternatives, the analysis of their respective management decisions, and any new information that would help the BLM as they develop the plan. Your comments should be as specific as possible and include suggested changes, sources, methodologies, and references to a section or page number. Comments containing only opinion or preferences will be considered and included as part of the decision-making process; however, they will not receive a formal response from the BLM.

Summary: The BLM should/should not designate ACECs to protect GRSG as a part of this RMPA/EIS process.

Response: The BLM addresses ACECs when developing Resource Management Plans (RMPs), during RMP revisions, and when ACECs are within the scope of an RMP amendment (43 CFR 1610.7-2). The BLM considered ACECs as within the scope of this RMP amendment process as it is the mechanism by which relevant and important GRSG habitat attributes could be identified and protected and is consistent with the BLM ACEC and RMP regulations. Due to the GRSG conservation specific purpose and need for this planning effort, the BLM initiated an extensive internal review of updated scientific data to identify potential ACECs and solicited external nominations for areas that have relevant and important GRSG values may for potential designation as an ACEC (refer to Appendix 5, Areas of Critical Environmental Concern for Greater Sage-Grouse Habitat). In the DEIS, 32 areas were analyzed as potential ACECs under Alternatives 3 and 6. In the Proposed RMP Amendment/Final EIS, ACEC acreages were refined in some States; four ACECs were removed from consideration in Idaho; and one ACEC was removed from consideration in Nevada as result of updates and refinements in data. The identification, evaluation, and analysis of the effects of the alternatives on the nominated and proposed ACECs are described in Appendix 5. Chapters 3 and 4, Appendix 10, and Appendix 5 were updated and clarified in response to comments between the Draft EIS and Proposed RMP Amendment/Final EIS.

In response to public and cooperating agency comments and in consideration of important habitat factors such as connectivity, population strongholds, and the potential for threats from development, the BLM adjusted the Priority Habitat Management Areas (PHMA) allocation in the Proposed RMP Amendment/Final EIS and identified areas within PHMA that would benefit from management that will provide additional protection. These areas within PHMA would have more limited exceptions than the rest of PHMA. These areas are made up of 12 of the areas identified as ACECs under Alternatives 3 and 6 and are discussed in detail in Appendix 3, Greater Sage-Grouse Habitat Management Area State-by-State Mapping Strategies and Appendix 5. With this management direction that will provide additional protections, the relevant and important values in proposed ACECs will also be (refer to effects analysis in Appendix 5). In the Proposed RMP Amendment, the BLM is not proposing to designate any of the potential ACECs. Appendix 5 describes the effects of the alternatives (including the Proposed RMP Amendment) on the potential ACECs proposed for designation under Alternatives 3 and 6.

During the comment period on the Draft EIS, the BLM received 35 ACECs nominations. This included 30 nominations specific to Oregon, one nomination specific to Nevada, one that included portions of Oregon and Nevada, and three that included portions of Oregon, Nevada, and Idaho. BLM reviewed all of the nominations and determined they did not meet the relevance and importance criteria necessary to consider them as potential ACECs in the Proposed RMP Amendment/Final EIS.

The BLM Oregon reviewed the 30 nominations received for Oregon during the Draft EIS comment period and took the lead on addressing the four nominations that shared acreage in Idaho and Nevada. In evaluating the nominated ACECs the BLM found that the nominated areas did not meet the relevance and importance criteria. BLM Oregon's ACEC review, assessment, and evaluation process focused on the new GRSG scientific information on key population (e.g., Doherty et al. 2016, Coates et al., 2021b), genetic (e.g., Cross et al., 2018, Oyler-McCance et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021c) and coordinated with state authorities (such as wildlife agencies) to identify and update GRSG habitat management areas (HMA). The BLM Oregon ACEC review, assessment, and evaluation process did not consider or consider in detail potential historic, cultural, scenic, or non-GRSG fish and wildlife values in accordance with the purpose and need for this planning effort. Nominations that addressed resource values beyond GRSG could be considered by the BLM during future planning efforts. Refer to Appendix 5 for additional detail on Oregon's evaluation process.

Nevada reviewed the one nomination received during the Draft EIS comment period that was specific to lands in Nevada and entailed the nomination of all Nevada Department of Wildlife Population Management Units (PMUs). The PMUs include all habitat management areas as well as areas of non-habitat within the Nevada and northeastern California sub-region. The BLM evaluated the PMUs and concluded that these areas generally meet the relevance criteria for fish and wildlife resource specific to GRSG, but did not meet the importance criteria of being more than locally significant. Because the nominated areas did not meet both relevance and importance criteria, and because GRSG habitat within the PMUs are already identified for GRSG-specific management, the BLM did not identify the PMUs as a potential ACEC.

Summary: The BLM should analyze an alternative that proposes designating the Sagebrush Sea nominated ACEC.

Response: The BLM considered the Sagebrush Sea nomination and the evaluation of the nomination is described in Appendix 5, Areas of Critical Environmental Concern for Greater Sage-Grouse Habitat.

The BLM received the Sagebrush Sea ACEC nomination during scoping. This nomination includes approximately 48.2 million acres of BLM managed public land in the planning area. The nomination is based on sage-grouse priority areas of conservation referred to as PACs in the US Fish and Wildlife Service's (USFWS) 2013 Conservation Objectives Team Report (COT Report) as well as the 75% breeding density areas from Doherty, et. al 2010[2], as well as new Wyoming Core Area designations from 2015. From all those areas in Wyoming the nominators removed areas with a density of active oil and gas wells that exceeded five wells per square mile. For Nevada, the nominated area expanded beyond the PACs "to increase coverage of important seasonal habitats for [GRSG] and ensure connectivity between numerous

[2] Doherty, K.E., J.D. Tack, J.S. Evans, J.SN. and D.E. Naugle. 2010. Mapping breeding densities of greater sage-grouse: a tool for range-wide conservation planning. BLM completion report: Agreement # L10PG00911.

patches of high-quality habitat that are separated by rocky mountain ranges, playas, and other expanses of marginal quality habitat."

The BLM did not identify the Sagebrush Sea as a potential ACEC in any of the Draft or Final EIS alternatives because the area did not meet the ACEC relevance and importance criteria (1610.7-2 (d)) because the BLM believes the PAC criteria utilized in identifying the Sagebrush Sea nomination no longer reflects the most up to date science on habitat connectivity, populations, effects to habitat from climate change, and genetic information across the range of the species. In this RMP Amendment effort, the BLM is choosing to focus management direction that protects and conserves GRSG in Priority and General GRSG Habitat Management Areas (PHMA, PHMA with limited exceptions, and GHMA). The BLM reviewed new scientific publications since our previous planning efforts on key population (e.g., Doherty et al. 2016, Coates et al., 2021b), genetic (e.g., Cross et al., 2018, Oyler-McCance et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021c) and coordinated with state authorities (such as wildlife agencies) to identify and update GRSG habitat management areas (HMA). The HMAs are identified using inventory data on habitat use and occupancy and reflect the dynamic nature of the vegetation communities that make-up GRSG habitat. Analyzing the Sagebrush Sea would not meet the BLM's purpose and need to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions based on new scientific information or changes in land use.

Summary: ACEC designation is duplicative, either that it is the same as PHMA or no special management was identified.

Response: To comply with the BLM's ACEC regulations at 43 CFR 1610.7-2, all nominated areas in the planning area which meet the relevant and important criteria and may need special management were considered for potential designation as an ACEC in the DEIS, under Alternative 3 and 6. A varied set of management direction for the potential ACECs was identified under both alternatives. The effects of the management direction in all of the alternatives (including the Proposed RMP Amendment) are described in Appendix 5, Areas of Critical Environmental Concern for Greater Sage-Grouse Habitat. BLM analyzed a reasonable range of alternatives in order to meet the BLM's purpose and need and included ACEC designation as one potential management tool for meeting those conservation objectives in areas where relevant and important GRSG habitat values were identified. In considering a variety of management approaches and analyzing the effects of them, the BLM fully complied with BLM's ACEC regulations and with NEPA.

In response to public and cooperating agency comments and in consideration of important habitat factors such as connectivity, population strongholds, and the potential for threats from development, the BLM has made adjustments to the Priority Habitat Management Areas (PHMA) allocation in the Proposed RMP Amendment/Final EIS and identified areas within PHMA that will benefit from additional protection. These areas within PHMA would have more limited exceptions than the rest of PHMA. These areas are made up of 12 of the areas identified as ACECs under Alternatives 3 and 6 and are discussed in detail in Appendix 3, Greater Sage-Grouse Habitat Management Area State-by-State Mapping Strategies and Appendix 5. With these additional protections, the relevant and important values in proposed ACECs will be protected (refer to effects analysis in Appendix 5). The associated management direction for these areas provides strengthened protections by removing exceptions described in the PHMA exclusion language for Utility Scale Solar, Utility Scale Wind, and Fluid Mineral No Surface Occupancy direction. In addition, the management direction for Major Rights-of-Way is "exclusion with exceptions" rather than "avoidance with exceptions

and conditions" as described in PHMA. In the Proposed RMP Amendment, the BLM is not proposing to designate any ACECs.

Summary: BLM should clarify the additional protections that would be in place for Alternative 6 under ACEC designation for fluid minerals management.

Response: In the Draft RMPA/EIS, Table 2-14 states that for Alternative 6 ACECs, fluid minerals would be No Surface Occupancy (NSO) and that only NSO Exception #1 could be considered and would be considered for the full ACEC area, not just within 0.6 miles of an active lek as allowed under the PHMA management direction in Alternative 6. The Proposed RMP Amendment/Final EIS does not propose the designation of any ACECs.

Summary: The ACEC analysis was incomplete. For instance, the Draft RMPA/EIS did not identify relevance criteria, did not identify existing ACECs, did not clarify how Sagebrush Focal Areas (SFAs) would interact with existing ACECs.

Response: In the Proposed RMP Amendment/Final EIS, the internal and external ACEC nomination process, the evaluation of relevance and importance criteria, and the analysis of effects on the potential ACECs identified in Alternatives 3 and 6 were updated and clarified in response to comments. These updates and clarifications are primarily found in Appendix 5, Areas of Critical Environmental Concerns for Greater Sage-Grouse Habitat, but are also included in Chapters 3 and 4 and Appendix 10. This includes a clarified discussion in Appendix 5 of how the BLM considered SFAs in identifying internally and externally nominated ACECs. Additionally, the management direction proposed under each alternative addresses the degree to which SFAs are or are not addressed and the management direction can be found in Table 2-4 in Appendix 21. In Alternative 1, there are SFAs in Idaho, Montana, Nevada, Oregon, Utah, and Wyoming. In Alternative 2, SFAs would be removed from the BLM's RMPs in all states except Oregon and Montana. Alternatives 3,4, 5, and 6 utilized updated science and data to identify habitat areas of importance to GRGS and this process is described in Appendix 3, Greater Sage-grouse Habitat Management Area State-by-State Mapping Strategies. The areas identified as SFAs in the 2015 RMPAs no longer reflect the most up to date science on habitat connectivity, populations, effects to habitat from climate change, and genetic information across the range of the species. In this RMP Amendment effort, the BLM is choosing to focus management direction that protects and conserves GRSG in Priority and General GRSG Habitat Management Areas (PHMA, PHMA with limited exceptions, and GHMA). The BLM reviewed new scientific publications since our previous planning efforts on key population (e.g., Doherty et al. 2016, Coates et al., 2021b), genetic (e.g., Cross et al., 2018, Oyler-McCance et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al., 2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021c) and coordinated with state authorities (such as wildlife agencies). As such, the BLM did not retain the SFA areas in Alternatives, 3, 4, 5, 6, or the Proposed RMP Amendment. The BLM did, however, consider these SFA areas in concert with the updated in science and data in identify ACECs and, as noted, this is described in Appendix 5.

BLM considered all habitat areas in light of new science and data, including areas that are currently designated as ACECs and this process has been clarified in Appendix 5. For example, in Oregon, in reviewing GRSG habitat across the State, the BLM identified the High Lakes ACEC as requiring limited exceptions to PHMA protections in the Proposed RMP Amendment. The additional protections will protect the area from threats from major rights of way and renewable energy development and will help maintain the sagebrush landscape integrity in that area (refer to Appendix 3, Greater Sage-Grouse Habitat Management Area State-by-State Mapping Strategies and Appendix 5).

Summary: ACEC designation exceeds the BLM's regulatory authority, is contrary to state/local statutes, or violates valid existing rights.

Response: The BLM followed the applicable federal laws, regulations, and policies in calling for ACEC nominations, evaluating the internally and externally identified ACECs, proposing ACECs for consideration under Alternatives 3 and 6, and analyzing the effects of the alternatives on the potential ACECs. Updates and clarifications to the ACEC analysis have been made in response to comments in Appendix 5, Areas of Critical Environmental Concern for Greater Sage-Grouse Habitat. The proposed management direction for the ACECs in Alternatives 3 and 6 do not conflict or violate valid existing rights. As stated in Section 1.5 of the Draft EIS and in Section 1.4.1 of the Final EIS, all proposed actions will be subject to valid existing rights. Accordingly, the BLM will ensure that its implementation of the management actions in the Proposed RMP Amendment is consistent with the terms and conditions in existing leases or existing contracts. The BLM also recognizes that it has limited authority to impose conditions on certain uses related to the Mining Law of 1872 through land use planning decisions. Accordingly, the BLM will apply management actions in the RMPA only to the extent that they are consistent with the Mining Law of 1872 and the BLM's regulations.

The language in state or local statutes are generally not inconsistent with the ACEC evaluation and analysis approach contained in FLPMA, relevant federal regulations and BLM policy. The BLM must comply with federal law, regulations and policies when developing land use plans. The BLM can consider and align with state and local plans to the maximum extent practicable while complying with federal law and policies. State and local plans and policies that are inconsistent with federal law, regulations, and policies do not allow the agency to operate contrary to those federal directives. Appendix 5 demonstrates evaluation of relevance and importance for GRSG habitat for those areas nominated as ACECs. The Proposed RMP Amendment/Final EIS analysis informs whether the management proposed under the various alternatives will or will not meet the ACEC criteria for requiring "special management." Section 1.8 in Chapter 1 and Appendix 23, Consistency with State and Local Land Use Plans, address potential inconsistencies with State and local plans in detail.

Summary: The BLM should designate ACECs based on wilderness characteristics.

Response: By regulation, wilderness characteristics are not one of the potentially relevant values for which an ACEC can be designated.

Summary: The BLM should adjust management within ACECs to be more or less restrictive, for example, ACECs should be closed to oil and gas leasing, comply with the 2015 RMPA regarding fencing in RNAs, or should be open to livestock grazing.

Response: Thirty-two ACECs are considered for designation in the Draft and Final EIS under Alternatives 3 and 6. Table 2-14 in the Draft EIS and Appendix 21 in the Final EIS outline the comparison of management actions within potential ACECs in Alternative 3 and 6. Under Alternative 3 all areas, including the proposed ACECs are closed to fluid mineral leasing and are closed to livestock grazing. Under Alternative 6 in ACECs fluid mineral development would be subject to No Surface Occupancy with a possible exception if criteria for the exception are met throughout the entire ACEC. Alternatives 4, 5, and 6 include Management Action RM-6 that calls for identifying and addressing livestock grazing fences that pose a high risk to GRSG. The variation in management direction with Alternative 3 and 6 and throughout the rest of the alternatives represent an appropriate range of alternatives in compliance with NEPA. The effects of these management actions are analyzed in detail in Chapters 3 & 4 and the effects of the alternatives on the ACECs are analyzed in detail in Appendix 5, Areas of Critical Environmental Concern for Greater Sage-Grouse Habitat. In the

Final EIS, clarification was added to Appendix 5 including additional details on the evaluation process. We clarified the ACECs considered for nomination in Alternatives 3 and 6 in Chapter 3, and updated the analysis in Chapter 4, Appendix 10, and Appendix 5 to show how all the alternatives affect these potential ACECs. Finally, the BLM clarified in the Final EIS that under Alternative 3 ACECs, where not otherwise described, would be managed with the same management direction as PHMA and not that all of the PHMA area identified in Alternative 3 would be designated as ACEC.

None of the alternatives in the Draft RMPA/EIS or Proposed RMP Amendment/Final EIS propose to eliminate existing RNA or ACECs.

Summary: The BLM should address indicated issues with ACEC evaluations and analysis, including not justifying boundaries, not taking into account future development including locatable mining, analyzing impacts to grazing permittees and access, using too coarse scale data for the analysis, and no transparency on evaluations.

Response: In the Final EIS, the internal and external ACEC nomination process, the evaluation of relevance and importance criteria, and the analysis of effects on the potential ACECs identified in Alternatives 3 and 6 were updated and clarified in response to comments. These updates and clarifications are primarily found in Appendix 5, Areas of Critical Environmental Concerns for Greater Sage-Grouse Habitat but are also included in Chapters 3 and 4 and Appendix 10. As specified in Appendix 5: The evaluation for relevance and importance criteria was conducted in a two-step approach that started with rangewide scientific data and models, followed by a review by staff at the state and field office levels who are more familiar with the local habitat conditions. The BLM's GRSG RMPA/EIS planning page has the ACEC data available: https://eplanning.blm.gov/eplanning-ui/project/2016719/510.

To comply with BLM policies and FLPMA, all nominated areas in the planning area which meet the relevant and important criteria were considered for potential designation as an ACEC in the Draft EIS, under Alternative 3 and 6. In both alternatives, only a subset of the planning area is proposed for ACEC designation. The BLM analyzed a reasonable range of alternatives and followed the procedural requirements for the designation of ACECs through the land use planning, revision, or amendment process in BLM planning regulations 43 CFR 1610.7-2. The alternatives identified and incorporated appropriate regulatory mechanisms to conserve, enhance, and restore GRSG habitat, and to eliminate, reduce, or minimize threats to this habitat to ensure that a balanced management approach was recommended. This includes alternatives that provide a greater and lesser degree of restrictions in various use programs but would not eliminate or invalidate any valid existing development rights.

Only Alternatives 1, 2 and 3 propose the BLM recommend a withdrawal from location and entry under the Mining Law of 1872. Analysis of this is included in Chapter 4 in sections 4.10 Mineral Resources, 4.11 ACECs and Research Natural Areas, and 4.12 Social and Economic Conditions (Including Environmental Justice). Socioeconomic analysis of the range of alternatives is included in the DEIS Chapter 3 & 4 with additional county specific information in Appendix 13 Socioeconomic Baseline Report.

The Proposed RMP Amendment does not propose the designation of any ACECs.

Summary: The BLM should address how the recently promulgated Public Lands Rule interacts with the ACEC evaluations.

Response: The recently promulgated Conservation and Landscape Health Rule (aka Public Lands Rule; 89 FR 403080) implements the BLM's longstanding statutory authority to manage lands for conservation,

including by taking account of certain resource values explicitly addressed in the rule. As a result, the management actions considered here are consistent with the Public Lands Rule (PLR), notwithstanding that they are within the BLM's discretion with or without the rule. Since the Notice of Availability for this Draft EIS was published prior to the effective date of the PLR, this planning process is not incorporating PLR elements into the Final EIS (BLM IB 2024-048).

The PLR confirms that ACECs are to be addressed in revisions or amendments of land use plans and establishes a clear and comprehensive framework for identifying, evaluating, and considering the need for special management attention for each ACEC during the land use planning process. ACECs are proposed and evaluated during land use planning using the best available science and information, extensive public involvement, and Tribal consultation. ACECs must meet three criteria: relevance, importance, and need for special management attention to be designated. The rule clarifies that an ACEC can be designated to protect ecological intactness and habitat connectivity, emphasizing the role of ACECs in maintaining resilient lands and waters. This GRSG planning process, the associated ACEC evaluations which were conducted, and the manner in which the potential ACECs were considered and analyzed in the Draft and Final EIS are consistent with the updated BLM ACEC regulations at 43 CFR 1610.7-2.

Summary: BLM should clarify the definition of "irreparable damage" related to ACECs.

Response: The term irreparable damage is used in FLPMA section 103(a) in the definition of an ACEC. The recently promulgated Public Lands Rule implements the BLM's longstanding statutory authority to manage lands for conservation, including by taking account of certain resource values explicitly addressed in the rule. As a result, the management actions considered here are consistent with the Public Lands Rule, notwithstanding that they are within the BLM's discretion with or without the rule. The updated regulations define "irreparable damage" to mean: "harm to a value, resource, system, or process that substantially diminishes the relevance or importance of that value, resource, system, or process in such a way that recovery of the value, resource, system, or process to the extent necessary to restore its prior relevance or importance is impossible." The Proposed RMP Amendment does not propose the designation of any ACECs.

Summary: The BLM should analyze the effects on mining and mining operations from the designation of ACECs.

Response: Impacts from designation of ACECs to mineral development are analyzed in detail in Section 4.10.4 of the Draft RMPA/EIS and in Section 4.10.4 of the Final EIS.

22.2.2 Adaptive Management

Summary: The adaptive management process is too prescriptive and burdensome.

Response: As described in the Draft RMPA/EIS Section 1.3 Purpose and Need, the objective of this planning effort is to ensure management on BLM-administered lands responds to changing land uses, improve efficiency and effectiveness of GRSG habitat management, provide for consistent conservation across state lines, and provide the BLM with locally relevant decisions that accord with range-wide GRSG conservation goals. The adaptive management language details coordination with state wildlife agencies and other stakeholders as appropriate. Final determinations of what may change occurs at the local level.

Previous adaptive management systems varied by state and resulted in inconsistent, and in some cases subjective and erroneous results. The population system detailed in the Draft RMPA/EIS was requested by the state wildlife agencies following the 2015 plans to allow for an objective and quantifiable method across

the range of GRSG. The product being used as one of the tools for assessing population and habitat anomalies (Targeted Annual Warning System; TAWS) has been peer-reviewed and published (Coates et al., 2021). U.S. Geological Survey (USGS) provides the calculations and results using lek data provided by state wildlife agencies. The results are used by BLM and others to identify where population anomalies may be occurring. The current language also details collaboration with individual state wildlife management agencies to confirm results, and to review other pertinent data.

Unlike some commenter's assertions, "canned thresholds" are not presented in the adaptive management language. The threshold definitions provide a quantifiable and repeatable measure of potential population anomalies and must be verified by the state wildlife agency. They are not "canned" as they are calculated using lek data provided by state wildlife agencies and are updated annually.

Summary: The BLM should defer to the state agencies regarding data collection or management decisions that pertain to population trends.

Response: BLM does not manage GRSG populations and therefore must rely on the States to provide population information. Each State has signed an agreement with USGS to synthesize the population data through their population hierarchical modeling tool, Targeted Annual Warning System (TAWS), which is what BLM will review when making decisions. However, as stated in the adaptive management section, that tool is only one piece of information the BLM will be using to assess population trends. The tool itself is not a decision point, but rather a data-driven mechanism to start a conversation with the State wildlife agencies about population status and anomalies. The Draft RMPA also outlines opportunities for state wildlife agencies to provide their information separately and to work with the BLM on concerns not identified by TAWS or other resources. The BLM recognizes State's authority to manage wildlife. However, population trends can be an indicator of habitat condition, which BLM has the authority to manage on BLM-administered lands.

The adaptive management language has been modified in the Proposed RMP Amendment/Final EIS to clarify the collaboration with state wildlife agencies and ensure that the population results start the adaptive management conversation. It was never intended that the threshold in and of itself was the decision point.

Summary: The BLM should clarify the adaptive management process, particularly regarding management and resolution of triggering thresholds and timeframes to complete Causal Factor Analysis and rapid assessments.

Response: The citation provided in the adaptive management language (Coates et al., 2021) describes the process that resolved the inconsistencies in adaptive management strategies for GRSG populations in the 2015 and 2019 plans. While the BLM did not provide the details of that one population analysis in the Draft EIS, it is cited, and the publication is public and widely available. In response to comments received the BLM also made several clarifications in the Proposed RMP Amendment/Final EIS to the adaptive management process (e.g., scale of analysis for examining habitat changes, population trends and causal factor analysis (CFA) processes). However, some generalities are appropriate to allow for local conditions and circumstances. For example, while well managed livestock grazing can be compatible with sage-grouse habitat, changes in range condition as a result of drought (as an example) may be identified in a local CFA, potentially necessitating changes in permit conditions to ensure sufficient nesting cover or forb availability for GRSG. Additionally, it's not possible at the RMP level to anticipate every potential causal factor that may result in a threshold being met. The BLM has also adjusted timelines with the adaptive management strategy to address some of the commenters' concerns.

Given the purpose of these planning efforts, the inclusion of hard and soft thresholds is appropriate to assist in defining those actions which might require immediate attention to preclude further population declines if BLM can make appropriate habitat modifications. Close coordination with state wildlife agencies and stakeholders is detailed throughout the adaptive management language in the Proposed RMP Amendment/Final EIS.

Summary: The adaptive management process is not consistent with current rules and regulations nor is it consistent with the alternatives for livestock grazing.

Response: The BLM adaptive management language as written is consistent with the DOI policy and has been closely reviewed for consistency with BLM livestock grazing management.

Summary: TAWS is not appropriate to rely on for adaptive management. The BLM should modify its reliance on TAWS.

Response: TAWS is one tool that provides a consistent and quantitative metric for identifying GRSG population anomalies across all states. It does not include habitat. State input is an important component of the TAWS model and adaptive management. The results of the model are also used to start a conversation on adaptive management and do not require a specific on-the-ground response. As stated in previous responses, previous adaptive management systems varied by state and resulted in inconsistent, and in some cases subjective and erroneous results. The system proposed was requested by the state wildlife agencies following the 2015 plans to allow for an objective and quantifiable method across the range of GRSG.

Summary: The BLM should consider the provided information on TAWS and neighborhood clusters in the adaptive management process.

Response: The BLM considered the citations provided by commenters. The TAWs process simply triggers the CFA team (which includes the state wildlife agency) to discuss GRSG population anomalies. It is a conversation starter and does not automatically dictate on-the-ground management changes. The TAWS tool is only one component of assessing population anomalies. The state wildlife agency is identified as confirming those anomalies and if there are concerns with lek numbers they should bring that data forward.

TAWs uses the best available and most recent science - including the latest USGS and state datasets. The TAWs process does not in any way consider neighborhood clusters to be "closed populations" - nor is that ever mentioned in the Draft RMPA/EIS. The CFA team process incorporates potential disagreements and timelines, as established by USGS in conjunction with states. The TAWs process is another tool in the multifaceted toolbox to ensure GRSG habitat on BLM-administered lands responds to changing land uses, improve efficiency and effectiveness of GRSG habitat management, provide for consistent conservation across state lines, and provide the BLM with locally relevant decisions that accord with range-wide GRSG conservation goals.

Summary: The BLM should adjust the adaptive management process so it is more protective of GRSG.

Response: The adaptive management process outlined in the Draft RMPA/EIS identifies when additional actions may be necessary to address habitat conservation for the benefit of GRSG. The actual management required will depend on local information and coordination with partners. Identifying precise management reactions when a threshold is met in the RMPA is not appropriate as the BLM cannot anticipate all potential scenarios under which might occur. Providing detailed management direction at the plan level about specific

management responses may result in an ineffective management response that is not based on the local conditions under which the population or habitat anomaly occurred.

Summary: The BLM should coordinate with other federal and state agencies in implementing adaptive management.

Response: The BLM will coordinate with other agencies as appropriate for data collection and during adaptive management implementation.

22.2.3 Air Resources and Climate Change

Summary: The BLM should acknowledge in the analysis that restrictions on oil and gas leasing would push development to other areas, which would still cause air quality and climate effects.

Response: This introductory paragraph of the Nature and Type of Effects section of 4.13.2 Climate Change and Greenhouse Gases does not indicate if the proposed alternatives would increase or reduce GHG emissions. There is no supposition or presumption listed that the proposed alternatives would reduce emissions. The BLM added a sentence in Section 4.13.2 similar to the one stated below (which is used elsewhere in the DEIS): "However, restrictions to development on BLM lands might push development onto private land, which could result in indirect impacts as described under Nature and Types of Effects."

Summary: The BLM should consider climate-ready management principles and climate change adaptation planning throughout all future management actions for GRSG.

Response: The BLM appreciates the commenters providing questions and considerations that could assist us in subsequent implementation level analysis and decisions including:

- Resist-Accept-Direct framework
- USGS Climate Toolbox and other climate adaptation tools
- Climate Impact Evaluations
- Systematic Monitoring.

Summary: The BLM should update the EIS with the best available information regarding drought and associated combined impacts from grazing.

Response: In the Proposed RMP Amendment/Final EIS, updates to Chapter 3 Affected Environment were made to incorporate more recent drought data for the planning area, and language was included in Chapter 4 and Appendix 10 to reflect the potential impacts of grazing during drought.

Summary: BLM should update analysis to include impacts from wild horses, burros, and big game on GHG emissions and carbon sequestration.

Response: In the Proposed RMP Amendment /Final EIS, Chapter 4 and Appendix 10 were updated with wild horse and burro discussion.

Summary: The BLM should update and clarify the analysis on climate change.

Response: Climate change and associated socioeconomic impacts are analyzed in the Draft and Final RMPA/EIS with supporting documentation provided in Appendix 10, Appendix 12, Appendix 13, and Appendix 18. Specific to GRSG, Section 3.2.2 includes an entire section describing persistent and emerging

threats to GRSG from interactions between climate change, wildfire, invasive species, and diseases relative to climate change.

Section 4.13.2 of the Draft RMPA/EIS and Appendix 10 and 14 and Chapter 4 of the Proposed RMP Amendment/Final EIS describes the direct and indirect environmental consequences of minerals projects, lands and realty projects, and livestock grazing management impacts on climate change and greenhouse gases and cites the best available science utilized in the analysis. There are no specific implementation level grazing decisions proposed in this analysis. Any future proposals would be addressed in an individual site-specific analysis in accordance with applicable laws and regulations. The BLM updated the analysis in the Proposed RMP Amendment/Final EIS with social cost of carbon and livestock grazing emissions estimates.

Summary: The BLM should update the analysis to include the role of renewable energy development regarding climate change and the use of methane as a renewable natural gas.

Response: This Draft RMPA/EIS process is to update a sub-set of the GRSG goals, objectives, allocations, and management actions to ensure management on BLM-administered lands respond to changing land uses, improve efficiency and effectiveness of GRSG management, provide for consistent conservation based on ecological boundaries, and provide the BLM with locally relevant decisions that accord with rangewide GRSG conservation goals. There are no specific implementation level renewable energy projects proposed in this analysis. Any future proposals would be addressed in an individual site-specific analysis.

Summary: The BLM should update the climate change analysis to include uncertainty analysis, an assessment of the uncertainties associated with climate models, data sources, and projections, as well as the development of methods to quantify and communicate these uncertainties effectively.

Response: The BLM utilizes the best available science in all NEPA documents. Chapter 6 includes all published science used in this planning effort and environmental analysis. Analysis of Climate Change and Greenhouse Gases is included in the Draft RMPA/EIS in section 4.13.2 and Chapter 4 in the Final EIS is at an appropriate scale and level for a land use planning process.

Summary: The BLM should update the analysis to recognize all new and existing rules and regulations pertaining to air quality and climate change, such as the new PM2.5 National Ambient Air Quality Standard and the New Source Performance Standards for Greenhouse Gas Emissions From New, Modified, and Reconstructed Fossil Fuel-Fired Electric Generating Units; and describe how restrictions on development negatively impact the Biden Administration's climate goals.

Response: The regulatory framework considered for the Air Resources and Climate analysis in the Draft RMPA/EIS is described in Section 3.13.1 and Chapter 3 in the Final EIS. The commenters included text from Alternative 3 in the Draft RMPA/EIS, which represents the greatest measures to protect and preserve GRSG and its habitat.

Summary: The BLM should update and clarify the analysis on air quality, including adding Alternative 6 into the cumulative effects analysis and adjusting Alternative 3 analysis related to the removal of livestock grazing

Response: The BLM updated the Alternative 6 descriptions in Section 4.21.12 in the Proposed RMPA/Final EIS. While Alternative 3 does identify PHMA as unavailable for permitted livestock grazing, it does not preclude active vegetation or fuels treatments. The BLM did not address vegetation treatments in this amendment, which means that the prioritization of PHMAs for vegetation treatments as identified in prior

planning efforts remains unchanged. The BLM updated the analysis in the Proposed RMP Amendment/Final EIS with social cost of carbon and livestock grazing emissions estimates.

22.2.4 Best Available Information-Baseline Data

Summary: The BLM should include more specific baseline data for the impacts analysis, such as acreages at every relevant geographic scale (rangewide, statewide, population level, and subpopulation), specific lek count data, and all photos of land health and riparian assessments.

Response: The BLM has reviewed the requests for quantitative data. Quantitative data regarding changed conditions is included in Appendix 9, Tables and Figures. A land use planning-level decision is broad in scope and, therefore, does not require an exhaustive presentation of baseline data or impacts analysis. The baseline data and impacts analysis provides the necessary basis to make informed land use plan-level decisions. Land use plan-level analyses are typically broad and qualitative rather than focused on site-specific actions (BLM Land Use Planning Handbook H-1601-1, Chapter II, A-B at 11-13 and Chapter IV, B at 29). As such, the exact locations or numbers of all range-wide resources is not presented as a part of the analysis as that degree of localized information does not help differentiate between the impacts of the alternatives.

Summary: The BLM should consider provided science on acoustic impacts and include range-wide sound measuring standards.

Response: The BLM considered acoustics as a part of indirect effects analysis in Section 4.2.1 of the Draft RMPA/EIS and Chapter 4 in the Final EIS. In addition, acoustic impacts would be considered in the analysis for implementation projects.

Summary: The BLM should consider the provided science on positive sage grouse/grazing interactions.

Response: While some commenters reference grazing data which has yet to be scientifically published (e.g., Bartholdt 2023), the Draft RMPA/EIS does not preclude implementation level decisions to utilize different grazing strategies to address GRSG habitat goals.

Summary: The BLM should consider the provided science on negative sage grouse and grazing interactions, including cumulative impacts on climate change.

Response: The BLM considered the provided citations and has incorporated several changes, including acknowledging ecological differences across the GRSG range. Citations provided by commenters on grazing impacts were reviewed, and if not previously considered were incorporated. Some suggested citations were not provided by commentors (e.g., Bartholdt 2023) and if they could not be found through a search of scientific literature they were not considered further. See Draft RMPA/EIS Section 3.2 for a description of the threats impacting GRSG including climate change and Section 4.2 for a description of the effects of the alternatives on GRSG and its habitat.

Summary: The BLM should consider provided GRSG data on leks & buffers.

Response: The BLM considered the citations provided. Lek buffers are another tool in the multifaceted toolbox to ensure GRSG habitat on BLM-administered lands responds to changing land uses, improve efficiency and effectiveness of GRSG habitat management, provide for consistent conservation across state lines, and provide the BLM with locally relevant decisions that accord with rangewide GRSG conservation goals. Lek buffers are not the only protection available - disturbance caps, adaptive management, seasonal

timing and NSO restrictions are all used in concert not in isolation. As described in Manier et al 2014, there is no one buffer distance that is perfect and applicable everywhere across GRSG range.

The BLM is not proposing rangewide changes to lek buffers in this RMPA. The BLM adopted The BLM adopted lek buffers identified by state wildlife management agencies at their request and based on their experiences and local conditions. A As noted in Appendix 4, the BLM is adopting the lek and lek status definitions developed by the Western Association of Fish and Wildlife Agencies (WAFWA) to promote consistency across the BLM states. Appendix 4 provides a comparison of the lek status definitions for each state for ease of reference.

Summary: The BLM should consider provided data on disturbance, habitat fragmentation, and reclamation.

Response: We considered the provided citations and several clarifications have been made to the Proposed RMPA/Final EIS. The BLM updated citations in Chapter 6, a no net habitat loss in the mitigation requirements, and several conservation measures to minimize GRSG habitat loss. For North Dakota benchmarks for perennial forb cover in breeding and nesting habitat, the BLM relied on Doherty et al. 2010, Doherty et al. 2011, Hagen et al. 2007, and Holloran et al. 2005. For Utah benchmarks for perennial forb canopy cover in breeding/nesting habitat and brood rearing habitat, the BLM relied on Stiver et al. 2015, Connelly et al. 2000, and Dahlgren et al. 2019. Table 8-1.B in Appendix 8 includes the Idaho perennial forb cover benchmarks for nesting/early brood rearing and late brood-rearing/summer habitat and the BLM relied on Connelly et al. 2000.

Summary: The BLM should consider the provided GRSG data on population levels and genetics, including historic species range and impacts from climate change.

Response: The BLM has reviewed available data on GRSG population levels as provided by state wildlife management agencies and published in the scientific literature. As stated in the DEIS Section 1.3 Purpose and Need - the goal is to ensure management on BLM-administered lands responds to changing land uses, improve efficiency and effectiveness of GRSG habitat management, provide for consistent conservation across state lines, and provide the BLM with locally relevant decisions that accord with range-wide GRSG conservation goals. The BLM provides a little less than half of the habitat for GRSG, and the RMPA focuses on maintaining GRSG populations on BLM-managed lands while acknowledging multiple use of public lands. While the document does reference historical leks, the Draft RMPA/EIS does not propose to restore GRSG to any perceived historic range.

The published genetic information in the DEIS (including the citations provided by commenters) was one of many components considered in the multi factorial analysis. Genetic connectivity /diversity was a primary consideration in revising habitat management areas (e.g., PHMA) to ensure key areas received protections to conserve this key issue.

To respond to a comment arguing that the BLM fails to acknowledge that its analysis on impacts to sagebrush and GRSG populations from long-term climate change relies on a scientifically-discredited SSP5-8.5 worst-case climate scenario that is no longer considered likely by the International Panel on Climate Change (IPCC) in their IPCC Sixth Assessment Report, the BLM relies on the best available science when formulating alternatives and management actions. The reference to the IPCC Fifth Assessment Report connects with the modifications in the sixth assessment report. The statement highlights that evidence of observed changes and human influence in extreme events, like heatwaves, heavy precipitation, and droughts, has strengthened since the IPCC Fifth Assessment Report (IPCC 2013). For instance, it is now "virtually certain" that the

frequency and intensity of extreme heat events have increased across most regions since the 1950s, while cold extremes have become less severe. There is "high confidence" that human-induced climate change is the primary driver of these changes (IPCC 2021).

Summary: The BLM should address identified issues with the development assumptions in the analysis, consider the provided development data, and show that it used adequate data for analysis on topics including consequences to the environment, impacts from domestic energy (both mineral and renewable) development and facilities on GRSG, and impacts to economic development from new restrictions.

Response: The BLM considered the provided citations. Currently, there is no science specific to renewable energy or geothermal impacts on GRSG- therefore we can only use the best available info on comparable disturbance and extrapolate.

Several commenter's concerns were alternative specific. NEPA directs the BLM to analyze a range of reasonable alternatives for management, based on the Purpose and Need, as outlined in Chapter 2, sections 2.1- 2.5. Alternative 3 includes the greatest measures to protect and preserve GRSG and its habitat. As noted, the preferred alternative in the Draft EIS was Alternative 5, but that is not the BLM's final decision about management of BLM lands. BLM retains the discretion to make a reasoned choice among the alternatives in a final decision for management based on public comments and the analysis.

All proposed actions will be subject to valid existing rights, including those associated with leases issued under the Mineral Leasing Act of 1920. Accordingly, the BLM will ensure that its implementation of the management actions in the RMPA is consistent with the terms and conditions in existing leases or existing contracts. For example, if the BLM previously issued an oil and gas lease with standard lease terms and conditions, and the lessee submits an application for permit to drill, the BLM will ensure that any management actions from the RMPA will be applied in a manner that is consistent with the terms and conditions of the underlying oil and gas lease.

The BLM also recognizes that it has limited authority to impose conditions on certain uses related to the Mining Law of 1872 through land use planning decisions. Accordingly, the BLM will apply management actions in the RMPA only to the extent that they are consistent with the Mining Law of 1872 and the BLM's regulations.

Summary: The BLM should consider tools other than HAF, such as the Density and Disturbance Calculation Tool (DDCT).

Response: HAF and the Density and Disturbance Calculation Tool (DDCT) are not interchangeable. HAF is used to assess whether an area provides GRSG habitat and, in this proposal, it is not the only tool used to complete that assessment. HAF is not used to measure disturbance levels. By contrast, the DDCT is a measure of disturbance used by the states of Wyoming and Montana and is not a habitat assessment tool.

Summary: Some commenters requested that the BLM address a possible discrepancy in NTT report usage, argue that the NTT and COT reports represent the best available science on GRSG needs, and propose management recommendations regarding the protection of GRSG.

Response: The science included in the National Technical Team (NTT; 2011) and Greater Sage-grouse Conservation Objectives: Final Report (COT Report–2013) was in no way dismissed in the Draft RMPA/EIS - simply updated with more recent research. As stated in Section 2.3, the BLM, the USFWS, States and other federal agency partners prepared the NTT and COT reports to identify rangewide GRSG conservation

objectives and conservation measures that would inform the USFWS 2015 Endangered Species Act decision and provide guidance for the BLM to consider through land use planning, which the BLM did in 2015, 2019, and again in 2020 planning efforts. The NTT and COT reports constituted starting points for the BLM to consider in at least one alternative through the NEPA and land use planning process. They are not compendiums that, standing alone, represent best available science. The NTT and COT reports do not address how the implementation of their GRSG conservation measures would affect other uses of the public lands—such as recreation, fluid mineral development, mining, and livestock grazing. Moreover, the NTT and COT reports do not quantify the GRSG conservation benefits of each respective conservation measure. Additional context related to the COT and NTT reports and rationale why they were not included as specific alternatives in this effort is provided in Appendix 6.

Summary: The BLM should not rely on open file reports, such as Teige, et al. 2023 or Carter, et al. 2020 that have not been made available for peer review, or public review and comment.

Response: Citations specifically listed are open file reports from USGS which serve simply as annotated bibliographies of recent GRSG science, with convenient links to each original publication - and are only cited in Section 1.2.3 of the Draft RMPA/EIS. These two USGS open file reports have been available to the public since October 27, 2023, and September 30, 2020, respectively. There are an additional 35 pages of literature cited in Chapter 6 of the Draft RMPA/EIS which are cited throughout the document.

Summary: The BLM should consider the provided science and information which relate to implementation level activities.

Response: As defined in the BLM's Land Use Planning Handbook (H-1601), BLM makes two types of decisions, Land Use Plan-level decisions, which establish desired outcomes and actions needed to achieve them, reached using the planning process in 43 CFR 1600, and implementation-level decisions, which are decisions that take action to implement land use plan decisions. No implementation-level decisions are under consideration as part of the RMP Amendment effort. However, the BLM appreciates commenters providing questions/considerations that will assist us in subsequent implementation level analysis and decisions including:

- continued close coordination and consultation with federal, tribal, state and local governments
- utilizing leading academic, governmental, and NGO sage-steppe scientists as a politically independent,
- standing panel of experts to help guide Plan implementation and assure its scientific veracity;
- consideration of other Special Status Species in possible vegetation treatments;
- restoration seed mixes considerations to maximize forb diversity and insect populations critical to GRSG chick development;
- grazing practice considerations;
- site specific habitat status when prioritizing and analyzing impacts of projects;
- geographic and temporal impacts to GRSG individuals and populations from specific actions;
- BMP selection and monitoring their use/results;
- considerations for compensatory mitigation
- project specific monitoring suggestions; and
- adaptive management models for underlying habitat issues and GRSG population levels.

22.2.5 Coal

Summary: The BLM should update the resource and economic analysis to reflect impacts on closing checkerboard lands to coal mining.

Response: The BLM incorporated indirect impacts for checkerboard land patterns into the Proposed RMP Amendment/Final EIS in the Air Resources and Climate Change, Minerals, Lands and Realty, and Socioeconomic sections.

Summary: The BLM should adjust PHMA and essential habitat designations from the Draft RMPA/EIS, which exceed the protections already in place under the Wyoming core area strategy and are not consistent with state and local plans. Placing unsuitability designations on top of the Wyoming core area strategy will not provide needed additional protections but will lock up the coal resources on the lands that are designated unsuitable.

Response: The management actions for coal in the Draft RMPA/EIS across the alternatives are largely the same as either the 2015 or 2019 planning efforts, which did not determine rangewide suitability or unsuitability in the RMPA process. Instead, they deferred that determination to the time an application for a new coal lease or lease modification is submitted.

Summary: The BLM should update analysis to specifically identify how GRSG HMA overlap with coal resources.

Response: Sections 3.10.3 and 4.10.3 of the Proposed RMP Amendment/Final EIS were updated with this information.

22.2.6 Comment Period Extension Request

Summary: BLM should extend the comment period due to the content, complexity, new science and size of the EIS.

Response: Consistent with the BLM's planning regulations, CEQ regulations, and applicable policy, the BLM provided multiple opportunities for public involvement as explained in Chapter 5 of the Draft RMPA/EIS and Proposed RMPA/Final EIS. This includes public scoping, public meetings, and a 90-day public comment period on the Draft RMPA/DEIS. Consistent with the BLM's planning regulations at 43 CFR part 1610, the BLM will also provide a 30-day protest process prior to issuing a final decision.

22.2.7 Consistency with State and Local Plans

Summary: The BLM received feedback from multiple states and counties that management direction and allocations proposed in one or more of the alternatives in the Draft RMPA/EIS were inconsistent with their state and county plans. Livestock grazing, ACECs, mineral development, renewable energy, fire and fuels management and taking a single-species approach were among the topics identified as inconsistent. State wildlife agencies provided feedback on inconsistencies between their state GRSG plan and the management direction proposed in one or more alternatives in the Draft EIS. Multiple states and counties suggested that BLM adopt the policies outlined in their plans.

Response: The BLM's land use plans must be "consistent with officially approved or adopted resource-related plans, and the policies and procedures contained therein, of other Federal agencies, and State and local governments, and Indian Tribes, so long as the guidance and resource management plans are consistent with the purposes, policies and programs of Federal laws and the regulations applicable to the public lands.43 CFR 1610.3-2(a). The BLM has worked closely with State and local governments throughout the preparation

of the Draft EIS. The Draft EIS lists the cooperating agencies involved in the planning process in Section 5.3, Cooperating Agencies. As described in Section 1.8, Consistency with State and Local Land Use Plans and Programs and Policies Therein, the BLM requested the cooperating agencies assist in the consistency reviews by reviewing the range of alternatives associated with the Draft EIS, and identifying potential inconsistencies between the alternatives and each agency's applicable plans. This allows the state, local, and tribal cooperating agencies to use their special expertise regarding the familiarity with their own state, local, or tribal plans.

The BLM is aware that there are specific State or local laws relevant to aspects of public land management that are discrete from, and independent of, federal law. However, the BLM is bound by federal law. As a consequence, there may be inconsistencies that cannot be reconciled. The FLPMA requires that BLM's land use plans be consistent with State and local plans "to the extent practical" (FLPMA 202(c)(9)). In a situation where State and local plans conflict with federal law, there will be an inconsistency that cannot be resolved. Thus, while State, county and federal planning processes, under FLPMA, are required to be as integrated and consistent as practical, the federal agency planning process is not bound by or subject to county plans, planning processes, or planning stipulations. The BLM does need to describe the known inconsistencies between the proposed action and the other plans and policies, so that the State and local governments have a complete understanding of the impacts of the Proposed RMP Amendment on State and local management options. Known inconsistencies between the Proposed RMPA and Federal, State, local, and Tribal plans is updated in the Proposed RMP Amendment/Final EIS in Section 1.8, Consistency with State and Local Land Use Plans and Programs and Policies Therein and Appendix 23 Consistency with State and Local Land Use Plans.

The BLM coordinates with cooperating agencies commensurate with each agency's recognized jurisdiction or expertise. In areas where the states have clear jurisdiction, such as wildlife populations, the BLM has worked closely with that State agency. In cases where a county or agency has expertise, such as local county socioeconomic information, the BLM has worked closely with the group to incorporate the information into the EIS.

Additionally, the Preferred Alternative in the DEIS specifically incorporates continued coordination and collaboration with state agencies throughout multiple aspects of the implementation process, such as - but not limited to - data collection, mitigation considerations, and adaptive management monitoring, to ensure consistency across land managers wherever possible.

Finally, within the range of alternatives analyzed in the Draft and Final EIS, state specific management direction was proposed and analyzed (refer to Section 2.5 in Chapter 2, State-Specific Circumstances. Each BLM state will issue their own Record of Decision which identify RMP Amendment decisions within that State, including those that are State-specific. The State-specific management direction identified in the Proposed RMP Amendment address geographically unique situations while still ensuring overall rangewide GRSG conservation goals."

22.2.8 Cultural Resources

Summary: The BLM should acknowledge the importance of Traditional Ecological Knowledge and Indigenous Knowledge into the analysis.

Response: In the Proposed RMPA/Final EIS, Sections 3.16 and 3.17 were updated with this information.

Summary: The BLM should revise impacts on cultural resources in the analysis to mention that the surface disturbance and field surveys associated with development often lead to discovery of cultural resources that contribute to scientific knowledge of the local cultural history.

Response: In the Draft RMPA/EIS, Section 4.16.1 includes the following language: "Additionally, many cultural resources have been discovered because of field surveys associated with anticipated mineral development activities. Reducing mineral development could have the unintended effect of reducing surveys and discoveries." For clarity, Sections 3.17, 4.16, 4.17, and 4.21 of the Proposed RMPA/Final EIS were updated with suggestions provided by commenters.

22.2.9 Cumulative Impacts

Summary: The BLM should consider additional actions and include more details in its list of past, present, and reasonably foreseeable future actions.

Response: The BLM has updated the past, present, and reasonably foreseeable actions in Appendix 14 to reflect several suggestions made by commenters. The list in Table 14-1 does not represent a full list of all projects at the site-specific level, but as stated in Section 14.2, it focuses on those actions that are at a similar level of decision-making to this RMPA and are most likely to have a cumulative impact with the actions considered in the alternatives. The level of detail presented in Table 14-1 is consistent with the broad and generalized nature of the cumulative impacts analysis presented in Chapter 4. The intent of Table 14-1 and the related cumulative impacts analyses is not to analyze every potential future land use in GRSG habitat. Each action conducted on public lands must go through its own analysis, including consideration of the direct, indirect, and cumulative effects associated with that project.

Summary: The BLM should consider additional cumulative impacts, such as those from large scale vegetation treatments, water developments, voluntary landowner and permittee GRSG conservation, drought, livestock grazing, wildfire, projects built before 2018, and the SFA mineral withdrawal.

Response: The BLM incorporated several of the commenters' suggestions for additional cumulative impacts. However, many of the suggested impacts are already described in the Draft RMPA/EIS, Section 4.21. For instance, cumulative impacts from the proposed SFA withdrawal on GRSG are described on page 4-230 and voluntary agreements with landowners, vegetation treatments, and wildfire are described on page 4-231. Projects built before 2018 are considered in the past actions contributing to cumulative effects, which are described in Section 4.21 and incorporated into the existing conditions in Chapter 3. In addition, each treatment or other action mentioned would also be subject to a NEPA analysis to assess additional impacts as the actions are proposed.

To address concerns raised about combined impacts of drought and livestock grazing, the BLM recently issued an Instruction Memorandum (IM) which provides policy and guidance for integrating the consideration of drought conditions and the availability of water for public land management purposes into decision-making process. BLM IM 2024-034 and an Information Bulletin (IB) for the National Grazing Drought Response Dashboard, a voluntary drought tool, are sources of information that can assist during drought planning and decision-making processes related to livestock grazing management.

Summary: The BLM should better describe cumulative impacts on socioeconomics, including the impacts on social sustainability of communities near public lands.

Response: Section 4.21.11 includes a discussion and analysis on the cumulative impacts on economic and social conditions. Section 4.12 includes an analysis on the impacts on economic and social values and

conditions, as described in the comment. Clarifications and revisions have been made to the socioeconomic analysis, as described under the Socioeconomics topic below in this Appendix.

Summary: The BLM should not predetermine the scope of the cumulative effects analysis at the RMPA level. The Draft RMPA/EIS is required to consider cumulative effects as part of its NEPA analysis of the RMPA; it is not meant to prescribe what cumulative effects should be considered as part of BLM's NEPA analysis of other future federal actions.

Response: The cumulative effects analysis in the Draft RMPA/EIS is in no way prescriptive of how future, site specific NEPA should conduct their cumulative effects analysis. The BLM conducted the cumulative effects at the appropriate scope and scale for the RMPA/EIS, limited to the scope of the proposed action. Because of the programmatic nature of an RMPA/EIS and cumulative impacts assessment, the analysis tends to be broad and generalized. This allows BLM to examine the impacts that could occur from a reasonably foreseeable management scenario, combined with other reasonably foreseeable activities or projects. Consequently, this assessment is primarily qualitative for most resources because of a lack of detailed project-scale information at the planning stage. As projects are proposed at a site-specific scale, additional site-specific NEPA will be conducted including more resource specific and cumulative effects analysis completed at a scale appropriate for each project.

Summary: The cumulative effects analysis is not detailed enough. The BLM should be more specific about the impacts on current projects and conduct site-specific surveys to determine actual cumulative impacts.

Response: The BLM has complied fully with the requirements of 40 CFR 1508.1 and prepared a cumulative impact analysis to the most detailed extent possible considering the broad nature and scope of the proposed management options at the land use planning level. The BLM thoroughly explained its consideration and analysis of cumulative effects, as well as assumptions regarding proposed projects and other reasonably foreseeable future actions in Appendix 14 of the Draft RMPA/EIS. Appendix 14 also includes a quantitative analysis of the cumulative effects by HAF group in Section 14.3.

The Draft RMPA/EIS considered the present effects of past actions, to the extent that they are relevant, and present and reasonably foreseeable (not highly speculative) federal and nonfederal actions, taking into account the relationship between the proposed alternatives and these reasonably foreseeable actions. This discussion summarizes CEQ guidance from June 24, 2005, stating that "[g]enerally, agencies can conduct an adequate cumulative effects analysis by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions." This is because a description of the current state of the environment inherently includes the effects of past actions. Information on the current conditions is more comprehensive and more accurate for establishing a useful starting point for cumulative effects analysis.

The BLM conducted the cumulative effects at the appropriate scope and scale for the RMPA/EIS. Because of the programmatic nature of an RMPA/EIS and cumulative impacts assessment, the analysis tends to be broad and generalized. This allows BLM to examine the impacts that could occur from a reasonably foreseeable management scenario, combined with other reasonably foreseeable activities or projects. Consequently, this assessment is primarily qualitative for most resources because of a lack of detailed project-scale information at the planning stage. As projects are proposed, additional site-specific NEPA will be conducted, and a cumulative effects analysis will be completed at a scale appropriate for each project. As needed, these analyses may involve site-specific surveys.

22.2.10 Direct/Indirect Impacts

Summary: The BLM should highlight the potential for development without significant impact on lek attendance in recognition of the estimate from the 2021 GRSG Monitoring Report that less than 1% of GRSG PHMA habitat loss was associated with anthropogenic disturbance.

Response: The effect of existing habitat loss is incorporated into the existing conditions for GRSG described in Section 3.2 of the Draft RMPA/EIS. These conditions are then used as the baseline for the analysis of effects in Section 4.2 for each alternative.

Summary: The BLM should better characterize indirect effects, including those from pushing impacts onto adjacent lands and impacts from developing nonhabitat.

Response: While decisions made from this EIS will only apply to BLM-administered lands, the analysis was conducted regardless of land status to facilitate a broader examination of the total direct, indirect, and cumulative impacts on GRSG and resources considered in the EIS. The Proposed RMPA/Final EIS provides an updated and expanded discussion of indirect impacts in Chapter 4 and Appendix 10, including indirect impacts for checkerboard land patterns into the Air Resources and Climate Change, Minerals, Lands and Realty, and Socioeconomic sections. Analysis of impacts on adjacent lands are described in cumulative impacts.

Summary: The BLM should analyze the effects on agricultural lands, including socioeconomic, environmental justice, and right of way impacts.

Response: Since cropland agriculture does not occur on BLM-administered lands, direct impacts on agriculture are not analyzed in the EIS. However, some socioeconomic impacts on the agricultural sector are described in Section 4.12, Social and Economic Conditions (Including Environmental Justice), and Appendix 18. Impacts on environmental justice are also described in Section 4.12. Analysis specific to burying powerlines to benefit agricultural landowners is not addressed in this document because we are not proposing specific construction or assembly methods, would be project specific, implementation level actions and analysis.

Summary: The BLM needs to analyze irretrievable and irreversible impacts.

Response: As required by 40 CFR 1502.16, the Draft RMPA/EIS provides a discussion of the environmental impacts of the alternatives including the no action alternative; any adverse environmental effects that cannot be avoided should the alternatives be implemented (e.g., impacts from existing infrastructure); the relationship between short-term uses of the built environment and the maintenance and enhancement of long-term productivity; and any irreversible or irretrievable commitments of resources that would be involved in the proposal should it be implemented. While the description of irretrievable and irreversible impacts is not a separate section, they are incorporated into the discussion of effects for each resource.

Summary: The BLM should clarify the assumptions and discussion of effects, and fully disclose nature and magnitude of the resource impacts associated with each alternative.

Response: The Proposed RMPA/Final EIS includes an updated and expanded discussion of the environmental consequences, including the assumptions, of the presented alternatives in Chapter 4 and Appendix 10 per suggestions made by commenters. Additionally, Appendix 21 provides updated, detailed descriptions of the impacts of the management actions associated with each alternative.

Summary: The EIS should not separate the analysis of the SFA withdrawals and this RMPA.

Response: The analysis of the SFA withdrawals is not a land use planning decision and thus is being prepared in a separate EIS. The United States District Court for the District of Idaho ordered the BLM to "re-initiate" the NEPA process for the proposed withdrawal. The effect of the SFA Withdrawal EIS in concert with this RMPA is analyzed in the cumulative effects, described for each resource in Section 4.21 and in further detail in Appendix 14.

Summary: The BLM must analyze all possible combinations of the alternatives and the associated direct and indirect impacts that could result from these combinations before choosing a Proposed RMP Amendment.

Response: Chapter 4, Environmental Consequences, of the Draft RMPA/EIS presents the impacts anticipated from the various alternatives based on best available science and professional judgment. The Draft RMPA/EIS provides sufficiently detailed information to aid in determining whether to proceed with the preferred alternative or to make a reasoned choice among the other alternatives in a manner such that the public could have an understanding of the environmental consequences associated with the alternatives, in accordance with 40 CFR 1502.16. Since the BLM analyzed six alternatives in the Draft RMPA/EIS and added analysis of the Proposed RMP Amendment in the Proposed RMPA/Final EIS, this analysis sufficiently covers the range of impacts that could potentially occur by choosing a combination of alternatives in the decision.

22.2.11 Disturbance Cap

Summary: The BLM should provide additional detail and clarification on the disturbance cap process, including calculations of restoration acreage that could reduce the amount of disturbance measured towards the disturbance cap, how density caps relate, and how the BLM would ensure that the disturbance cap would be met.

Response: Disturbance cap is one tool in the toolbox to achieve no net loss of habitat across the landscape. The range of alternatives in the Draft RMPA/EIS outline variations in the disturbance cap process and analyzes the effects of these differences.

Rather than directing a specific calculation in the RMP, the BLM will use the best available disturbance information when determining whether a proposed action would be in conformance with the disturbance cap described in the RMP. This could be the disturbance estimate using the data, approach, and timing described in the Monitoring Framework. It could also include data from more specific disturbance inventories, as described in Appendix 7 on page 7-14 of the Framework, "more complex disturbance…estimation approaches may also be implemented…" While the BLM has a process to maintain and update data associated with disturbances across the west, committing to only use a specific dataset limits the BLM's ability to adapt to newer, more accurate data or approaches that could better inform whether a project conforms to the RMP disturbance cap.

We have included language in the Proposed RMP Amendment/Final EIS to include in-place, and pre-development compensatory mitigation requirements. The preferred alternative also identifies 3% as the maximum disturbance. The 1% per decade component of the Oregon disturbance cap was included in Appendix 2 as part of the Oregon existing approach for the disturbance cap in that state. The Proposed RMP Amendment has been clarified to retain that 2015 aspect of the disturbance cap as a state-specific retention for Oregon.

This planning effort is not considering any changes to the density caps in the existing plans and as such, comments on the density cap are not within the scope of this planning effort. Those actions would remain in the plans as described in the prior planning efforts, unchanged by this amendment. Density caps are independent of disturbance caps. The first measures the density of the facilities, while the second measures the amount of cumulative disturbance from all facilities. Density caps are part of most state wildlife agency management plans for GRSG and are based on published research cited in the NTT.

Summary: The BLM should apply the disturbance cap once a population trend threshold has been identified and should include all types of disturbances. Concrete actions that may be taken to reverse negative GRSG population trends should be explicitly stated in the RMP.

Response: When authorizing disturbing activities within important GRSG habitats (PHMA and IHMA in Idaho) the BLM applies disturbance caps to limit habitat losses associated with discrete anthropogenic disturbances and their associated human activity. Other management tools consider effects from diffuse or non-anthropogenic disturbances like wildfire, such as sagebrush availability objectives, GRSG habitat objectives, and adaptive management thresholds for population trends. Disturbance caps identify an upper limit (maximum disturbance permitted) above which no new development is generally permitted (subject to applicable laws and regulations and valid existing rights). A disturbance cap acts as a "backstop" to ensure that total disturbance does not exceed the level of GRSG tolerance for anthropogenic activities.

The Proposed RMP Amendment addresses declining habitat and population trends as part of its adaptive management approach that is described in detail in Chapter 2, Table 2-3, Adaptive Management in the Proposed RMP Amendment. When a population threshold is identified, the BLM and the State wildlife agency will coordinate to confirm the data and if a threshold has been met and will determine the causal factor. The BLM will identify appropriate management responses to any thresholds being met. Changes to existing management would be addressed through site-specific NEPA analysis.

Summary: The BLM should provide a disturbance cap exemption in certain instances such as when compensatory mitigation would offset disturbance cap exceedance. Other examples of exceptions to disturbance caps that were requested by commenters included the development of projects related to public health and safety issues, co-location of transmission facilities with existing infrastructure, and maintenance of critical roads.

Response: The disturbance cap process is only one of the tools to help the BLM analyze new project proposals while meeting the GRSG habitat objectives. The range of alternatives in the Draft RMPA/EIS includes some alternatives with exceptions for the disturbance cap, and others that do not include the exception, and discloses the effects of these differences. As noted in the Draft RMPA/EIS, an exception could only be granted according to specific criteria, including documentation that avoidance and minimization occurs before compensation is even considered, and so long as the BLM's GRSG goals and objectives are met. As outlined in the Proposed RMP Amendment/Final EIS, there are four categories for possible exceptions to the disturbance cap, found in Table 2-4 Priority Habitat Management Area (PHMA) Allocations and Management Direction.

Co-location of facilities is considered an exception to the disturbance cap under Alternatives 4 and 5 and would be considered minimization of impacts under the mitigation hierarchy, as described in Section 2.5 of the Draft RMPA/EIS. Compensatory mitigation would be required under Alternatives 3 through 6 where avoidance or minimization will not fully offset a project's impacts.

One comment raised hypothetical situations with only vague suggestions of proposed activities on uncertain rights-of-way or roads. It would be speculative for BLM to conclude whether these vague, hypothetical situations would or would not be allowed and under what circumstances, and whether "road improvements" would affect or be restricted by the disturbance caps considered in the Proposed RMP Amendment/Final EIS. Whether the disturbance cap applies at all would depend on several factors, including the authority under which the ROW was granted, the scope of the ROW, and potentially consultation with the BLM to determine whether the proposed improvement is reasonable and necessary. In sum, the hypothetical situations raised in this comment would need to be addressed at the implementation level on a case-by-case basis.

Summary: The BLM should consider the provided information and raise/lower the disturbance cap allowances.

Response: The disturbance cap process is only one of the tools in the toolbox to help the BLM analyze new project proposals while meeting the GRSG habitat objectives. It works in concert with specific management actions, mitigation, and adaptive management to address overarching GRSG goals. The alternatives in the Draft RMPA/EIS analyze a reasonable range of alternatives, including the addition of wildfire in the numerator calculation along with various exceptions. The BLM's RMPs use different management tools to manage for the appropriate levels of sagebrush, namely sagebrush availability objectives, habitat objectives, and adaptive management thresholds. The disturbance cap is primarily focused on discrete anthropogenic disturbances. GRSG are sensitive to increasing levels of anthropogenic disturbance with recent science indicating that levels of about 3% of disturbance result in GRSG moving out of an area and that about 70% of nests were located in habitats with 0-1% disturbance (Kirol et al., 2020). Additionally, Knick et al. 2013 specifically identified a relationship between disturbance and leks being abandoned, demonstrated by the finding that less than 10% of leks occur in areas with greater that 1% development. While these results are similar to those identified in the NTT, the BLM did not rely on the NTT report in developing this RMPA, but rather on published data that post-dates the 13-year-old NTT report which supports limiting disturbance to the levels presented. While the disturbance cap does not address every aspect of impact from developments, it does address the direct loss of habitat. The BLM analyzed the impacts of the proposed disturbance cap process in the Draft RMPA/EIS and disclosed the potential impacts.

Limiting disturbance is supported by the scientific literature to prevent or minimize impacts of development on GRSG. If a project results in loss of greater than 3%, habitat function for GRSG in the area may also be lost, and thus it may be difficult for BLM management to be responsive to changing land uses, improve efficiency and effectiveness of GRSG habitat management, provide for consistent conservation across state lines, and provide the BLM with locally relevant decisions that accord with range-wide GRSG conservation goals. While some states may not currently have a high level of anthropogenic infrastructure throughout the state, the location of the infrastructure is important in assessing actual impacts to GRSG, which is the intent of using HAF fine scale and project scale levels. Further, the exercise of valid existing rights does not preclude inclusion of disturbance associated with those leases in HMAs or disturbance calculations when considering whether to authorize future disturbances not covered by the lease; rather, it only protects the actual development as it is allowed under the lease. Understanding the amount of disturbance in an area provides the BLM with important information on how to consider new developments and still meet our GRSG conservation objectives.

Some commenters suggested application of the DDCT across the range of GRSG. However, in many areas of the GRSG range the habitat is not typically large contiguous areas of sagebrush as in Wyoming and

Montana, where the DDCT was developed. In such areas, use of a four-mile buffer could include substantial areas of non-habitat entirely unused by GRSG. Further, in some areas limiting the project area denominator to just the four-mile buffer omits areas that a GRSG population may regularly use in the seasonal use patterns. Finally, HAF and the DDCT are not interchangeable. HAF is used to assess whether an area provides GRSG habitat and, in this proposal, it is not the only tool used to complete that assessment. HAF is not used to measure disturbance levels. By contrast, the DDCT is a measure of disturbance which does not incorporate all of the seasonal habitat types such, winter range or connectivity. DDCT is not a habitat assessment tool. In many areas of the GRSG range the habitat is not typically large contiguous areas of sagebrush as in Wyoming and Montana, where the DDCT was developed. In such areas, use of a four-mile buffer could include substantial areas of non-habitat entirely unused by GRSG. Further, in some areas limiting the project area denominator area to just the four-mile buffer omits areas that a GRSG population may regularly use in the seasonal use patterns. The language that was added provides an opportunity for local monitoring of GRSG use patterns to guide definition of the project-level denominator. If such data is not available, the use of the DDCT-based approach would still be required. This approach provides flexibility to adjust the methodology of the disturbance cap to fit ecological and topographic variations across the range.

Summary: The BLM should provide additional detail and clarification on the disturbance cap process, specifically the usage of HAF.

Response: The HAF is a multi-scale assessment approach; addressing only a single scale in isolation misses the overall approach. To conserve seasonal habitat requirements associated with a local GRSG populations, disturbance caps will be applied to PHMA within the Habitat Assessment Framework (HAF) fine scale (Stiver et al. 2015, as revised), as well as at the project scale. Previous applications of a disturbance cap at a larger scale (e.g., biologically significant unit) did not limit the consideration to local populations and were often "diluted" by large amounts of non-habitat.

HAF fine scale units were delineated using the methodology identified by Stiver et al. 2015, and are available on the BLM GRSG web page. The units themselves are not RMP decisions, but are boundaries informed by the best available science to reflect the characteristics of the scale described in the HAF. As GRSG data continue to be collected, the Fine Scale areas could be refined and updated in coordination with the applicable state agencies to reflect the scale of habitat use described in the HAF.

The DEIS analyzes a range of alternatives for the disturbance cap process. The preferred alternative outlines the relationship between the disturbance cap at the project scale and the HAF Fine Scale habitat selection in Table 2-7.

Summary: The BLM should correct the analysis of the disturbance cap in the Draft RMPA/EIS, including failing to analyze the disturbance cap being reached more quickly using Habitat Assessment Framework (HAF) fine scale versus biologically significant units (BSU) or density and disturbance calculation tool (DDCT) methods and the possibility of encouraging development in undeveloped areas to avoid areas which are close to hitting the cap.

Response: The Draft RMPA/EIS includes this analysis in Section 4.2.3. The BSUs were developed inconsistently in the 2015 effort and were not always based on biological considerations. HAF fine-scale areas incorporate habitat associated with the seasonal habitats of GRSG populations. As such, there is a consistent biological metric from which disturbance will be calculated at a biologically meaningful scale. Using the HAF boundaries provides a more biologically meaningful assessment of impacts to GRSG. There is no

evidence that project approval rates are influenced by the scale at which disturbance is measured, and exact project location is an implementation level decision.

Summary: The BLM should provide additional detail and clarification on the disturbance cap process not applying to locatable mining.

Response: It is explicitly listed in Table 2-7 Comparison of Alternatives, Disturbance Cap and in multiple locations in the Draft RMPA/EIS that the disturbance cap would be applied to "the extent allowable under applicable laws (such as the Mining Law of 1872), or valid existing rights." While mining activity could count towards meeting the cap, further exploration and development would continue consistent with the Mining Law of 1872 as amended.

The disturbance cap only includes on-the-ground disturbance from anthropogenic sources listed in the Draft RMPA/EIS. That list does not include acres of oil and gas leases or mining claims since a lease or a claim does not itself have any disturbance until actual infrastructure is authorized. There are many examples across the west of leases going the entire ten-year term with no development, then expiring.

Summary: The BLM should not consider non-federal lands as a part of the disturbance cap.

Response: It is common and standard scientific practice to assess habitat for sensitive species across an entire landscape to ensure an accurate picture of the potential on BLM managed lands specifically. Disturbances on non-Federal lands may affect GRSG and need to be considered in potential development on BLM managed lands for biological accuracy. While the disturbance cap would not limit development on non-BLM managed lands, that development would be included in the disturbance cap calculation and thus may impact further development on BLM lands within the cap's boundary.

Summary: The BLM should provide additional detail and clarification on the disturbance cap process when it comes to indirect impacts, degraded lands, vegetation treatments, and livestock grazing.

Response: The disturbance cap process is only one of the tools available to help the BLM analyze new project proposals while meeting the GRSG habitat objectives. Disturbance caps are a tool to manage actual anthropogenic disturbance. For a management tool to be effective it needs to be implementable and there is substantial variability in the literature for a consistent distance associated with indirect impacts. While the disturbance cap does not address every aspect of impact from developments, it does address the direct loss of habitat, which reduces risks from other sources of mortality such as predation. In addition, limiting disturbance is supported by the scientific literature to prevent or minimize impacts of development on GRSG. Indirect disturbance from anthropogenic activities (e.g., noise, project traffic) will vary in intensity and impact depending on the project and local conditions (e.g., topography, distance) which cannot be assessed at a programmatic level.

Sagebrush availability is addressed in the vegetation objective that is already present in the plans and is not being proposed for change in this effort. In addition, habitat availability, including sagebrush cover, is included in the GRSG habitat objectives included in this effort that establish that the desired conditions in GRSG HMAs is to manage for suitable habitat, based on the best science available for the various ecological conditions across the range. Sagebrush availability is calculated annually through spatial analyses and is included both as the vegetation objective and as a component of the adaptive management approach. Additional management actions from the prior planning efforts that are not being changed as part of this amendment process establish guidance for GRSG habitat treatments.

Some commenters misunderstood the analysis of the disturbance cap with Alternative 4 livestock grazing management actions. In the Draft RMPA/EIS, Section 4.8.5 does not describe how the disturbance cap will limit livestock grazing, but how impacts to livestock grazing from development would be affected by the application of exceptions to the disturbance cap. This is noted in the 4th paragraph of the section which states that allowing cap exceedances "may lead to more development and increased impacts on livestock grazing operations, forage, and increased human-livestock conflicts." The effect is not a reduction of grazing or livestock-related infrastructure due to the cap, but the conclusion that the potential for more development due to cap exceptions could increase impacts on livestock grazing operations. The disturbance cap numerator does not include livestock grazing or associated infrastructure, as reflected in the Draft RMPA/EIS disturbance cap numerator section: "No other activities or actions beyond those listed in the above list are included when calculating the cap (e.g., wildfire, agriculture, vegetation treatments, residences, barns, fencing or range improvements, etc.)."

Summary: The BLM should remove or add exceptions to the disturbance cap process, including exceptions associated with the completion of any required compensatory mitigation.

Response: The range of alternatives in the DEIS includes some alternatives with exceptions for the disturbance cap, and others that do not include the exception. The DEIS discloses the effects of these differences. As noted in the DEIS, the exception can only be granted according to specific criteria, including documentation that avoidance and minimization occurs before compensation is even considered, and so long as the BLM's GRSG goals and objectives are met.

We have included language in the Proposed RMP Amendment/Final EIS to include in-place, and pre-development compensatory mitigation requirements. The Proposed RMP Amendment also identifies 3% as the maximum disturbance. This planning effort is not considering any changes to the density caps from the prior land use plan amendments, and as such, comments on the density cap are not within the purpose of this planning effort. Those actions would remain in the plans as described in the prior planning efforts, unchanged by this amendment. Considering the exception to the disturbance cap, in the Proposed RMP Amendment they are only allowable if the compensatory mitigation is implemented and functioning as habitat before the exception is granted. In addition, the compensation must benefit the GRSG population being impacted by the disturbance. These requirements ensure that any exceptions to the cap will not occur unless the compensatory mitigation is in place and documented to offset the impacts from the disturbance, eliminating the concern that the restoration/compensation would take decades to offset the immediate impacts of disturbance.

22.2.12 ESA Consultation

Summary: The BLM should disclose the biological assessment for the candidate, threatened, or endangered species with potential and/or actual habitat in the greater sage grouse habitat

Response: The Biological Assessment will be made available to the public on the project's ePlanning website.

Summary: The EIS is placing management restrictions that exceed the scope of the BLM's authority via FLPMA for a species that does not warrant restrictions as it is not listed as threatened or endangered under the ESA.

Response: While GRSG is not listed under the ESA, it is considered a BLM sensitive species. FLPMA gives BLM broad authority to conduct land use planning, including considering special status species as outlined in Manual 6840, Special Status Species, which states that "...the BLM shall designate Bureau sensitive species

and implement measures to conserve these species and their habitats ... to promote their conservation and reduce the likelihood and need for such species to be listed pursuant to the ESA." This EIS/RMPA process is not about "recovery," as defined by the ESA. Further, FLPMA describes "fish and wildlife development and utilization" as one of the six "principal or major uses of the public lands" and mandates that "the public lands will be managed in a manner that will...provide food and habitat for fish and wildlife."

22.2.13 Fish and Wildlife

Summary: Management strategies should align with historical data and local community values, incorporating active human management to ensure both ecological and economic sustainability, and not focus on single species management for GRSG.

Response: The BLM is not proposing single species management. The BLM manages the largest single share of GRSG habitat in the United States – nearly 69 million of 145 million acres total. These same lands sustain Western rural economies built on outdoor recreation, ranching, farming, energy development, and small businesses, and are critical for more than 350 other wildlife species – including pronghorn, mule deer, and pygmy rabbits. They are also the headwaters for the West's major river systems.

For decades, federal, state and private land managers have worked to conserve and restore the sagebrush ecosystem, with federal agencies managing habitat on the lands whose surface they administer and states managing and monitoring wildlife populations. Despite these best efforts, the GRSG is in sharp decline. Populations once in the millions now number fewer than 800,000, largely due to habitat loss exacerbated by climate change effects such as drought, increasing wildfires, and the spread of invasive species.

The Proposed RMP Amendment seeks to continue providing the BLM with locally relevant decisions that achieve rangewide GRSG conservation goals consistent with the agency's multiple use and sustained yield mission, and GRSG management efforts with federal, State, local, and Tribal partners.

Summary: The Draft RMPA/EIS should emphasize the importance of coordination with state wildlife management agencies and recognize their responsibility in the regulation of hunting, fishing, and predator control actions.

Response: The Draft RMPA/EIS clearly articulates that the BLM does not manage GRSG populations, only their habitat on BLM administered lands. Section 5 of the EIS discusses coordination with other agencies. See also Range of Alternatives and Section 1.8 of the Draft RMPA/EIS for a discussion of consistency with state and local plans. The BLM has worked extensively with the ten State Governments within the planning area to promote consistency with each of the States' GRSG plans and with the GRSG plans of the many cooperating local and county governments. The feedback and input of State fish and wildlife agencies and local governments significantly shaped the Draft Plan Amendment/Draft Environmental Impact Statement (EIS) and the Proposed RMP Amendment/Final EIS. Each BLM State Office has held numerous meetings with State wildlife agencies and county cooperating agencies to seek consistency with their respective plans. Additionally, the BLM and the States have each participated in over twenty meetings as part of Western Governor's Sage-grouse Task Force, including weekly meetings preparing the alternatives in the fall of 2023.

Summary: The EIS should be updated with provided text revisions. These include updates to address inconsistencies, adding citations, impacts to amphibians, a list of species that will benefit or be harmed by the proposed action, and impacts of livestock grazing management to fish and wildlife.

Response: A land use planning-level decision is broad in scope and, therefore, does not require an exhaustive presentation of baseline data or impacts analysis. Given the large geographic scope of the effort,

the EIS does not include a list of all species potentially affected by the RMPA. A representative list of species is included in Section 3.5 and a list of BLM Special Status Species and their habitats is included in Appendix 11. Similarly, detailed site-specific conditions are not included at this planning level of analysis but will be considered during project-level NEPA reviews. The baseline data and impacts analysis in the EIS provides the necessary basis to make informed land use plan-level decisions. The agency does not need to determine that the RMP nor any subsequent implementation level projects need to benefit all wildlife species. Impacts on fish and wildlife under each alternative are described in Section 4.5 of the Draft RMPA/EIS to a level that would allow for an informed decision among alternatives. The BLM has made several clarifying edits in the Proposed RMP Amendment/Final EIS to the affected environment (Section 3.5) and impacts analysis (Section 4.5 and Appendix 10) based on comments received on the Draft RMPA/EIS.

22.2.14 FLPMA

Summary: The BLM should analyze multiple use and sustained yield under the Federal Land Policy and Management Act (FLPMA).

Response: FLPMA (Section 103(c)) defines "multiple use" as the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people. FLPMA does not mandate all uses be allowed on all areas of the public lands. Instead, it requires the BLM to evaluate and choose an appropriate balance of resource uses which involves tradeoffs between competing uses. FLPMA also directs the BLM to develop and periodically revise or amend its resource management plans, which guide management of BLM-administered lands, and provides an arena for making decisions regarding how public lands would be managed and used.

BLM's planning processes allows for analysis and consideration of a range of alternatives that identified and incorporated appropriate regulatory mechanisms to conserve, enhance, and restore GRSG habitat, and to eliminate, reduce, or minimize threats to this habitat to ensure that a balanced management approach was recommended. This includes alternatives that provide a greater and lesser degree of restrictions in various use programs but would not eliminate or invalidate any valid existing development rights. Chapter 4 presents the anticipated direct and indirect impacts on the human and natural environment that could result from implementing each of the alternatives.

The BLM is striving to slow or stop the decline of GRSG on BLM-administered lands with this planning amendment. The goal to conserve and manage GRSG habitats to support persistent, healthy populations, consistent with BLM's sensitive species policy (BLM-M-6840) and in conformance with inventory requirements found in Section 201 of FLPMA.

In all GRSG habitat management areas, and consistent with valid existing rights and applicable law, BLM will apply the mitigation hierarchy (avoidance first, then minimization, compensation last) when authorizing third-party actions resulting in GRSG habitat loss and degradation to achieve minimum standards. The mitigation hierarchy to achieve either "no net loss" or "net conservation gain" are designed to comply with CEQ regulations (40 Part 1508.20), State regulatory requirements while conforming with the basis of multiple use and sustained yield in a manner that provides for habitat, ecological, and environmental protection.

This amendment effort recognizes the importance of including RMP actions that address GRSG threats on BLM-administered public lands in context of the 2010 and 2015 USFWS GRSG listing decisions. This effort also recognizes the legal and functional imperative of coordinating management with state, federal, tribal, and local plans and policies. Many actions from the 2015 and 2019 efforts already accomplish this. As a result, the purpose of the current BLM RMPA is to amend a sub-set of the GRSG management actions to ensure

management actions on BLM-administered lands support GRSG conservation goals, respond to changing land uses in GRSG habitats, improve the efficiency and effectiveness of GRSG management actions, provide for consistent conservation outcomes in GRSG habitat, and provide the BLM with locally relevant decisions that accord with range-wide GRSG conservation goals. The purpose of this amendment is focused on cross-cutting management actions/topics that are applicable throughout the planning area. Land use plan revisions will be completed on an individual basis as specific land use plan evaluations warrant.

Summary: BLM illegally applies FLPMA and multiple use lands use plans to wild horse areas. FLPMA did not amend the Wild Free-Roaming Horses and Burros Act of 1971

Response: Commenter's assertion that FLPMA did not amend the Wild Free-Roaming Horses and Burros Act of 1971 is incorrect. FLPMA incorporated the existing sections of the Act, renumbered them, and added a new section allowing the Secretary to use or contract for the use of helicopters for transporting captured animals. See Sec. 404 of P.L. 94-579.

Summary: The BLM should not select certain alternatives because they conflict with the multiple use mandate under FLPMA.

Response: FLPMA (Section 103(c)) defines "multiple use" as the management of the public lands and their various resource values so that they are utilized in the combination that will best meet the present and future needs of the American people. FLPMA does not mandate all uses be allowed on all areas of the public lands. Instead, it requires the BLM to evaluate and choose an appropriate balance of resource uses which involves tradeoffs between competing uses. FLPMA also directs the BLM to develop and periodically revise or amend its resource management plans, which guide management of BLM-administered lands, and provides an arena for making decisions regarding how public lands would be managed and used. Under Alternative 3 BLM would recommend that certain areas are withdrawn from locatable mineral entry as a conservation measure to attempt to reduce impacts on GRSG from locatable mineral development. BLM planning efforts are able to recommend areas for withdrawal, but the Secretary of the Interior must act on the recommendation for the lands to be withdrawn from mineral entry by Public Land Order. While Alternative 3 Is the most restrictive to certain uses, all alternatives comply with FLPMA.

Summary: BLM should not use compensatory mitigation because FLPMA does not authorize it.

Response: In all GRSG habitat management areas and consistent with valid existing rights and applicable law, BLM will apply the mitigation hierarchy (avoidance first, then minimization, compensation last) when authorizing third-party actions resulting in GRSG habitat loss and degradation to achieve minimum standards. The mitigation hierarchy is designed to comply with CEQ regulations (40 Part 1508.20) and State regulatory requirements while conforming with the basis of multiple use and sustained yield in a manner that provides for habitat, ecological and environmental protection. Management actions related to mitigation are also in conformance with Executive Order (EO) 13990, Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis (January 20, 2021) and Secretarial Order (SO) 3398, Revocation of Secretary's Orders Inconsistent with Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis (April 16, 2021) and IM 2021-038. The BLM's multiple use and sustained yield mission as defined under FLPMA supports policy direction to:

- Implement consistent principles and procedures for mitigation in the BLM's authorization of public land uses;

- Apply mitigation to address reasonably foreseeable impacts to resources (and their values, services, and/or functions) from public land uses; and
- Follow the mitigation hierarchy by first avoiding damage to the public lands and resources; second, minimizing damage that cannot be avoided; and third, compensating for any residual impacts to important, scarce, or sensitive resources or resources protected by law.

Summary: BLM should only use landscape scale planning in land use plans which is authorized and led by a BLM State Director.

Response: This amendment effort recognizes the importance of including RMP actions that address GRSG threats on BLM-administered public lands in context of the 2010 and 2015 USFWS GRSG listing decisions. This effort also recognizes the legal and functional imperative of coordinating management with state, federal, tribal, and local plans and policies. The purpose of the current BLM RMPA is to amend a sub-set of the GRSG management actions to ensure management actions on BLM-administered lands support GRSG conservation goals, respond to changing land uses in GRSG habitats, improve the efficiency and effectiveness of GRSG management actions, provide for consistent conservation outcomes in GRSG habitat, and provide the BLM with locally relevant decisions that accord with range-wide GRSG conservation goals. The purpose of this amendment is focused on cross-cutting management actions/topics that are applicable throughout the planning area with state-specific variation. Records of Decision will be issued using a state-by-state approach that further accounts for site-specific variation at the discretion of each State Director.

Summary: The BLM's management and policy decisions to prevent degradation should be applied to all uses, not just grazing.

Response: Where land is not achieving or making progress toward achieving land health standards, the BLM will evaluate the causal factors responsible and take appropriate action under either or both the grazing regulations (43 C.F.R. subpart 4180) or the conservation regulations recently promulgated by the Public Lands Rule, once fully implemented (43 C.F.R. subpart 6103). Appropriate actions will be taken for the identified causal factor.

22.2.15 Fluid Minerals

Summary: Positive contributions from oil and gas development, including restoration efforts and new technologies, should be considered in the document.

Response: The BLM recognizes that restoration efforts and new technologies used by operators can reduce impacts on sage-grouse habitat and has reviewed the referenced studies for potential inclusion in the document.

Summary: For fluid minerals, designation of NSO, major stipulation areas and minor stipulation areas considered resources other than GRSG and would therefore not adequately protect GRSG while placing undue restrictions on public land users.

Response: Section 202 of the FLPMA requires the BLM, to the extent consistent with the laws governing the administration of the public lands, coordinate the land use inventory, planning, and management activities of, or for, such lands with the land use planning and management programs of other federal departments and agencies, and of the States and local governments within which the lands are located. This coordination will help balance all resource needs, including conservation.

NEPA directs the BLM to analyze a range of reasonable alternatives for management, based on the Purpose and Need, as outlined in Chapter 2, sections 2.1- 2.5. As noted, the preferred alternative in the Draft EIS was Alternative 5, but that is not the BLM's final decision about management of BLM lands. BLM retains the discretion to make a reasoned choice among the alternatives in a final decision for management based on public comments and the analysis.

In addition, Table 2-4 includes a description for Alternative 4, 5 & 6 for how to address areas of non-habitat within mapped GRSG habitat management areas.

Summary: The BLM should improve its analysis of impacts on split estate lands and checkerboard.

Response: The BLM incorporated and clarified indirect impacts for checkerboard land patterns into the Proposed RMP Amendment/Final EIS in Air Resources and Climate Change, Minerals, Lands and Realty, and Socioeconomic sections.

Future activities that are expected to cause disturbance, such as rights or way or special use permit applications, would be evaluated and approved on a case-by-case basis based upon site-specific determination of ability to avoid, minimize, and/or mitigate impacts on GRSG habitat at the implementation phase. A proposed project's contribution to the amount of disturbance on the landscape will be evaluated during site-specific NEPA analysis. Per NEPA requirements, the BLM will consider disturbance on private lands as appropriate when making land use decisions since actions on private lands could impact the agencies' ability to manage GRSG.

Summary: The BLM should change fluid minerals management, such as having a 1-mile no leasing buffer around leks and NSO within PHMA and outside of the 1-mile lek buffer. Waivers, exceptions, and modifications to NSO stipulations and the mitigation hierarchy should be limited, changed, or clarified.

Response: Under the Proposed RMP Amendment/Final EIS, waivers, exemptions and modifications (WEM) would be granted only when meeting specific criteria designed to advance the management goals and objectives in the RMP Amendment. The Proposed RMP Amendment balances the risk of uncertainty against the benefits of management flexibility when considering whether to grant a WEM. Planning criteria identified for this amendment include consideration of how planning decisions may impact future listing determinations under the ESA. Where NSOs are less than 1 mile BLM has deferred to the local state wildlife agency and their authority on GRSG.

The BLM continually meets with state wildlife agency and other appropriate state authorities on a local basis for individual projects, to clarify how BLM, project proponents, and state management agencies will collaborate to implement a mitigation hierarchy and compensatory mitigation. This allows consideration of local ecological and topographical information in determining how to best avoid and minimize impacts, and if needed, implement compensatory mitigation.

Summary: The reasonably foreseeable development scenario requires changes and updates. Additional data should be incorporated to improve the analysis. Other data submitted needs to be considered.

Response: The BLM places great import on the best available information, including new scientific studies and government reports that indicate a potential change in our assumptions or conditions related to a land use planning effort. The BLM has to balance reviewing new information with determining what information is relevant to a decision in light of the BLM's purpose and need. Many commenters highlighted information and studies to the BLM to consider, and the BLM has reviewed each source submitted. Further, the BLM

asked the USGS to participate in the review, and to verify if information was included in the USGS synthesis report that was developed for the Draft EIS. Many suggested articles were already included for analysis in the USGS report and may have been missed by commenters in the initial review of the synthesis report and Draft EIS.

Both known and new studies were reviewed by BLM staff, including scientists and NEPA specialists, and each BLM State Office reviewed each study specific to how it informed their planning decisions and environmental conditions. The BLM has included, where appropriate, updates to analysis in the appropriate EISs. Overall, submitted studies did not offer information that changed the analysis of the plans/EISs and did not offer any new conditions or other information the BLM had not considered already. In addition, subsequent proposed projects will require additional NEPA analysis.

Summary: The Draft EIS does not allow any flexibility for development of fluid mineral resources and potential could close areas to mineral entry or leasing, or put subject to burdensome and unnecessary NSO stipulations or right-of-way restrictions because of BLM's management decisions. Valid existing rights will be restricted in the proposed in the Draft EIS.

Response: NEPA directs the BLM to analyze a range of reasonable alternatives for management, based on the Purpose and Need, as outlined in Chapter 2, sections 2.1- 2.5. As noted, the preferred alternative in the Draft EIS was Alternative 5, but that is not the BLM's final decision about management of BLM lands. BLM retains the discretion to make a reasoned choice among the alternatives in a final decision for management based on public comments and the analysis.

As stated in the Draft EIS in Section 1.5, all proposed actions will be subject to valid existing rights, including those associated with leases issued under the Mineral Leasing Act of 1920. Accordingly, the BLM will ensure that its implementation of the management actions in the RMPA is consistent with the terms and conditions in existing leases or existing contracts. For example, if the BLM previously issued an oil and gas lease with standard lease terms and conditions, and the lessee applies for permit to drill, the BLM will ensure that any management actions from the RMPA are applied in a manner that is consistent with the terms and conditions of the underlying oil and gas lease. The definition of valid existing rights is included in the glossary of the Draft RMPA/EIS.

Summary: The BLM should clarify what management would apply in situations where updates to sage-grouse habitat maps result in existing leases being classified as PHMA, or where leases that had been classified as PHMA are no longer PHMA.

Response: In each case any valid existing legal rights and grants would remain in place. As stated in the Draft RMPA/EIS in Section 1.5, all proposed actions will be subject to valid existing rights, including those associated with leases issued under the Mineral Leasing Act of 1920. Accordingly, the BLM will ensure that its implementation of the management actions in the RMPA is consistent with the terms and conditions in existing leases or existing contracts. For example, if the BLM previously issued an oil and gas lease with standard lease terms and conditions, and the lessee submits an application for permit to drill, the BLM will ensure that any management actions from the RMPA will be applied in a manner that is consistent with the terms and conditions of the underlying oil and gas lease. The definition of valid existing rights is included in the glossary of the Draft RMPA/EIS.

Summary: Geothermal energy has no carbon emissions and should be considered a renewable resource. Expanding geothermal energy is an important way to minimize impacts on Sage-Grouse while still meeting

broad multi-use management, energy production, and climate objectives. Geothermal impacts need to be considered further. The Proposed RMP Amendment does not consider the impacts of this type of renewable energy in detail.

Response: While geothermal resources are renewable, they follow a leasing process similar to fluid minerals and the ground disturbance associated with their development is comparable. The regulations for geothermal are housed in 43 CFR 3000 – Minerals Management. Thus, it is addressed as such in the EIS. Impacts from geothermal development is analyzed in the Draft RMPA/EIS in Chapter 4 for GRSG, Fish and Wildlife, Lands and Realty, Mineral Resources, and Social and Economic Conditions. The BLM will work with the lessee, operator, or project proponent in developing an APD or Geothermal Drilling Permit (GDP) for the lease to apply the mitigation hierarchy to impacts on GRSG or its habitat and will ensure that the best information about the GRSG and its habitat informs and helps to guide development of such federal leases.

Summary: The BLM should disclose the effects of Fee/Fee/Fed and State minerals in further detail.

Response: While the development of wells on non-BLM managed surface in GRSG habitat results in impacts on GRSG it is not appropriate to analyze these in the plan and is outside the scope and management area. For fluid minerals, the term "Fee/Fee/Fed" refers to all situations where a well is located on non-Federal land overlying non-Federal minerals, but some portion of the wellbore enters and produces from the Federal mineral estate. Because fee/fee/fed wells are initially drilled on private surface and private minerals, they may be drilled without BLM knowledge or input, before being later extended into federal mineral estate. Therefore even if BLM did not approve the Federal portion in these cases impacts to GRSG would already have occurred. Because of such issues it is not possible to accurately determine what impacts might result from fee/fee/fed wells under all the Alternatives.

Summary: There are no BLM habitat management areas called "Winter Concentration Areas" or by extension any stipulations associated with it. References to exceptions in these areas should be removed from Fluid Mineral Leasing Waivers, Exceptions, and Modifications.

Response: Sage Grouse Winter Concentration areas were created by the Wyoming Game & Fish Department and are available here: https://wgfd.wyo.gov/wyoming-wildlife/sage-grouse-management/sage-grouse-data. BLM used habitat areas developed by the Wyoming Game & Fish Department in the development of PHMA and GHMA boundaries and may reference specific habitat areas in stipulations. As stated in the Draft RMPA/EIS Section 2.5.2, Priority Habitat Management Areas (PHMA) have the highest value to maintaining sustainable GRSG populations and can include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors.

Summary: Fluid mineral prioritization should be consistent with BLM's rule on onshore oil and gas development.

Response: In Section 1.8.1, Planning Criteria, of the Draft EIS, there is a criterion stating that all alternatives would comply with existing laws, regulations, and policies. The BLM has reviewed all actions in the Proposed Final EIS and found them to be consistent and within the bounds of all required laws, regulations, and policies.

Summary: The BLM should consider the impacts to development on existing federal oil and gas leases and the contracts that are in place including the BLM's continued decision to limit its and lessees' operational flexibility through NSO stipulations, Conditions of Approval (COAs) on new APDs and by only allowing

limited Waivers, Exceptions, and Modifications (WEMs) to certain restrictions within the GRSG DRMPA/EIS. BLM should recognize valid existing uses and rights for oil and gas production.

Response: As stated in the Draft RMPA/EIS Section 1.2 and throughout the document, all proposed actions will be subject to valid existing rights, including those associated with leases issued under the Mineral Leasing Act of 1920. Accordingly, the BLM will ensure that its implementation of the management actions in the RMPA is consistent with the terms and conditions in existing leases or existing contracts. For example, if the BLM previously issued an oil and gas lease with standard lease terms and conditions, and the lessee submits an application for permit to drill, the BLM will ensure that any management actions from the RMPA will be applied in a manner that is consistent with the terms and conditions of the underlying oil and gas lease. BLM could apply other mitigation efforts, such as COAs on new APDs and other required approvals in some situations.

Summary: The Proposed RMP Amendment limits states' abilities to manage state lands from development opportunities and leasing across different ownership patterns. More information on the impacts to state and private lands needs to be included. State concerns regarding state-specific issues need to be clarified.

Response: The BLM is aware that there are specific State or local laws relevant to aspects of public land management that are discrete from, and independent of, federal law. However, the BLM is bound by federal law. As a consequence, there may be inconsistencies that cannot be reconciled. The FLPMA requires that BLM's land use plans be consistent with State and local plans "to the extent…practical." In a situation where State and local plans conflict with federal law, there will be an inconsistency that cannot be resolved. Thus, while State, county and federal planning processes, under FLPMA, are required to be as integrated and consistent as practical, the federal agency planning process is not bound by or subject to county plans, planning processes, or planning stipulations. While the BLM is not obligated to seek consistency, the agency is should describe the inconsistencies between the proposed action and officially approved or adopted plans of State and local governments, so that the State and local governments have a complete understanding of the impacts of the Proposed RMP Amendment on State and local management options.

The BLM incorporated indirect impacts for checkerboard land patterns and other adjacent non-BLM managed lands into the Proposed RMP Amendment/Final EIS in Air Resources and Climate Change, Minerals, Lands and Realty, and Socioeconomic sections.

Summary: The process for evaluating WEMs is overly complicated and needs to be further refined. WEMs are too stringent. The effects of WEMs need to be analyzed.

Response: Under the Proposed RMP Amendment, waivers, exemptions, and modifications would be granted only when meeting specific criteria designed to advance the management goals and objectives in the RMPs. The Proposed RMP Amendment balances the risk of uncertainty against the benefits of management flexibility when considering whether to grant a WEM. Planning criteria identified for this amendment include consideration of how planning decisions may impact future listing determinations under the ESA. The Draft RMPA/EIS analyzes WEMs in Chapter 4 for GRSG, Vegetation, Fish and Wildlife, and Mineral Resources.

Confusion was expressed by commenters regarding an inconclusive causal factor analysis and when an exception could be issued, who would consider those exceptions, and how that exception would apply. The sentences referenced in the associated comment on Table 2-9, page 2-57, of the Draft RMPA/EIS indicate that if the required causal factor analysis is inconclusive, then exceptions could be considered. Without this

clarification, if the required causal factor analysis is inconclusive there would be confusion on if exceptions could be considered or not. No change was made as a result.

Summary: The BLM should explain why the Oil Shale and Tar Sands Record of Decision (ROD) removed GRSG HMAs in Utah from oil shale and tar sands leasing but not in Colorado and Wyoming.

Response: The Oil Shale and Tar Sands EIS and ROD was a separate planning process which was completed in 2013. The ROD for that process includes the rationale for those decisions. This GRSG planning effort is not revisiting those decisions.

22.2.16 General Consultation

Summary: BLM should address cooperating agencies comments and should improve its cooperating agency process. BLM should provide cooperators with better documents on a timely basis.

Response: All agencies participating as cooperating agencies have been given opportunities to participate during various steps of the planning process, including regular briefings, requests for input on draft alternatives and the administrative draft EIS, and identification of issues and data during public scoping and the Draft RMPA/EIS public comment period, as required by 40 CFR 1503.2 and 40 CFR 1506.10. Further, coordination with cooperating agencies continued through the development of the Proposed RMP Amendment/ Final EIS in order to identify consistency issues and to be compliant with the relevant laws and regulations. While the laws and regulations associated with cooperating agencies and coordination with other federal agencies and state, local, and tribal governments, state that coordination must occur; they do not prescribe the methods necessary to meet the legal or regulatory requirements. Based on the coordination efforts describe above, the BLM has met the legal and regulatory requirements for coordination to date.

Summary: The BLM should be more collaborative and continue working closely with states, tribes, and other stakeholders.

Response: Both the CEQ and BLM planning regulations define cooperating agency status, including what it is, who is eligible to become a cooperating agency, and how the lead agency should invite participation as a cooperating agency (40 CFR 1501 and 1508; 43 CFR 1601.0-5). Cooperating agency relationships are limited to government entities, state agencies, local governments, tribal governments, and other federal agencies that have jurisdiction by law or special expertise. Additionally, per the regulations and BLM policy, there is no coordinating agency status (BLM Desk Guide to Cooperating Agency Relationships and Coordination with Intergovernmental Partners, pages 21 and 31, respectively). To be a cooperating agency, the local agency must meet the eligibility criteria set out in the regulations and policies. The specific role of each cooperating agency is based on jurisdiction by law or special expertise, which is determined on an agency-by-agency basis and identified in the Memorandum of Understanding.

BLM sent letters to tribal governments inviting them to be cooperating agencies. The BLM also sent letters to local, state, and federal agencies inviting them to participate as cooperating agencies. These agencies are invited to participate because they have jurisdiction by law or can offer special expertise. Cooperating agency status provides a formal framework for these governments to engage in active collaboration with a lead federal agency in the planning process. Invitations were sent to potential cooperating agencies in December 2021 and January 2022. The list of cooperating agencies with signed Memorandum of Understandings is provided in Table 5-1. The BLM invited many other cooperators to engage in this effort who either did not reply or chose not to participate. In addition, the BLM engaged the U.S. Forest Service, U.S. Fish and Wildlife

Service, and Environmental Protection Agency at the national level to identify and receive feedback on specific issues under the jurisdiction of those agencies.

In addition to the BLM's invitations to a wide variety of agencies to participate as cooperating agencies, US Department of the Interior regulations (43 CFR 46.225(c)) also require the BLM, as lead agency, to consider any request by a government entity to participate as a cooperating agency (BLM Desk Guide to Cooperating Agency Relationships and Coordination with Intergovernmental Partners, pages 8-9). From the time that the Notice of Intent was published in the Federal Register and throughout the development of the EIS, an agency could notify the BLM requesting cooperating agency status.

In addition, the Western Governors' Association (WGA) Sage-Grouse Task Force was created by the State Governors and DOI was invited to participate. The Task Force is comprised of Governor designees who advocate for the interests of their state, including the interests of the counties. BLM met regularly with the WGA Task Force over the past two years, sometimes weekly, to discuss options for management decisions. Those fruitful discussions helped frame both the preferred alternative and the Proposed RMP Amendment, particularly relative to adaptive management mitigation, energy development, and transmission.

Summary: BLM should allow the counties to be involved with land use decisions.

Response: There are numerous counties participating as cooperating agencies in this land use planning process. See the prior response for details on the cooperating agency process for this project. A list of cooperating agencies is in the DEIS Section 5.3. In addition, there will likely be further opportunities to participate in decisions within GRSG habitat at the implementation level.

Summary: BLM should coordinate with the U.S. Fish and Wildlife Service to ensure the final RMPAs and RODs provide adequate regulatory measures to maintain the GRSG's not warranted status.

Response: BLM will continue to work closely with the USFWS. Chapter 5 of the Draft EIS outlines the consultation and coordination efforts undertaken in the development of the RMPA/EIS. In addition, the USFWS participated in this planning effort as a Cooperating Agency. See the prior response for details on the cooperating agency process for this project.

22.2.17 GIS Data and Analysis

Summary: Maps are unclear and based on incomplete data. The BLM should explain how mapping was completed. The GIS layers used have errors or are flawed. The BLM should use publicly available data.

Response: Before beginning the GRSG RMPA/EIS and throughout the planning effort, the BLM considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. The data needed to support broad-scale analysis of the planning area are substantially different than the data needed to support site-specific analysis of projects. The RMPA/EIS data and information is presented in map and table form and is sufficient to support the broad-scale analyses required for land use planning. Data used in the Draft RMPA/EIS is available on the project website and upon request.

Clarification on some questions posed by commenters regarding the GIS data used in the EIS as well as the maps generated using that data is provided in the following locations. Chapter 1 of the DEIS states, "A planning area boundary includes all lands regardless of jurisdiction; however, the BLM can only make decisions on the public lands and federal mineral estate within the agency's jurisdiction." Appendix 5 provides data analysis and the resultant findings for ACEC relevance and importance criteria. Appendix 3 provides

descriptions of efforts in each state within the planning area to review new GRSG data and coordinate with state wildlife agencies to consider adjustments to the habitat management areas to enhance GRSG conservation.

The BLM has made changes to maps where applicable to address substantive comments received. In response to concerns raised by commenters regarding key habitat maps, Idaho-specific MDs pertaining to key habitat have been removed from the Proposed RMP Amendment. Additionally, in the Proposed RMPA/Final EIS text was added to the Locatable Mineral maps for Alternatives 4, 5, 6 and the Proposed RMP Amendment to clarify that all existing and recommended withdrawals displayed are due to efforts not associated with the GRSG plan amendment.

Summary: The BLM needs to have maps within the DEIS that are smaller scale, such as by state, county, or grazing allotment, rather than a rangewide scale. An online mapper should be available.

Response: The data needed to support broad-scale analysis of the planning area are substantially different than the data needed to support site-specific analysis of projects. The scale of the RMPA/EIS maps is sufficient to support the broad-scale analyses required for land use planning. A rangewide online mapper is not available, but the state-specific data used in the RMPA/EIS are available on the project's National NEPA Register eplanning page at https://eplanning.blm.gov/eplanning-ui/project/2016719/510. Under "Map Data" and, additionally, specific maps for areas within the planning area can be requested be contacting the associated BLM State Office or by contacting the GRSG headquarter planning team.

Summary: The BLM should display only field-verified HMA and peer-reviewed mapping data within the EIS map figures.

Response: The data needed to support broad-scale analysis of the planning area are substantially different than the data needed to support site-specific analysis of projects. The RMPA/EIS data and information are sufficient to support the broad-scale analyses required for land use planning. There are provisions for ground-truthing mapping at a project level, such as non-habitat, or justifiable departures under lek buffers. However, there must be good documentation to demonstrate lack of GRSG use and/or impacts on adjacent habitats, for example in connectivity areas.

A land use planning-level decision is broad in scope and, therefore, does not require an exhaustive gathering and monitoring of baseline data. The baseline data used in the Draft RMPA/EIS provides the necessary basis to make informed land use plan-level decisions. Land use plan-level analyses are typically broad and qualitative rather than focused on site-specific actions (BLM Land Use Planning Handbook H-1601-1, Chapter II, A-B at 11-13 and Chapter IV, B at 29). The BLM will conduct subsequent project-specific NEPA analyses for projects proposed for implementation under the land use plan. Project-specific analyses may utilize field-verified data as appropriate. The subsequent NEPA analyses for project-specific actions may tier to the land-use planning analysis and evaluate project impacts at the appropriate site-specific level (40 CFR 1501.11, 40 CFR 1508.1). As required by NEPA, the public will have the opportunity to participate in the NEPA process for site-specific actions.

Summary: The Draft RMPA/EIS associated maps (Volume 2: Appendix 1. Maps), and associated GIS data were first published March 14, 2024. However, on March 20, 2024, all GIS data for Alternatives 3, 4, 5, and 6 were overwritten. The BLM should have notified the public that data and mapping figures were being changed during the public comment period.

Response: The data and maps for the Draft RMPA/EIS were not changed during the public comment period. Early in the public comment period, which started on March 14, 2024, the BLM was notified that some states were experiencing technical issues when individuals attempted to download the datasets from the project website. The BLM reloaded the same dataset on March 20, 2024, as the commenter noted, to correct the glitches.

Summary: GIS data is not available online.

Response: State specific GIS data for each State in the planning area is available on the project's National NEPA Register eplanning website at https://eplanning.blm.gov/eplanning-ui/project/2016719/510 and has been there since the release of the Draft EIS. Some individuals had trouble downloading the data when they tried to download multiple Alternative datasets at the same time. If issues arise when downloading data, it is recommended that you delete all the GIS data that's not working from your ArcPro project, re-download the data from ePlanning, and pull these new data into your project. If that still doesn't work, try clearing the cache on your internet browser (e.g., cookies, etc.) and then downloading only one file at a time. BLM Wyoming staff assisted this commenter in successfully accessing the data in March 2024.

22.2.18 Greater Sage-grouse

Summary: The BLM should revise its analysis of GRSG to acknowledge additional impacts or revise the existing discussion of impacts., such as disturbance associated with GRSG dust bath locations along roads, impacts to specific species of sagebrush, or how the BLM disturbance cap should be considered when habitat loss associated with anthropogenic disturbance is less than 1% throughout the range.

Response: A land use planning-level decision is broad in scope and, therefore, does not require an exhaustive presentation of baseline data or impacts analysis. The baseline data and impacts analysis provide the necessary basis to make informed land use plan-level decisions. Impacts on GRSG under each alternative are described in Section 4.2 of the Draft RMPA/EIS to a level that would allow for an informed decision among management alternatives. The BLM has made several clarifying edits to the impacts analysis in Section 4.2 based on comments received on the Draft RMPA/EIS.

Disturbance caps in this planning effort are applied at scales important to GRSG. While disturbance from anthropogenic disturbance across the entire range of the species may be less than identified as concerning in the scientific literature, too much disturbance in the wrong place can have devastating impacts on GRSG. Additionally, anthropogenic disturbance in addition to habitat losses from wildfire can result in significant impacts to GRSG. The disturbance cap applies to cumulative disturbance, not simply one factor.

Summary: The BLM should modify management of GRSG to move away from the current ESA recovery-oriented management.

Response: While GRSG is not listed under the ESA, it is considered a BLM sensitive species. As such, the BLM complies with its sensitive species policy in Manual 6840, Special Status Species, which states that "...the BLM shall designate Bureau sensitive species and implement measures to conserve these species and their habitats ... to promote their conservation and reduce the likelihood and need for such species to be listed pursuant to the ESA."

Summary: The BLM should increase lek buffers in this EIS to provide greater protections for GRSG.

Response: The BLM reorganized the presentation of the management direction in the Proposed RMPA. This reorganization should allow the reader to more easily see where lek buffers are applied within the

rangewide management direction and where BLM state offices have applied state-specific lek buffers that differ from the rangewide management direction. For example, in the rangewide PHMA management direction Table 2-2; lek buffers are utilized in the fluid minerals, disturbance cap, and adaptive management rangewide management direction. In the fluid mineral section, multiple states also identify specific lek buffers that will apply in their states for fluid minerals that vary from the rangewide management direction. The BLM is not proposing rangewide changes to lek buffer in this RMPA. Management direction from the 2015 and 2019 plans. To ensure consistency with state wildlife management agencies BLM has adopted the lek buffers identified by individual state wildlife agencies for conformance with state wildlife agency management strategies for GRSG.

Summary: The BLM should statistically correlate GRSG declines with a specific cause such as annual precipitation and climate change and how historic baseline population numbers were determined.

Response: Annual precipitation does influence GRSG habitats and therefore population trends. However, the BLM does not have any authority over annual precipitation and therefore must focus on maintaining habitats. The BLM has considered climate change in identifying, with our state partners, habitats that are most resilient to change into the future. Most of these areas are PHMA and therefore subject to the limitations imposed on proposed activities for the conservation of GRSG and their habitats.

As identified by Schroeder et al., 2004, 1965 is when state wildlife agencies began to standardize lek surveys so they were repeatable and able to be analyzed with some statistical rigor. Therefore 1965 provided the most reliable baseline for comparisons.

Summary: The BLM should clarify or change the management related to GRSG such as clarifying "persistent, healthy populations," specifying how lek buffers are defined and used, and justifying the use of the HAF fine scale.

Response: BLM Special Status Species Management Manual (BLM-M-6840) directs the BLM to initiate proactive conservation measures that reduce or eliminate threats to Bureau sensitive species (including GRSG) to minimize the likelihood of and need for listing these species under the Endangered Species Act. Persistent and healthy populations are those that will survive throughout the course of this plan life without loss of abundance (independent of natural cyclic changes). Sustaining healthy, persistent populations requires sustaining the habitat which support the species. In the Draft RMPA/EIS Table 2-2, all the new alternatives list the overarching goal as: "Conserve, enhance, restore and manage GRSG habitats to support persistent, healthy populations, consistent with BLM's Special Status Species Management Policy (BLM-M- 6840) and in coordination and cooperation with state wildlife agencies. Habitat conservation and management should maintain existing connectivity between GRSG populations." Specific responses to certain comments received are presented below.

Lek buffers are one management tool to conserve GRSG nesting and brood-rearing habitat. Any appropriate adjustments to management within the buffer based on local conditions and allowable exceptions will be made at the implementation level. To ensure consistency with state wildlife management agencies BLM has adopted the lek buffers supported by the Western Association of Fish and Wildlife Agencies (WAFWA) and their state members. The differences in lek buffers are to allow for conformance with state wildlife agency management strategies for GRSG.

Lek definitions have changed since 2015. BLM has adopted new lek definitions developed by WAFWA, which are being used in all sage-grouse states that address this concern. The lek definitions developed by WAFWA

will be applied once the Proposed RMP Amendment/Final EIS and RODs are complete. They will not be applied to projects already approved and underway.

HAF is one tool used to assess habitat sufficiency. Other methods can be employed as appropriate. The BLM can and does collect habitat data at the fine-scale HAF and neighborhood cluster. The HAF fine scale is in general the level at which local populations of GRSG are most likely to be impacted by management decisions. It is one tool which is used with our partners to assess local habitat conditions and address any necessary flexibility.

Summary: The BLM should clarify definitions in the EIS, including those for different types of leks and neighborhood clusters.

Response: Intact habitat is not equivalent stable ecological state or desired ecological state. Intact habitat means sagebrush habitats that support GRSG that have not been fragmented or lost. BLM has adopted new lek definitions developed by WAFWA and being used in all sage-grouse states that address this concern. The lek definitions developed by WAFWA will be applied once the Proposed RMP Amendment/Final EIS and RODs are complete. Appendix 4 provides detailed definitions of leks, with comparisons to changes in the definitions used in 2015 and 2019. The DEIS Section 2.5.13 includes a description of neighborhood clusters:

"The BLM will use neighborhood clusters identified by USGS (Coates et al., 2021) to track habitat conditions, the same spatial scale used by USGS for population trend analyses. A neighborhood cluster generally represents a GRSG population unit and includes local aggregations of leks and seasonal habitats used by birds attending those leks based on state wildlife agency and research data."

22.2.19 Habitat Boundary/Habitat Management Area Designations

Summary: The EIS does not use correct or sufficient data to map HMAs.

Response: As described in Best Available Information and Baseline Data, of this comment report, the BLM considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. The data and process used to identify HMA boundaries is described, in detail, in Appendix 3. Data needed to support broad-scale analysis of the planning area are substantially different than the data needed to support site-specific analysis of projects. The RMPA/EIS data and information is presented in map and table form and is sufficient to support the broad-scale analyses required for land use planning. State-by-state habitat management area mapping strategies are described in detail in Appendix 3 of the Draft RMPA/EIS.

The BLM acknowledges that site-specific conditions on the ground may vary from the landscape scale modelling and those conditions on the ground change over time. As such, PHMA management would not be applied to non-habitat. The process for identifying non-habitat is described in Section 2.5.2 of the Draft RMPA/EIS. Such identification would occur at the project level, including associated project specific NEPA analysis.

Summary: HMA mapping would result in overly restrictive management.

Response: The BLM considered a reasonable range of alternatives during the planning process in full compliance with NEPA. This resulted in six alternatives analyzed in the Draft RMPA/EIS with different levels of restrictions on GRSG habitat to meet the purpose and need (Section 1.3). Multiple uses, including mineral, infrastructure, and renewable energy development, on BLM-administered lands would be retained per FLPMA, though the BLM's multiple-use and sustained yield mandate does not require that all uses be allowed

on all areas of the public lands. The effects of the alternatives on resources, resource uses, and socioeconomics are disclosed in Appendix 10, Appendix 14, and Chapter 4 of the Final RMPA/EIS.

Summary: The BLM should clarify state-specific management within HMAs and how HMAs were developed, including explanations for "key habitat" in Idaho and OHMA in Nevada.

Response: BLM has adopted state wildlife agency delineations of important GRSG habitats and worked closely with those agencies on adjustments. The Proposed RMP Amendment identifies state-specific management within these areas by activity type (e.g., oil and gas leasing, right-of-way management), and will complete additional state-specific step-down actions in the state specific Records of Decisions to follow. BLM has revised language in the Proposed RMP Amendment/Final EIS for clarity, including adding clarifying language regarding the role of validation/confirmation of HMA type. The data and process used to identify HMA boundaries and the definitions of each of the HMA types is described in detail in Appendix 3, Greater Sage-grouse Habitat Management Area State-by-State Mapping Strategies.

The BLM has clarified in the Proposed RMP Amendment that "key habitat" is no longer the applicable term. For example, MD SSS 8 and MD SSS 13 from the 2015 RMP Amendment would be replaced by the term "habitat" used in this Proposed RMP Amendment. (See Idaho - Additional Management Direction for more detail). Unless specifically noted, management of OHMA does not change. Also, see Appendix 2. section 2.12.

Summary: The BLM should implement a consistent prioritization strategy to prioritize new oil and gas leasing outside of PHMA and GHMA.

Response: To the extent appropriate, the RMPA/EIS identifies prioritization of management within PHMA and GHMA. However, sufficient flexibility in prioritization has been retained for the Authorized Officer during implementation, depending on District or Field Office specific conditions, such as staffing or budget.

Summary: BLM should use ground-truthing and other site-specific methods to accurately assess potential habitat areas and should ensure that areas can be de-classified in a timely manner if it is appropriate to do so.

Response: As described in Best Available Information and Baseline Data, of this comment report, the BLM considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. The data needed to support broad-scale analysis of the planning area are substantially different than the data needed to support site-specific analysis of projects. The RMPA/EIS data and information is presented in map and table form and is sufficient to support the broad-scale analyses required for land use planning.

The BLM acknowledges that site-specific conditions on the ground may vary from the landscape scale modelling and those conditions on the ground change over time. As such, PHMA management would not be applied to non-habitat. The process for identifying non-habitat is described in Section 2.5.2 of the Draft RMPA/EIS and Table 2-4 in the Proposed RMP Amendment/Final EIS. Such identification would occur at the project level, including associated project specific NEPA analysis.

Summary: The BLM should update the analysis to recognize negative impacts of development on GRSG and should avoid any development in or near GRSG habitat.

Response: This DEIS includes analysis and consideration of a reasonable range of alternatives that identified and incorporated appropriate regulatory mechanisms to conserve, enhance, and restore GRSG habitat, and to eliminate, reduce, or minimize threats to this habitat to ensure that a balanced management approach was recommended. This includes alternatives that provide a greater and lesser degree of restrictions in various use programs but would not eliminate or invalidate any valid existing development rights. The BLM analyzes effects on GRSG in Section 4.2 of the Draft RMPA/EIS. The EIS considers a range of alternatives that includes alternatives that are more restrictive to development, such as Alternative 3.

The separate EIS effort that is considering a withdrawal from location and entry under the Mining Law of 1872 of the 2015 sagebrush focal areas (SFAs) is independent of any SFA decisions associated with this planning process. The United States District Court for the District of Idaho ordered the BLM to "re-initiate" the NEPA process for the proposed withdrawal. This separate withdrawal EIS effort is analyzed in this GRSG RMPA/DEIS in the Cumulative Effects analysis (Section 4.21 and Appendix 4.

Summary: The BLM should retain/remove SFAs from the alternatives.

Response: The Draft and Final EISs include analysis and consideration of a reasonable range of alternatives that identified and incorporated appropriate regulatory mechanisms to conserve, enhance, and restore GRSG habitat, and to eliminate, reduce, or minimize threats to this habitat to ensure that a balanced management approach was recommended. Alternative 1 includes designation of some areas of PHMA as Sagebrush Focal Areas (SFA) with a recommendation to withdraw them from mineral location and entry under the Mining Law of 1872 and prioritization for various other activities related to vegetation treatments, livestock grazing, and wild horses and burros. The separate EIS effort that is considering a withdrawal from location and entry under the Mining Law of 1872 of the 2015 SFAs is independent of any SFA decisions associated with this planning process. The United States District Court for the District of Idaho ordered the BLM to "re-initiate" the NEPA process for the proposed withdrawal. This separate withdrawal EIS effort is included in this GRSG RMPA/DEIS in the Cumulative Effects analysis (Section 4.21 and Appendix 4).

Summary: PHMA and ACEC management in Alternative 3 requires clarification.

In Alternative 3, all habitat is managed as PHMA and ACECs are identified for designation. The ACECs in Alternative 3 would receive the management proposed for PHMA under that Alternative with additional protections provided that relate to major rights of way and the development of a plan of operation for locatable minerals. In Alternative 3, there are 64,990,000 acres of PHMA (Final EIS, Table 2-14) and 8,732,000 acres of ACECs (Appendix 5, Areas of Critical Environmental Concern for Greater Sage-Grouse Habitat). Clarification was made in the Proposed RMP Amendment/Final EIS that all PHMA is not managed as ACEC – but the reverse: All designated ACECs would have the same allocations as PHMA, with some additional protections.

Summary: The BLM should reconsider or clarify Habitat Management Area actions in Alternative 3, including compensatory mitigation requirements and ACEC management.

Response: The Draft RMPA/EIS includes analysis and consideration of a range of alternatives that identified and incorporated appropriate regulatory mechanisms to conserve, enhance, and restore GRSG habitat, and to eliminate, reduce, or minimize threats to this habitat to ensure that a balanced management approach was recommended. This includes alternatives that provide a greater and lesser degree of restrictions in various use programs but would not eliminate or invalidate any valid existing development rights. The commenter is referencing language specific to Alternative 3, which includes the greatest measures to protect

and preserve GRSG and its habitat. The management direction required under Alternative 3 is described in Chapter 2 in the Draft EIS, and in the Final EIS this information is found in Appendix 21.

As described in Section 2.5.3 of the Draft EIS, in all GRSG habitat management areas and consistent with valid existing rights and applicable law, BLM will apply the mitigation hierarchy (avoidance first, then minimization, compensation last) when authorizing actions resulting in GRSG habitat loss and degradation. Table 2-5 of the Draft EIS clearly outlines the application of that mitigation hierarchy, including compensation.

In Alternative 3, all PHMA is not managed as ACEC – but the reverse: All designated ACECs would have the same allocations as PHMA. In Alternative 3, there are 69,199,000 acres of PHMA (Table 2-3) and 11,139,472 acres of ACECs (Table 2-14).

Summary: The BLM should consider actions which allow addition of acreage to PHMA/GHMA.

Response: The Proposed RMPA outlines a process and criteria for addressing areas of non-habitat in mapped GRSG Habitat Management Areas when non-habitat is identified (refer to Chapter 2, Table 2-4, Criteria Based Management for Non-Habitat). In accordance with existing law, regulation and policy, inventories will continue to be conducted to provide information on GRSG habitat and distribution (BLM Manual 6840 .04 D 3; BLM-M-6840 .04 E 2) and as part of that evaluation process, BLM will consider whether adjustments to HMA boundaries are necessary. Changes to HMA boundaries would need to be addressed through appropriate resource management planning procedures such as through an RMP amendment or revision.

Summary: The BLM should clarify direction that would apply in GHMA, such as coal management, locatable minerals management, management in Known Potash Leasing Areas (KPLAs), and the boundaries of where management would be applied. The BLM should make GHMA management less restrictive.

Response: NEPA directs the BLM to analyze a range of reasonable alternatives for management, based on the Purpose and Need, as outlined in the Draft RMPA/EIS in Chapter 2, sections 2.1- 2.5. Descriptions of management direction across alternatives for the resources mentioned can be found in Table 2-4. Boundaries for GHMA vary across the alternatives but are reflected in Maps 2.1 thru 2.6.

GHMA management would apply only within the boundaries of GHMA for each alternative. Regarding coal management, for Alternatives 4, 5 & 6 - Table 2-4 states that in PHMA & GHMA in CO, MT/DK, UT and WY at the time an application for a new coal lease or lease modification is submitted to the BLM, the BLM will determine whether the lease application area is "unsuitable" for all or certain coal mining methods pursuant to 43 CFR Part 3461.5, unless a suitability process has already been conducted that considered GRSG HMAs. As outlined in 43 CFR Part 3461.5(o)(1), federal lands where the BLM and the state jointly agree are habitat for resident species of high interest to the state and which are essential for maintaining these priority wildlife species shall be considered unsuitable. However, a lease may be issued if, after consultation with the state, the surface management agency determines that all or certain stipulated methods of coal mining will not have a significant long-term impact on the species being protected. This process would be applied in both PHMA and GHMA, though there is no statement that acres in either of these areas would be unsuitable based on language in the RMP amendment.

Language regarding KPLA impacts has been revised in Chapter 4.

Summary: Language regarding HMAs is too vague. The BLM should clarify the acreage within the HMAs, where they would occur (such as within existing ACECs or lands with wilderness characteristics), and provide state specific maps.

Response: A land use planning-level decision is broad in scope and, therefore, does not require an exhaustive presentation of baseline data or impacts analysis. The baseline data and impacts analysis provide the necessary basis to make informed land use plan-level decisions. Land use plan-level analyses are typically broad and qualitative rather than focused on site-specific actions (BLM Land Use Planning Handbook H-1601-1, Chapter II, A-B at 11-13 and Chapter IV, B at 29). As such, the specific location of all resources within HMAs is not presented but would be evaluated at the site-specific level as projects are proposed.

As a range-wide planning document, the BLM did not prepare site specific maps as a part of the analysis as that degree of localized information does not help differentiate between the impacts of the alternatives. However, GIS data used in the RMPA/EIS are available on the project's National NEPA Register website and upon request.

22.2.20 Habitat Objectives

Summary: The habitat objectives, including the use of the HAF, are too prescriptive and should be made more flexible.

Response: The HAF is a multi-scale habitat assessment approach, which provides a standardized, science-based methodology to assess GRSG habitat suitability at multiple scales (mid, fine, and site-scale). This is key, as addressing only a single scale in isolation misses the overall approach. While the HAF Technical Reference gives suggested indicators and thresholds, these are not prescriptions. GRSG management requires multi-scale assessments to focus conservation work where needed. Decisions based on the assessment should also factor in additional information, threats, etc. as part of broader processes, such as land health. The site-scale indicators are not standards nor should they be considered individually, and both the indicators and benchmarks are (as stated in the HAF and these management actions) adjusted based on local science and best available information. Site-scale HAF does not determine management. Management responses are not based on a single rating in a single plot. It is up to the BLM and partners at the implementation stage to determine adequate indicators and thresholds and conduct multi-scale assessments.

Habitat objectives provide a framework to guide management in areas where GRSG occur. The objectives identified in Appendix 8 have considered different ecological conditions across the planning areas. They serve as objectives but not mandates and local adjustments can be made as determined in the field by BLM staff and state wildlife agency members.

Summary: The BLM should not use HAF because it is too complex, hard to apply, and is a formal regulation not complying with APA.

Response: The Habitat Assessment Framework provides a standardized, scientifically based methodology to assess GRSG habitat suitability at multiple scales and helps further inform measurable habitat objectives. HAF is not a regulatory framework. Using multi-scale evaluations is important for assessing GRSG habitat by considering the entire suite of conditions that contribute to high quality habitat, the success of past conservation actions, and prioritizing future land uses and conservation actions. The indicators and benchmarks help inform the wildlife and/or sensitive species component of the Land Health Standards evaluation process but are not land health standards and do not replace land health assessments. Additional guidance on the use of these tools and the associated products are available in the Habitat Assessment

Framework (Stiver et al. 2015, BLM TR 6710-1, as revised) and BLM Sage-grouse HAF Implementation Guidelines. HAF complies with CEQ regulations that agencies shall make use of reliable existing data and resources (40 CFR 1502.23). The use of HAF in and of itself does not affect the rights of 3rd parties. However, project proponents can always challenge a decision the BLM makes based on HAF assessments.

Summary: Habitat objectives should be applied as a term of every livestock grazing lease.

Response: The suggested change is not a land use planning decision but a site-specific consideration at a grazing allotment level. The BLM can change the terms and conditions of grazing leases and permits during the renewal process.

Summary: The BLM should consider adjusting the habitat indicators used for habitat objectives, including using adequate residual nesting cover.

Response: As stated in Appendix 8 Section 8.2, as research becomes available, new data could refine or clarify GRSG selection for vegetation structure and composition in seasonal habitats for certain populations. Because of this, the habitat indicators will be periodically reviewed to incorporate the best available science in coordination with applicable federal, state, local, and tribal agencies. BLM will continue to work with appropriate partners to evaluate the latest science and consider changes to habitat indicator tables. Edits should only be made if warranted by scientific evidence, in coordination with the applicable state agency.

The decision to not use the language 'adequate residual nesting cover' for a habitat indicator is because the term is 'adequate' is inherently subjective and lacks a standardized approach for consistent implementation or monitoring.

Summary: Habitat objectives should take into account current ecological potential according to the Ecological Site Description (ESD), associated State and Transition Model (STM), and existing ecological state.

Response: The Draft RMPA/EIS includes the concepts of ESD, STM, and ecological state as a part of Appendix 8, Habitat Indicators and Benchmarks. The BLM will continue to work with appropriate partners to evaluate the latest science and consider changes to habitat indicator tables. As stated in Appendix 8, Section 8.2, as research becomes available, new data could refine or clarify GRSG selection for vegetation structure and composition in seasonal habitats for certain populations. Because of this, the habitat indicators will be periodically reviewed to incorporate the best available science in coordination with applicable federal, state, local, and tribal agencies. Edits should only be made if warranted by scientific evidence, in coordination with the applicable state agency.

Some comments received on habitat objectives were state-specific and not applicable to the range-wide planning effort. Those issues are more appropriate to consider during decision-making for implementation-level projects when more site-specific information is available.

Summary: The BLM should clarify the use of the HAF in assessing suitability of GRSG habitat, its applicability to grazing management, and clarify the terminology used.

Response: As described in Section 2.5.4 of the DEIS, habitat objectives identify the desired habitat outcome on BLM-administered lands in GRSG HMAs at multiple scales including seasonal habitats and connectivity within and between populations.

As described in Appendix 8 of the DEIS, habitat indicators are assessed following the methods described in the Sage-grouse Habitat Assessment Framework. The Habitat Indicators Tables provide a list of indicators

and benchmarks, derived from local and regional research on GRSG habitat selection, that collectively are used to inform habitat suitability. BLM will leverage the terrestrial Assessment, Inventory, and Monitoring (AIM) methods, additional monitoring approaches for wetland and riparian habitats, credible partner data, and supplemental long-term monitoring data and guidelines developed by the BLM to collect data on site-scale habitat condition.

As research becomes available, new data could refine or clarify GRSG selection for vegetation structure and composition in seasonal habitats for certain populations. Because of this, the Habitat Indicators Tables will be periodically reviewed to incorporate the best available science in coordination with applicable federal, state, local, and tribal agencies. The addition or adjustment to indicators or benchmarks in the Habitat Indicators Table must include the reference or basis for which the changes are made. Edits should only be made if warranted by scientific evidence, in coordination with the applicable state agency.

The Proposed RMP Amendment/Final EIS was updated to clarify the variability within the habitat objectives by acknowledging that there are ecological differences across the GRSG range and to clarify HAF fine scale exceptions in specific circumstances.

Summary: The BLM should clarify what a "disturbance response group" is and justify its use.

Response: "Disturbance response group" is terminology specific to the Great Basin and the State of Nevada to describe ecological sites that occur at scales too small for application in planning large-scale vegetation treatments or post-fire rehabilitation. Disturbance Response Groups (DRGs) are used to scale up ecological sites by grouping ecological sites based on their responses to disturbances (Stringham et al 2016).

Summary: The BLM should update habitat indicators to resolve inconsistencies between states or to better reflect site-specific differences.

Response: As described in Appendix 8 of the Draft RMPA/EIS, habitat indicators are assessed following the methods described in the Sage-grouse Habitat Assessment Framework. BLM will leverage the terrestrial Assessment, Inventory, and Monitoring (AIM) methods, additional monitoring approaches for wetland and riparian habitats, credible partner data, and supplemental long-term monitoring data and guidelines developed by the BLM to collect data on site-scale habitat condition. Data will inherently vary between states as ecosystems are not uniform across the GRSG range.

As research becomes available, new data could refine or clarify GRSG selection for vegetation structure and composition in seasonal habitats for certain populations. Because of this, the Habitat Indicators Tables will be periodically reviewed to incorporate the best available science in coordination with applicable federal, state, local, and tribal agencies.

The Proposed RMP Amendment/Final EIS was updated to clarify the variability within the habitat objectives by acknowledging that there are ecological differences across the GRSG range.

22.2.21 Lands and Realty

Summary: Closing ACECs to major ROWs would result in longer routes and increased costs and environmental impacts.

Response: NEPA directs the BLM to analyze a range of reasonable alternatives for management, based on the Purpose and Need, as outlined in Chapter 2, sections 2.1- 2.5. In order to comply with BLM policies and FLPMA, all nominated areas in the planning area which meet the relevant and important criteria were

considered for potential designation as an ACEC in the DEIS, under Alternative 3 and 6 along with a range of potential management actions. The BLM analyzed a range of alternatives in Chapters 3 and 4 of the Draft RMPA/EIS and followed the procedural requirements for the consideration of designation of ACECs through the land use planning, revision, or amendment process in BLM planning regulations 43 CFR 1610.7-2. The Proposed RMP Amendment does not propose to designate any ACECs.

Summary: The BLM should clarify the terminology used for and discussion of impacts on lands and realty in the RMPA.

Response: The BLM has clarified the definitions of co-location, the different types of rights-of-ways, transmission lines, and transmission corridor in the Glossary of the Proposed RMP Amendment/Final EIS. In Chapter 2, the BLM specifies that management direction applies to RMP designated corridors. The BLM has clarified the analysis in Section 4.9 and Appendix 10 to reflect the impacts of the restriction on widening ROWs and to better analyze the effects of ROW burial. The BLM has searched the EIS to ensure the correct use of the terms "power line" and "transmission line" and clarified the definition of "Major ROW".

Summary: The BLM must recognize valid existing rights and that ROW exclusion areas conflict with valid existing rights, such as RS 2477 or RS 2339. In addition, there are cases of unpatented mining claims and unclaimed lands open to mineral entry, independent of the discovery status of these lands.

Response: As stated in the Draft RMPA/EIS in Section 1.5, the RMPA will recognize all valid existing rights. Accordingly, the BLM will ensure that its implementation of the management actions in the RMPA is consistent with the terms and conditions in existing leases or existing contracts. The definition of valid existing rights is included in the glossary of the Draft RMPA/EIS.

The BLM also recognizes that it has limited authority to impose conditions on certain uses related to the Mining Law of 1872 through land use planning decisions. Accordingly, the BLM will apply management actions in the RMPA only to the extent that they are consistent with the Mining Law of 1872 and the BLM's regulations.

In this planning process, the BLM is not making a determination regarding valid RS 2477 rights of way or RS 2339 ditches. Adjudicated RS 2477 and RS 2339 are considered valid existing rights.

The Proposed RMP Amendment/Final EIS Lands and Realty analysis in Chapter 4 and Appendix 10 has been revised to include an analysis of any potential indirect effects to valid existing rights as a result of the management alternatives.

Summary: The BLM should include language describing the RMPA's connection to the Solar PEIS. The BLM should also use the existing and planned transmission lines identified in the Solar PEIS to identify areas for co-location.

Response: The BLM analyzed a range of reasonable alternatives from ROW avoidance and exclusion areas for GRSG habitat management areas. Impacts associated with ROW development, such as disturbance and increased potential for predation, could occur in these areas if developed, but mitigation measures would help to lessen the impacts. The BLM would co-locate new ROWs with existing infrastructure when possible. as described in Nature and Types of Effects.

In a separate NEPA process, the BLM is currently updating the BLM RMPs for solar energy development in the Solar Programmatic Environmental Impact Statement (PEIS). In that analysis of impacts the Solar PEIS

considers existing management associated with the 2015 GRSG amendments as those direct current GRSG habitat management on BLM- administered lands. However, the Solar PEIS update defers to this GRSG planning effort to decide how solar energy development would be conducted in GRSG habitat management areas.

Summary: The BLM should eliminate ROW exclusions in KSLA.

Response: The BLM considered a range of reasonable alternatives during the planning process in full compliance with NEPA. The CEQ regulations (40 CFR 1502.1) require that the BLM consider alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment. In the Draft RMPA/EIS, ROW avoidance under Alternatives 1, 2, 4, 5, and 6 would not preclude development of major ROWs in PHMA where it overlaps with KSLA.

Summary: The BLM should work with state agencies to determine if additional mitigation for federally permitted projects would be needed to ensure future impacts on private lands would not occur once an easement or similar mechanism is lifted.

Response: BLM has worked and will continue to work with state agencies both as cooperators and stakeholders on this project, and on a continuing basis when analyzing actions at the Field Office level. This process will continue to inform if additional mitigation would be needed to ensure future impacts on private lands would not occur once an easement or similar mechanism is lifted.

Summary: The BLM should acknowledge that there are multiple requirements requiring reclamation be completed for project disturbances. Additionally, the EIS should clarify whether reclaimed land can be re-impacted.

Response: Section 4.2, Greater Sage-Grouse, has been updated acknowledging these effects. There is nothing proposed that states that PHMA cannot be disturbed. In the Draft RMPA/EIS, Section 2.5.5 states that a disturbed area is included in the disturbance cap calculation until it has been restored to provide equal or improved habitat function as was provided by the area before the disturbance.

Summary: The BLM should adopt an alternative with more stringent management to limit indirect impacts to adjacent high valuable habitat when co-locating major ROWs with existing disturbance.

Response: The BLM considered a range of reasonable alternatives during the planning process in full compliance with NEPA. The CEQ regulations (40 CFR 1502.1) require that the BLM consider alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment.

Summary: New transmission lines should not be authorized outside of utility corridors and, for those locations where transmission lines already exist, or where valid existing rights necessitate construction of new gen-ties in GRSG habitat, BLM should apply the avoidance criteria and additional protections for breeding, nesting, and other high-value/limiting seasonal habitat.

Response: The BLM considered a range of reasonable alternatives during the planning process in full compliance with NEPA. The CEQ regulations (40 CFR 1502.1) require that the BLM consider alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment. PHMA would be ROW exclusion under Alternative 3, outside of RMP designated corridors, which could preclude development of major ROWs. Required design features would be applied as described in the 2015 ARMPAs.

Summary: Alternatives 3 and possibly 4 would seriously restrict the possibility for urban expansion and housing affordability, as well as limit necessary infrastructure development, including that required for emergency services.

Response: The BLM has clarified and acknowledged the impacts on lands and realty under Alternatives 3 and 4 in Section 4.9 and in Appendix 10.

Summary: The Draft RMPA/EIS lacks adequate analysis of the effects on neighboring state and private lands in the analysis area.

Response: The BLM has clarified and acknowledged the potential indirect impacts on adjacent state, tribal and private lands in Section 4.9 and in Appendix 10.

Summary: The BLM should allow for exceptions to the requirement to use utility corridors depending on site-specific conditions, in areas where corridors end, or exceptions to avoidance requirements.

Response: The BLM considered a range of reasonable alternatives during the planning process in full compliance with NEPA. The CEQ regulations (40 CFR 1502.1) require that the BLM consider alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment. The range of alternatives includes encouraging placement of major ROWs in designated utility corridors under Alternatives 1 and 2, requiring the use of utility corridors under Alternative 3, and exemption from the disturbance cap if major ROWs are sited in utility corridors under Alternatives 5 and 6. The Proposed RMP Amendment encourages the use of utility corridors through major ROW exception criteria and allows for deviations depending on site-specific conditions. The BLM is not proposing changes to any RMP designated corridors under this RMPA.

For BLM, ROW avoidance means that areas should be avoided but may be available for location of ROWs with special stipulations. For management direction which discusses micro-siting to avoid placement - the first step is overall avoidance, then micro-siting to avoid impacts to active leks or connectivity corridors, then application of minimization measures, and finally residual direct and indirect impacts would be mitigated through compensatory mitigation. There is an exception listed that Major ROWs that are located inside RMP designated utility/ROW corridors would not need to comply with disturbance cap (at either the HAF fine scale or project level) or compensatory mitigation requirements unless required by State regulations.

Summary: The BLM should consider designating additional future corridors or use the more general approach from the GRSG planning effort where designated utility corridors include locations of existing linear infrastructure.

Response: The BLM dataset for designated utility corridors is based on corridors designated through BLM resource management plans. While the BLM is not changing designated utility corridors through this effort, future RMPs can consider designating additional corridors as suggested by the commenter. The BLM is not proposing changes to any RMP designated corridors under this RMPA.

Summary: Location of major ROWs in PHMA/IHMA may be necessary to meet other resource needs, including but not limited to the need for protection of prime agricultural lands or major ROW transmission corridors.

Response: NEPA directs the BLM to analyze a range of reasonable alternatives for management, based on the Purpose and Need, as outlined in Chapter 2, sections 2.1- 2.5. The BLM is not proposing changes to any RMP designated corridors under this RMPA.

22.2.22 Lands with Wilderness Characteristics

Summary: The BLM should consider suggested edits to lands with wilderness characteristics analysis in Chapters 3 and 4.

Response: This RMP amendment process is not proposing any changes to the management of lands with wilderness characteristics. The BLM appropriately inventoried lands for wilderness character and analyzed impacts of proposed management on lands with wilderness characteristics as required by law and BLM policy. BLM has revised language in the Proposed RMP Amendment/Final EIS for clarity and included edits to the analysis in Chapter 4 and Appendix 10 based on public comments.

22.2.23 Livestock Grazing

Summary: The BLM should update the analysis to recognize negative impacts of livestock grazing on GRSG habitat.

Response: As noted in the Best Available Information and Baseline Data section of this comment report, before beginning the GRSG Draft RMPA/EIS and throughout the planning effort the BLM considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. The BLM has incorporated the latest science into the discussion of impacts in Chapter 4, including an analysis of both the potential for beneficial and adverse effects on GRSG habitat. For instance, in Section 4.2.1 of the Draft RMPA/EIS, on page 4-7, the BLM describes the potential for the timing and amount of grazing to affect cover for nesting GRSG. The discussion of the potential effects of livestock grazing on GRSG continues through page 4-9.

Summary: The BLM should update and clarify the analysis to recognize benefits of livestock grazing to GRSG.

Response: As noted in Best Available Information and Baseline Data, of this comment report, before beginning the GRSG Draft RMPA/EIS and throughout the planning effort, the BLM considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. The BLM has incorporated the latest, best available science into the discussion of impacts in Chapter 4, including a balanced analysis of both the potential for beneficial and adverse effects on GRSG habitat. For instance, in Section 4.2.1 of the Draft RMPA/EIS, on page 4-7, the BLM describes the potential for the timing and amount of grazing to affect cover for nesting GRSG. The discussion of the potential effects of livestock grazing on GRSG continues through page 4-9. The BLM has made several changes to Section 4.2 in the Proposed RMP Amendment/Final EIS to clarify the potential for beneficial effects from livestock grazing on GRSG.

Summary: The BLM has adequate processes in place to manage livestock grazing and does not need an RMP amendment with additional direction. The BLM cannot keep up with the existing workload.

Response: As noted in Section 2.5.10 and described further in Appendix 15, Alternatives 1 and 2 include many livestock grazing actions addressed by regulation, policy, or that duplicate management in the existing RMPs. The action alternatives focused on the threat to GRSG from improper livestock grazing. The BLM will continue to comply with all existing laws related to livestock grazing, including 43 CFR 4100 and the

Taylor Grazing Act. The workload associated with administered livestock grazing cannot be addressed through an RMPA.

Summary: The BLM should update the analysis to focus on the impacts of proper versus improper grazing practices. Additionally, comparisons of impacts between livestock grazing and wild horse and burro grazing should be clarified such that the comparison is made only with improper livestock grazing practices.

Response: The BLM has language throughout the Draft RMPA/EIS distinguishing between proper and improper grazing and acknowledging that negative effects to GRSG are often from improper grazing. See for instance, page 3-4 of the Draft RMPA/EIS: "Habitat loss is attributed to ... improper livestock grazing ..." and page 4-9, which states: "Under all alternatives, described in Section 2.9.7, livestock grazing would be managed to meet or make progress towards land health standards and improper grazing would be limited and addressed through implementation-level corrective actions." In addition, to the extent appropriate, the RMPA/EIS identifies prioritization of management within PHMA and GHMA. However, sufficient flexibility in prioritization has been retained for the Authorized Officer during implementation, depending on District or Field Office specific conditions, such as staffing or budget.

In addition, as analyzed in the Draft RMPA/EIS, wild horse presence, particularly when herds are at levels greater than appropriate management levels, can lead to impacts on the quality of GRSG habitat. The types of effects that different large herbivores can have on rangeland ecosystems can be similar, even while the specific magnitude and spatial distribution of those effects may vary from species to species. The analysis did not state that wild horses are the sole source of impacts to GRSG, nor did the analysis conclude that all such impacts are identical across all large herbivores. Reducing any of the uses or resources that impact GRSG has the potential to reduce the negative impacts.

Summary: The BLM should update and clarify the data, methods, or language in the analysis on livestock grazing.

Response: The BLM has made several clarifying edits to the Proposed RMP Amendment in Chapter 2, for instance to RM-3. The BLM has also made clarifying edits to Section 4.4, Livestock Grazing, and Appendix 10 in the Proposed RMP Amendment/Final EIS to better explain impacts on livestock grazing from the alternatives, such as by clarifying that livestock grazing is not a surface disturbing activity and that the BLM would comply with land health standards. Section 4.12.1 was also revised per a comment on the language used describing strain on ranches in the U.S.

One comment questioned a specific BMP regarding the location of livestock supplements, but this BMP deals with more mesic areas of the landscape commonly associated with brood-rearing habitat, not lekking habitats. In the sagebrush systems, areas with water provide critical resources for GRSG and other wildlife species. Encouraging the location of supplements outside such sensitive areas protects these sensitive areas. Additionally, while the relative higher uses of grazing that corresponds with supplement locations can provide clearings which the GRSG may use to lek, GRSG leks are located in areas where there is good nesting habitat and not just where there is a clearing in the sagebrush. As a BMP, historic use areas can be taken into account when local managers consider local landscape characteristics.

Another comment raised an issue with a BMP for grazing management as it pertains to the SSS land health standard, but this BMP specifically states action would be considered when "...current livestock management practices are determined to not be meeting or making progress towards meeting the SSS land health standard…" While not using the words "significant causal factor" there is an intent of direct relationship

between livestock grazing and the area not meeting the land health standard. The BMP and Chapter 2 actions are clear that the list of potential changes are suggestions ("could include, but are not limited to"), and should be coordinated with local permittees and consider local conditions.

As stated in the Draft RMPA/EIS in Section 1.5 and in the Proposed RMP Amendment/Final EIS in Section 1.4.1, all proposed actions will be subject to valid existing rights, which includes those associated with permits issued under the Taylor Grazing Act as amended. Accordingly, the BLM will ensure that its implementation of the management actions in the RMPA is consistent with the terms and conditions in existing leases or existing contracts. The BLM complied with all applicable laws and agency regulations and policy in developing this Proposed RMP Amendment, including the BLM's LHS and SSS management.

Summary: The BLM should provide additional details regarding implementation of management practices, such as who is responsible for additional costs associated with actions like range improvements. Allotment Management Plans (AMPs) should be established as they are the most appropriate way to effectively manage livestock grazing at a site-specific scale to benefit Sage-grouse.

Response: The RMPA/EIS contains only land use planning decisions and does not include any implementation decisions. The BLM will address implementation decisions during future decision-making. Budget and agency resources issues are appropriately addressed during the budget appropriations process. AMPs are site-specific to each allotment. As such they are implementation level activities and out of scope for a land use planning document.

Summary: The BLM should change or clarify the livestock grazing management being considered.

Response: In preparing the GRSG RMPA/EIS, the BLM developed a range of alternatives. The range of alternatives in the Draft RMPA/EIS includes the no-action alternative, Alternative 3 under which PHMA would be unavailable for grazing, and three other action alternatives with varying grazing management. Additional alternatives related to livestock grazing that the BLM considered were described in Section 2.3 in the Draft RMPA/EIS, as alternatives considered but not analyzed in detail. Many suggestions made by commenters are included in the range of alternatives. Further, language in the RMPA is intended to allow for discretion of the authorized officer during implementation, depending on site-specific conditions. The RMPA/EIS contains only planning-level actions and does not include any implementation actions. The application of the livestock grazing BMPs, annual monitoring, and site-level mapping will occur during the implementation process and will take into account local ecological conditions at the time those applicable decisions are needed.

Lek buffers would not prevent livestock grazing but would be used to reduce the likelihood of disturbance to lekking grouse associated with certain livestock grazing activities, such as supplemental feeding and fence locations.

To the extent appropriate, the RMPA/EIS identifies prioritization of management within PHMA and GHMA. However, sufficient flexibility in prioritization has been retained for the Authorized Officer during implementation, depending on District or Field Office specific conditions, such as staffing or budget.

Establishing specific monitoring methodologies as an RMP decision could constrain the BLM's ability to adapt to new monitoring approaches and technologies without having to conduct a plan amendment. The BLM's Monitoring Framework is included as Appendix 7 and includes a description of several aspects of monitoring both habitat and disturbance in GRSG HMAs. However, monitoring of specific habitats due to concerns with various uses or changes in conditions are driven by those site-specific conditions, and therefore cannot be

identified and defined in an office-wide or range wide RMP decision. The RMP does establish several standards for monitoring and evaluation as components of the RMP decisions. For example, the proposed goal states the BLM's desired condition is to manage for healthy GRSG habitat that supports healthy, persistent GRSG populations. It also establishes the objective to managing for suitable GRSG habitat, considering the methodologies of the HAF. In other management actions it directs use of Land Health Assessments, tracking anthropogenic disturbance, or using approaches for tracking adaptive management thresholds. The BLM's planning process itself includes a regular evaluation to determine if the goals, objectives are still applicable and appropriate, and if the management actions present are effective at meeting those desired conditions. This is evident in the BLM's GRSG planning process through the completion RMP evaluations throughout the range of GRSG, as well as publication of the 2021 Monitoring Report referenced in the DEIS Section 1.2.2. Implementation of all these specific monitoring standards is dependent are available staff and budget; as such, development of a specific schedule for monitoring beyond those included in Appendix 7 is not reasonable.

In RM-7, which would apply to Alternatives 4, 5, 6, and the Proposed RMP Amendment, the BLM would "consider whether to offer the permit for re-authorization," which would not force retirement of grazing permits and leases.

As stated in Appendix 15, the BMPs or design features, which would apply only to livestock grazing activities, are not required in every instance but are useful to aid in proper livestock grazing management in GRSG habitats. The applicability and overall effectiveness of each BMP cannot be fully assessed until the project level when the project location and design are known. Because of site-specific circumstances, some BMPs may not apply to some projects (e.g., a resource is not present on a given site) and/or may require slight variations. Discretion would be allowed by the authorized officer in how and when the BMPs and design features would be applied.

Clarification requested by one commenter on how grazing could be returned if treatment objectives are not able to be met regardless of grazing deferment is not needed, as it can be decided at the implementation level. The ecological capabilities of an area are also specifically addressed in RM-2, the habitat objectives, and DEIS Appendix 8.

To respond to a request from a commenter for an explanation for why Nevada has specific BMPs that do not appear to be set up in coordination with the 2019 Nevada Greater Sage-grouse Conservation Plan, the Nevada-specific BMPs originated in the Nevada/California 2015 and 2019 GRSG ARMPAs as actions only present in the Nevada/California ARMPAs. After reviewing the language, they were moved from livestock grazing management decisions to be BMPs, but still applied to the state where that language originated.

One commenter expressed an urgent need for rest pastures that permittees can place their livestock in when their current allotment is burned or experiences a restoration treatment. Reserve pastures could be established, but this is not an RMP level decision.

Another comment received requested that the BLM remove any language recommending a reduction in AUMs. The language refers to adjustments in AUMs which is within the authority of the BLM to do. The BLM is not making adjustments in AUM in this process and will undergo additional decision-making prior to making any adjustments.

A further commenter stated that the BLM must not assume that the Standard for SSS has not been met and requested that associated language from Chapter 2 be changed. The language does not assume the SSS

standard is not met, but establishes a strategy for action "where the LHS for SSS habitat (including GRSG) is not being met." This commenter also requested another change to language in Chapter 2, stating that the BLM should not remove infrastructure of any kind if the removal will create additional disturbance or encourage the spread of annual grasses so any associated language calling for removal of infrastructure should be altered. Impacts must be considered in the NEPA process. This action is only applicable where impacts to GRSG from existing infrastructure is present based on the language "projects that negatively affect GRSG or GRSG habitat." If a project does not meet this definition, this management would not apply.

An additional comment received recommended that BLM incorporate the prioritization framework from the Gunnison Sage-grouse RMPA for grazing allotment reauthorizations in GRSG habitats because it was unclear when a causal factor analysis would be triggered. As described in the Draft RMPA/EIS in Chapter 2, Adaptive Management, the causal factor analysis is initiated when a soft or hard population trend threshold is identified. State wildlife agencies can alert the BLM when population thresholds (soft or hard) are met to initiate a causal factor analysis. The BLM will also review the annual results of TAWS in determining if population trends indicate potential habitat concerns.

Another comment received asserted that the EIS must take a hard look at BLM's authority to temporarily or permanently reduce or eliminate livestock grazing from the public lands in the HMAs pursuant to 43 C.F.R. 4710.5(a). This is existing regulation. Nothing in the Draft RMPA/EIS impacts the ability of the BLM to implement this should the situation arise. Temporarily reducing or eliminating livestock grazing if necessary to provide habitat for wild horses or burros is outside the scope of this land use planning process. Management related to livestock grazing and wild horses and burros are clearly separated in Chapter 2.

LHS are a standard part of the BLM livestock grazing program. The Draft RMPA/EIS simply applies the objective for grazing administration that addresses "restoring, maintaining, or enhancing habitats of...special status species to promote their conservation" (43 CFR Part 4180.2(e)(9)). Table 2-12, Management Action RM-2 in the Draft RMPA/EIS outlines how HAF would be incorporated. In addition, as described in Appendix 8 of the DEIS, habitat indicators are assessed following the methods described in the Sage-grouse Habitat Assessment Framework. BLM will leverage the terrestrial Assessment, Inventory, & Monitoring (AIM) methods, additional monitoring approaches for wetland & riparian habitats, credible partner data, and supplemental long-term monitoring data and guidelines developed by the BLM to collect data on site-scale habitat condition. Data will inherently vary between states as ecosystems as not uniform across the GRSG range. As research becomes available, new data could refine or clarify GRSG selection for vegetation structure and composition in seasonal habitats for certain populations. Because of this, the Habitat Indicators Tables will be periodically reviewed to incorporate the best available science in coordination with applicable federal, state, local, and tribal agencies.

Summary: The BLM should change or clarify the livestock grazing management being considered for range improvements.

Response: As noted in prior responses, in preparing the GRSG RMPA/EIS, the BLM developed a range of alternatives, including alternatives considered but not analyzed in detail. Many suggestions made by commenters are included in the range of alternatives. Further, language in the RMPA is intended to allow for discretion of the authorized officer during implementation, depending on site-specific conditions. The RMPA/EIS contains only planning-level actions and does not include any implementation actions. The application of the livestock grazing BMPs, annual monitoring, and site-level mapping will occur during the implementation process and will take into account local ecological conditions at the time those applicable decisions are needed.

Water development, range improvements, and targeted grazing near water sources and intact sagebrush stands (when effective controls prevent detrimental impairment of riparian areas or sage-grouse habitat) are allowed under all alternatives except Alternative 3.

Another commenter requested that wording for an RFD in Appendix 15 stating that new livestock handling facilities must be located outside of nesting habitat should be removed and the requirement "around 1.2 miles from active leks" should be accompanied by a qualifier stating, "to the extent possible." The items noted in Appendix 15 are not RFDs but are clearly described as BMPs "to be considered during implementation of the RMP. These measures are not required in every instance but are useful to aid in proper livestock grazing management in GRSG habitats. The applicability and overall effectiveness of each BMP cannot be fully assessed until the project level when the project location and design are known." Given this explanation for all the BMPs in Appendix 15, additional language of "to the extent possible" is not necessary.

To respond to an objection raised by a commenter regarding the use of virtual fencing as a blanket solution for any lapses in fence maintenance, virtual fencing is used as an example in RM-6 but would not be required.

Some commenters expressed opposition to the BLM removing or modifying any water developments without thorough coordination with the affected permittee and following all applicable laws, disallowing grazing from May 15 - Sept. 15 in riparian areas and wet meadows, and making allotments unavailable to grazing. These actions are associated with management actions in the 2015 and 2019 planning efforts and are not being considered to be carried forward as management actions in the preferred alternative.

A comment was received requesting language from the DEIS regarding potential deferral of new infrastructure projects or permits in PHMA or IHMA where wildfire impacted GRSG populations be removed or modified so that other land uses are not punished for the damage of wildfire events. Since wildfire is a large cause of GRSG habitat destruction, many activities may be limited after wildfire events, not just livestock grazing. The language does not specify that grazing would be restricted. However, it is not uncommon for wildfire events to result in changes to livestock grazing due to the substantial changes in vegetation in the burned areas. Uses that were compatible with the vegetation conditions prior to a fire may not be compatible to the same area after a fire. This language notes that such changes must be taken into account when authorizing uses in such affected habitats.

Summary: The BLM should not prohibit grazing and should not eliminate grazing districts.

Response: All the alternatives comply with all applicable laws, including the Taylor Grazing Act. The BLM is not proposing to create nor eliminate designated grazing districts. The Proposed RMP Amendment does not make changes to specific grazing permits. The Taylor Grazing Act requires a separate process to close areas to grazing, which includes giving affected permittees two years' notice. The BLM continues to manage grazing in accordance with FLPMA and the TGA. The BLM will also comply with its own regulations when conducting land health evaluations.

One commenter asked about how the BLM intends to remove or modify water developments and what the mitigation plan is for the loss of these developments, which are implementation-level questions where the answer is likely different from allotment to allotment. These scenarios would be addressed at the permit level and thus this question is out of scope.

Summary: BLM should include grazing permittees in their decision making.

Response: BLM decision making is a collaborative process which involves general direction, policy and advice from HQ, and implementation decisions primarily at the field and district office level. BLM provides guidance that field and state managers incorporate as they make decisions, which allows for more local assessment of resources and impacts. Grazing permittees will work with Field Office specialists which will assure their concerns are heard and made available to inform the decision making process. In general, all proposed actions will be subject to valid existing rights, including those associated with grazing. Accordingly, the BLM will ensure that its implementation of the management actions in the RMPA is consistent with the terms and conditions in existing leases or permits.

One commenter specifically requested that language be incorporated to include coordination with permittees on fencing evaluations for GRSG, as fences are key to livestock distribution, which affects land health and GRSG conservation. Evaluation of if a fence is in a high-risk area for GRSG, as described in the first sentence of RM-6, is a wildlife issue. The second sentence deals with determining if the fence is needed. Permittees will be involved in decisions that affect their permits through the implementation process.

The BLM complies with the Taylor Grazing Act (TGA) and its own grazing regs to make implementation level decisions-this includes coordinating with affected permittees. If the terms and conditions of a permit need to be reconsidered in light of this RMPA, the BLM would still follow the TGA and its own grazing regs when renewing the permit.

22.2.24 Locatable Minerals

Summary: The BLM should conduct a more detailed and quantitative analysis of the impacts on locatable minerals; coordinate and develop a land management mineral classification plan and an updated mineral potential report in order meet the requirements of NEPA to take a hard look at the impacts to mineral resources.

Response: A land use planning-level decision is broad in scope and, therefore, does not require an exhaustive presentation of baseline data or impacts analysis. The baseline data and impacts analysis provide the necessary basis to make informed land use plan-level decisions. Land use plan-level analyses are typically broad and qualitative rather than focused on site-specific actions (BLM Land Use Planning Handbook H-1601-1, Chapter II, A-B at 11-13 and Chapter IV, B at 29). A mineral potential report is not required for land use planning efforts. The BLM has collated sufficient information to support the analysis in this broadscale planning document.

The BLM analyzed a reasonable range of alternatives adequate to address the agency's purpose and need for considering these amendments, as described in Chapter 2. Further, BLM considered a number of alternatives and issues during scoping that the agency determined not to carry forward, as detailed in Section 2.3. Only Alternatives 1, 2 and 3 propose any withdrawal from location and entry under the Mining Law. Impacts to locatable minerals from management outlined in the alternatives are analyzed in Section 3.10.4 and 4.10.4, with additional information in Appendix 10 Section 10.10.4, to a level that would allow for an informed decision among alternatives. Social and economic impacts from the alternatives are analyzed in Sections 3.12 and 4.12, with additional detail in Appendix 18.

The Proposed RMP Amendment does not identify any areas to recommend for withdrawal from location and entry under the Mining Law.

The BLM will conduct subsequent site-specific NEPA analyses for projects proposed for implementation under the land use plan. The subsequent NEPA analyses for project-specific actions may tier to the land-use

planning analysis and evaluate project impacts at the appropriate site-specific level (40 CFR 1501.11, 40 CFR 1508.1). As required by NEPA, the public will have the opportunity to participate in the NEPA process for site-specific actions.

Summary: The EIS should consider the impacts of mineral withdrawal as a result of recommendation for withdrawal and provide basis for the statement that the withdrawal of all SFAs had no impact.

Response: As stated in Section 4.10.4 of the Draft RMPA/EIS: "Recommending areas for closure to the mining laws for locatable exploration or development does not restrict any activities and therefore, such recommendation does not have any impacts. However, the BLM could ask the Secretary of the Interior to propose and make a withdrawal of the land from location and entry under the Mining Law of 1872 pursuant to Section 204(a) of FLMPA. Proposing and making a withdrawal is not a land use planning decision. Should the Secretary propose a withdrawal, the proposal would require environmental and other analysis under NEPA and other applicable authorities before the land could be withdrawn. For purposes of this planning initiative, the alternatives analysis includes a description of the likely environmental effects should the Secretary propose and make a withdrawal in the future (e.g., reduced potential for behavioral disturbance and habitat loss/alterations)."

The separate EIS effort that is considering a mineral withdrawal of the 2015 sagebrush focal areas (SFAs) is independent of any SFA decisions associated with this planning process. As ordered by the United States District Court for the District of Idaho, the consideration of whether the withdrawal is needed for sage-grouse conservation has been remanded to the BLM, including the completion of that NEPA process. This separate mineral withdrawal EIS effort is considered in the GRSG Draft RMPA/EIS in the Cumulative Effects analysis (Section 4.21 and Appendix 4).

Summary: The BLM should clarify that restrictions on motorized travel, including any temporary closures authorized under various other provisions in FLPMA, do not apply to locatable mineral operations.

Response: As stated in Chapter 2, Table 2-1, Alternatives Considered but Not Analyzed in Detail, this planning effort is not considering any travel and transportation management decisions. In addition, Section 1.5 of the Draft RMPA/EIS states "The RMPA will be completed in compliance with all relevant Federal laws and regulations, Executive Orders, and management policies of the BLM, including the Mining Law of 1872". The BLM recognizes it has limited authority to manage mining operations under the Mining Law of 1872.

Summary: BLM should include elevated protections within SFAs to limit impacts from locatable minerals.

Response: The Draft RMPA/EIS includes a consideration and analysis of Alternative 1, under which SFAs are considered. The separate EIS effort that is considering a mineral withdrawal of the 2015 sagebrush focal areas (SFAs) is independent of any SFA decisions associated with this planning process. As ordered by the United States District Court for the District of Idaho, the consideration of whether the withdrawal is needed for sage-grouse conservation has been remanded to the BLM, including the completion of that NEPA process. This separate mineral withdrawal EIS effort is included in this GRSG RMPA/DEIS in the Cumulative Effects analysis (Section 4.21 and Appendix 4).

Summary: The DEIS fails to demonstrate how the alternatives meet the stated goals and objectives and preclude listing of the GRSG without mineral withdrawal recommendation or maps and locations of mining claims relative to GRSG populations.

Response: NEPA directs the BLM to analyze a range of reasonable alternatives for management, based on the Purpose and Need, as outlined in Chapter 2, sections 2.1- 2.5. As noted, the preferred alternative in the Draft EIS was Alternative 5, but that is not the BLM's final decision about management of BLM lands. BLM retains the discretion to make a reasoned choice among the alternatives in a final decision for management based on public comments and the analysis. Alternatives 1 and 3 would recommend that certain areas are withdrawn from location and entry under the Mining Law of 1872. As noted in Section 3.2.1 of the Draft RMPA/EIS, there are numerous reasons for the decline of GRSG populations, locatable mineral development is one source of loss, fragmentation, and/or degradation of suitable sagebrush habitat.

A land use planning-level decision is broad in scope and, therefore, does not require an exhaustive presentation of baseline data or impacts analysis. The baseline data and impacts analysis provides the necessary basis to make informed land use plan-level decisions. Impacts on GRSG from locatable minerals management under each alternative are described in Section 4.2 of the Draft RMPA/EIS to a level that would allow for an informed decision among alternatives.

The BLM also recognizes that it has limited authority to impose conditions on certain uses related to the Mining Law of 1872 through land use planning decisions. Accordingly, the BLM will apply management actions in the RMPA only to the extent that they are consistent with the Mining Law of 1872 and the BLM's regulations.

Summary: The DEIS should demonstrate how avoidance or mitigation will be achieved for notice level mining operations and should address impacts from notice-level exploration disturbances across alternatives particularly the impacts from segmenting or stacking these activities to stay under the 5-acre mitigation threshold.

Response: The BLM's process for notice-level mining operations is an implementation level activity. Impacts from notice-level exploration disturbances are described at a broad level in the discussion of effects from locatable minerals. For instance, in Section 4.2, the types of impacts that result from locatable mineral development, including notice-level operations, are described in Section 4.2.1 under the header of Other Mineral Resource Management (Salable, Nonenergy Leasable, Locatable, and Coal). The impacts from segmenting or stacking activities are not addressed since that is not a reasonably foreseeable action with proper BLM management.

Summary: BLM needs to consistently describe their authority over operators exercising their rights under the Mining Law. BLM should better analyze effects of the alternatives on valid existing rights.

Response: Section 1.5 of the Draft RMPA/EIS states "The RMPA will be completed in compliance with all relevant Federal laws and regulations, Executive Orders, and management policies of the BLM, including the Mining Law of 1872" and " The RMPA will recognize valid existing rights."

Further, Section 4.10.4 of the Draft RMPA/EIS states "If lands are withdrawn by the Secretary, the only locatable mineral resources that may be developed on withdrawn lands during the term of the withdrawal are those associated with mining claims that the BLM has determined to be valid.'

Only management actions consistent with the Mining Law of 1872 will apply to mining operations. The BLM recognizes it has limited authority to manage mining under the Mining Law of 1872.

Summary: The Draft RMPA/EIS should clarify how not designating SFAs under the preferred alternative would affect the pending withdrawal of SFAs from locatable minerals.

Response: The separate EIS effort that is considering a withdrawal from location and entry under the Mining Law of 1872 of the 2015 sagebrush focal areas (SFAs) is independent of any decisions associated with this planning process. The United States District Court for the District of Idaho, ordered the BLM to "re-initiate" the NEPA analysis for that proposed withdrawal. This separate mineral withdrawal EIS effort is included in this GRSG RMPA/DEIS in the Cumulative Effects analysis (Section 4.21 and Appendix 4). The BLM cannot withdraw lands from location and entry through land use planning and has limited authority to manage mining under the Mining Law of 1872.

Since the withdrawal proposed in 2015 is a separate process, it does not matter whether SFAs are designated or not in this RMPA. If the proposed withdrawal recommendation were to occur, it would just be within the previous SFA boundaries as analyzed in the separate EIS effort.

Summary: BLM should clarify existing rights under the 1872 Mining Law and impacts of withdrawals to the supply of critical minerals.

Response: The BLM recognizes that it has limited authority to impose conditions on certain uses related to the Mining Law of 1872 through land use planning decisions. Accordingly, the BLM will apply management actions in the RMPA only to the extent that they are consistent with the Mining Law of 1872 and the BLM's regulations. Withdrawals are considered under a separate process by the Secretary consistent with FLPMA and applicable regulations.

Alternative 1 includes SFAs and the BLM recommended those areas to be withdrawn from location and entry under the Mining Law of 1872. That recommendation has no impact because it is a recommendation and the Secretary considers withdrawals under a separate process. The separate EIS effort that is considering a mineral withdrawal of the 2015 sagebrush focal areas (SFAs) is independent of any SFA decisions associated with this planning process. As ordered by the United States District Court for the District of Idaho, the consideration of whether the withdrawal is needed for sage-grouse conservation has been remanded to the BLM, including the completion of that NEPA process. This separate mineral withdrawal EIS effort is included in this GRSG RMPA/DEIS in the Cumulative Effects analysis (Section 4.21 and Appendix 4).

22.2.25 Mineral (Salable) Materials

Summary: BLM should not use Alternative 1 or Alternative 3 because it closes too much mineral estate.

Response: NEPA directs the BLM to analyze a range of reasonable alternatives for management, based on the Purpose and Need, as outlined in Chapter 2, sections 2.1- 2.5. As noted, the preferred alternative in the Draft EIS was Alternative 5, but that is not the BLM's final decision about management of BLM lands. BLM retains the discretion to make a reasoned choice among the alternatives in a final decision for management based on public comments and the analysis. In the Draft RMPA/EIS, impacts to salable minerals are analyzed in Sections 3.10.5, 4.10.5, and 4.21.8.

Summary: The BLM should update and clarify the data, methods, or language in the analysis on mineral (salable) materials, such as the impacts when expansion of existing gravel pits is not feasible.

Response: Section 4.10.5 was updated based on comments provided.

Summary: BLM should choose Alternative 3 for salable minerals, specifically that PHMA is closed to salable mineral material pits.

Response: BLM formulated a reasonable range of alternatives to analyze, based on the Purpose and Need, as outlined in Chapter 2, sections 2.1- 2.5. As noted, the preferred alternative in the Draft RMPA/EIS was Alternative 5, but BLM can change the alternative selection and composition in accord with the results of analysis and comments.

Free use pits support maintenance needs for existing local roads to ensure public safety. Under the preferred alternative, the intention is to allow use and expansion of authorized free use pits that would not create significant impacts (i.e., upon completion of an Environmental Assessment, BLM determines that a FONSI is applicable) and where the applicable area has not met the disturbance cap, without further analysis or mitigation. Bear in mind that prior to the use being authorized for existing pits, the size of the authorized pit would have been analyzed in existing NEPA. There could be new information that wasn't analyzed initially; in that case, BLM would need to conduct another analysis that takes that information into account.

22.2.26 Mitigation

Summary: The BLM should clarify how compensatory mitigation would be applied, such as whether state boundaries could be crossed to obtain credits from mitigation banks; the meanings of "no net habitat loss" versus "net conservation gain"; and consequences if mitigation fails. The BLM should also provide information on the past success of mitigation. Mitigation requirements and commitments should be included in the ROD.

Response: Compensatory mitigation would be specifically targeted to areas where key resources would receive the greatest benefits. Compensatory mitigation may involve the use of mitigation banks and identifies the need to provide mitigation in the area of impact. However, in some areas mitigation would not necessarily be geographically bound to areas of impacts based on local situations. The terms "no net habitat loss" versus "net conservation gain" have been clarified in Chapter 2 in the Proposed RMP Amendment. The "net conservation gain" terminology is solely from the 2015 and 2019 plans, analyzed in the DEIS as Alternative 1 and Alternative 2, respectively. The Proposed RMP Amendment does not propose "net conservation gain." Although the BLM is not required to follow state programs or requirements that conflict with federal law and policy, all applicable state mitigation requirements will be met. While presenting detailed information on the past success of specific mitigation methods is not within the scope of the EIS, mitigation measures are selected based on peer-reviewed science and demonstrated efficacy.

Summary: Mitigation requirements should be changed, such as waiving mitigation requirements in certain instances, not requiring the mitigation completed prior to the disturbing activity, changing language to "no net loss" or "net conservation gain", and applying mitigation to other activities.

Response: The BLM has reviewed the suggested changes to the mitigation management direction and has incorporated some changes into the Proposed RMP Amendment (see Chapter 2). The Alternatives in the Draft RMPA/EIS provide a range on when the compensatory mitigation should be complete which aids in the analysis of the options.

Summary: The BLM should defer to state compensatory mitigation systems, such as Nevada's Conservation Credit System (CCS). The BLM should coordinate with state agencies regarding mitigation.

Response: The BLM will follow its own mitigation policy as outlined in BLM-MS-1794 but has deferred to state agencies regarding additional mitigation requirements. Operators are required to comply with other relevant laws which may include mitigation required by the state.

Summary: The BLM should limit or eliminate use of compensatory mitigation.

Response: As described under Range of Alternatives, the BLM considered a reasonable range of alternatives during the planning process in full compliance with NEPA. As a result, the BLM analyzed six alternatives in detail in the Draft RMPA/EIS that best addressed the purpose and need. The allowance for compensatory mitigation varies across alternatives, though all alternatives would follow the mitigation hierarchy which considers compensatory mitigation after avoidance and minimization.

Summary: State mitigation systems are not adequate to prevent project-level impacts.

Response: The BLM notes the state mitigation systems under Cumulative Impacts but does not rely on these systems for its compensatory mitigation nor does the Draft RMPA/EIS assert that state systems would eliminate all impacts.

Summary: The BLM should prevent unnecessary or undue degradation (UUD) that cannot be mitigated by refusing applications.

Response: BLM has both the authority and the measures in place to avoid UUD that cannot be mitigated by denying the application. In addition, if an impact cannot be mitigated and the circumstances support accepting the application, BLM will require an EIS for any substantial impacts.

Summary: The BLM should use terminology already defined and embedded in the HAF and not add terms like "habitat sufficiency" into the process. The BLM should consider alternative approaches, including remote sensing, to verify the effectiveness of compensatory mitigation actions, and supplement these with the HAF where available.

Response: There is only one location in the Draft RMPA/EIS that uses the term "habitat sufficiency" and it's in the introduction of Section 2.5.3 Mitigation. The sentence reads, "The principles of HAF can be used to measure habitat sufficiency in implementing mitigation." HAF is one tool used to assess habitat sufficiency. Other methods can be employed as appropriate. While presenting detailed information on the past success of specific mitigation methods is not within the scope of the EIS, mitigation measures are selected based on peer-reviewed science and demonstrated efficacy.

Summary: BLM should be consistent in the requirement to have compensatory mitigation completed prior to development occurring.

Response: Each alternative approaches mitigation in a different fashion. In accordance with NEPA and the input of cooperators and commenters, as well as the information from previous similar efforts, BLM sought to provide a wide range of alternatives, each incorporating different approaches and procedures. It is consistent with the requirements of NEPA to analyze a range of reasonable alternatives that result in an informed decision.

Summary: BLM should make the mitigation proximity requirement and net conservation gain/no net loss standard less difficult to implement and to be consistent with the BLM's Mitigation Handbook.

Response: Mitigation will be applied to implementation actions and decisions, consistent with valid existing rights and applicable law, that take place on BLM managed lands within GRSG habitat during the life of this plan amendment. The management direction for mitigation, Section 2.5.3, was developed to follow the BLM's Regional Mitigation Manual MS-1794 and CEQ 40 CFR 1508.20. The intent of requiring mitigation to be within the same area as the affected population is to ensure further range degradation and loss does not

occur, consistent with the objective of this planning effort. The BLM has clarified mitigation requirements in the Proposed RMP Amendment.

Summary: The BLM should reconsider the requirement that compensatory mitigation be completed prior to initiating habitat disturbances, since it ignores how existing mitigation systems function. Commenters suggested requiring periodic monitoring of mitigation activities to ensure compliance with durability standards and timely implementation of conservation actions.

Response: The BLM considered a reasonable range of alternatives during the planning process in full compliance with NEPA. As a result, the BLM analyzed six alternatives in detail in the Draft RMPA/EIS that best addressed the purpose and need. The intent of requiring mitigation being completed prior to project disturbance is to minimize impacts to affected populations and to ensure further range degradation and loss does not occur which is consistent with the objective of this planning effort. Alternatives 1 and 2 do not require compensatory mitigation to be completed prior to the disturbance. Mitigation monitoring would be conducted.

Summary: The BLM should provide more exceptions for locatable mining activities throughout the mitigation requirements.

Response: As stated in the DEIS in Section 1.5, all proposed actions will be subject to valid existing rights, including those associated with leases issued under the Mining Law of 1872 as amended. Accordingly, the BLM will apply management actions in the RMPA only to the extent that they are consistent with the Mining Law of 1872 and the BLM's regulations. The definition of valid existing rights is included in the glossary of the Draft RMPA/EIS.

Summary: The impacts of compensatory mitigation need to be analyzed in further detail. NSO provides much greater certainty and eliminates impacts from surface occupancy, if the proposed NSO waivers are changed to disallow modifications.

Response: If residual impacts to GRSG from implementation-level actions remain after applying avoidance or minimization measures, then compensatory mitigation projects will be used to offset the residual impacts in an effort to achieve the land use plan goals and objectives. As articulated in the Proposed RMP Amendment/Final EIS, compensatory mitigation will occur on sites that have the potential to yield the greatest conservation benefit to the GRSG, regardless of land ownership. These sites should be sufficiently "durable." According to BLM Manual 1794, durability is defined as "the administrative, legal, and financial assurances that secure and protect the conservation status of a compensatory mitigation site, and the ecological benefits of a compensatory mitigation project, for at least as long as the associated impacts persist."

The GRSG planning process recognizes that continued coordination with state wildlife agencies is vital. The DEIS Table 2-9 states that Exception #1 for Alt 4 & 5 (emphasis added): "To approve this exception based on any of the above criteria, after coordination with the appropriate State agency, the Authorized Officer must document, that the proposed action satisfies at least one of the criteria listed above. If the State agency does not concur with granting the exception, the Authorized Officer must provide rationale for how the criteria are met considering the information the State provides." For Exception #2, the criteria for Exception #1 would still apply or for Alt 4 the compensation project must be completed and habitat functionality documented before the exception is granted to ensure the offset in impacts will occur. In addition, this exception would still require documentation in coordination with the appropriate State authority. For

Exception #2 the Proposed RMP Amendment outlines that the compensatory mitigation direction in the Mitigation section must be followed, though the compensation project must be completed and habitat functionality documented before the exception is granted. The compensation must also provide offsetting benefits to the population being impacted.

22.2.27 Monitoring

Summary: The final plan should include the qualifier that when monitoring identifies parcels of land within habitat management areas that are not capable of providing desired habitat characteristics due to ecological potential, they should be removed from PHMA/GHMA requirements.

Response: The BLM acknowledges that site-specific conditions on the ground may vary from the landscape scale modelling and those conditions on the ground change over time. As such, PHMA management would not be applied to non-habitat. The process for identifying non-habitat is described in Section 2.5.2 of the Draft RMPA/EIS. Such identification would occur at the project level, including associated project specific NEPA analysis.

Summary: The BLM uses incorrect methods for vegetation monitoring, specifically assessing perennial grass height and cover.

Response: Generally, there are many valid methods for measuring plant heights that the scientific community has used over time. The BLM AIM strategy standardized height measurements by adopting a method that was originally published almost two decades ago (https://www.blm.gov/sites/default/files/docs/2022-04/TR_1734_8_vol1_508.pdf) and is used by many different land managers including the NRCS National Resources Inventory. As the commenter notes, this measurement focuses on maximum plant heights for woody and herbaceous plants within a small area. Repeated measurements across a plot yield an average of the maximum height measurements. Plant height measured this way has been shown to relate to both wildlife habitat and wind erosion.

While there are other ways of calculating plant heights, there are pros and cons to each method. Plant height can be quite variable across an area. Maximum height per area captures information that is meaningful for many of the aspects of ecosystems that we are trying to measure including wildlife habitat.

Summary: The BLM should monitor annually.

Response: Monitoring is a key element of complex long-term conservation strategies, particularly where there is uncertainty (FWS 2015a). In the DEIS Table 2-15, there is a description of the annual monitoring requirements in adaptive management. With this annual monitoring, the BLM and state wildlife agencies should be aware of annual population fluctuations.

Summary: The BLM should include a specific timeline for each step of the monitoring implementation strategy in a chart.

Response: In the DEIS Table 2-15, there is a description of the annual monitoring requirements in adaptive management. With this annual monitoring, the BLM and state wildlife agencies should be aware of annual population fluctuations.

22.2.28 NEPA (National Environmental Policy Act)

Summary: The document and alternatives are unclear. The EIS is hard to understand and not written in plain language.

Response: The BLM has reviewed the EIS and reorganized both the layout and the language for improved readability and clarity. Changes have been made throughout the Proposed RMPS/Final EIS accordingly.

Summary: The BLM should adopt a standard form to be included in NEPA analyses across projects as an appendix or supplemental GRSG report that clarifies GRSG design and management decision obligations.

Response: The BLM appreciates the commenters providing considerations that could assist us in subsequent implementation level analysis and decisions.

Summary: BLM should use a state-specific GRSG plan instead of a West-wide one. The current RMPA covers too large of an area to be meaningful.

Response: The GRSG planning effort is consistent with the BLM's planning regulations. The BLM's existing land use planning regulations allow planning at any appropriate geographic scale. See 43 CFR 1610.1(b) ("A resource management plan shall be prepared and maintained on a resource or field office area basis, unless the State Director authorizes a more appropriate area.") (emphasis added). See also BLM Land Use Planning Handbook ("State Directors may also establish regional planning areas that encompass several field offices and/or states, as necessary."). The planning area here, defined in coordination with relevant BLM state directors, includes ten Western states to enhance GRSG conservation. This planning area facilitates consistency across states and updates the approach taken in the BLM's 2015 and 2019 planning efforts. Further, FLPMA (at 43 USC 1712(a)) directs the Secretary of the Interior to develop, maintain, and revise land use plans. While the Secretary has delegated land use planning authority to BLM Field Managers and State Directors through the planning regulations (43 CFR 1601.0-4), this delegation does not preclude a supervisor of the delegee (including the BLM Director) from exercising that authority. Programmatic environmental analysis is also appropriate under NEPA for actions that have common impacts, subject matter, and technology (40 CFR 1501.11).

The BLM has prepared this Draft RMPA/EIS and Proposed RMPA/Final EIS to analyze potential amendments to specific GRSG goals, objectives, and management actions contained in 77 existing RMPs to enhance GRSG conservation through management of GRSG habitats on BLM-administered lands. These amendments seek to continue providing the BLM with locally relevant decisions that achieve rangewide GRSG conservation goals consistent with the agency's multiple use and sustained yield mission, and GRSG management efforts with Federal, State, local, and Tribal partners. The ten-state planning area includes nearly 121 million acres of BLM-administered public land. GRSG habitat management areas occur on approximately 69 million acres and are the focus of this effort.

Summary: BLM should explain why it did not use the 2021 Record of Decision or the 2019 plan.

Response: This is described in Section 1.2.1 of the DEIS. The BLM amended or revised land use plans in 2014 and 2015 in the States of California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming (2015 Sage-Grouse Plan Amendments) to provide for GRSG conservation on public lands. Subsequently, the BLM amended several of those plans in 2019 in the States of California, Colorado, Idaho, Nevada, Oregon, Utah, and Wyoming (2019 Sage-Grouse Plan Amendments). On October 16, 2019, the United States District Court for the District of Idaho preliminarily enjoined the BLM from implementing the 2019 Sage-Grouse Plan Amendments (Case No. 1:16-CV-83-BLW).

Following the completion of the Sage-Grouse Plan Amendments, the BLM determined that the 2019 Sage-Grouse Plan Amendments (and for Montana, North Dakota, and South Dakota, the 2015 Sage-Grouse Plan Amendments) were potentially inconsistent with new science and rapid ecological changes affecting the

BLM's management of the public lands, including the effects of climate change (e.g., drought, loss of habitat, more frequent wildland fires, less riparian areas).

In November 2021, the BLM initiated this new land use planning process under the authority of Section 202 of FLPMA and its implementing regulations at 43 CFR1600, and in compliance with NEPA, to evaluate alternative management approaches to contribute to the conservation of GRSG and sagebrush habitats and to evaluate the impacts of any land use planning decisions directed toward GRSG and sagebrush habitat conservation. Pursuant to NEPA and the BLM's planning regulations, the BLM prepared a new EIS for this new planning process.

Summary: BLM should not use a separate mineral withdrawals EIS; they should be combined.

Response: As detailed in the Draft RMPA/EIS, proposing and making a withdrawal is not done through the land use planning process and is not a land use planning decision. During the planning process the BLM can make a recommendation that an area be proposed for withdrawal. However, a withdrawal is made by the Secretary of the Interior pursuant to a separate decision-making process. The BLM could ask the Secretary of the Interior to propose and make a withdrawal of the land from location and entry under the Mining Law of 1872 pursuant to Section 204(a) of FLMPA. Should the Secretary propose a withdrawal, the proposal would require environmental and other analysis under NEPA and other applicable authorities before the land could actually be withdrawn.

For purposes of this planning initiative, the alternatives analysis includes a description of the likely environmental effects should the Secretary propose and make a withdrawal in the future (e.g., reduced potential for behavioral disturbance and habitat loss/alterations). Simply recommending areas for closure to the mining laws for locatable exploration or development, through a withdrawal, does not restrict any activities and therefore, such recommendation does not have any impacts.

Summary: BLM should provide more baseline information, detail, and analysis to guide their assessment and satisfy NEPA requirements.

Response: The BLM coordinated with states, federal agencies and cooperating agencies to identify how the affected environment for sage-grouse management has changed. BLM specifically partnered with USGS to review the best available information and incorporate the management implications of that information into this EIS. The BLM places great import on the best available information, including new scientific studies and government reports that indicate a potential change in our assumptions or conditions related to a land use planning effort. The BLM has to balance reviewing new information with determining what information is relevant to a decision in light of the BLM's purpose and need. Many commenters highlighted information and studies to consider, and the BLM has reviewed each source submitted. Further, the BLM asked the USGS to participate in the review, and to verify if information was included in the USGS synthesis report that was developed for the Draft EIS. Many suggested articles were already included for analysis in the USGS report and may have been missed by commenters in the initial review of the synthesis report and Draft EIS.

Both known and new studies were reviewed by BLM staff, including scientists and NEPA specialists, and each BLM State Office reviewed each study specific to how it informed their planning decisions and environmental conditions. The BLM has included, where appropriate, updates to analysis. Overall, submitted studies did not offer information that changed the analysis and did not offer any new conditions or other information the BLM had not considered already. The BLM has reviewed all new information and suggested studies from comments received rangewide, and in specific states.

22.2.29 Nonenergy Leasable Minerals

Summary: The BLM should update the analysis, including impacts of alternatives on the Known Sodium Leasing Area (KSLA) and providing clarity on whether GRSG HMA overlaps with non-energy leasable (NEL) resources or not - including KSLAs, phosphate, and gilsonite areas.

Response: The BLM clarified language and updated the analysis for nonenergy leasable minerals in Chapter 3, Chapter 4 and Appendix 10 of the Proposed RMP Amendment/ Final EIS based on information provided by commenters.

Summary: BLM should define "key habitat."

Response: Idaho-specific actions pertaining to 'key habitat' have been removed from the Proposed RMP Amendment/Final EIS.

Summary: Closing PHMA to non-energy minerals under Alternative 3 would limit the ability to manage surface disturbances in a way that would minimize impacts to GRSG.

Response: The Draft RMPA/EIS includes analysis and consideration of a range of alternatives that identified and incorporated appropriate regulatory mechanisms to conserve, enhance, and restore GRSG habitat, and to eliminate, reduce, or minimize threats to this habitat to ensure that a balanced management approach was recommended. This includes alternatives that provide a greater and lesser degree of restrictions in various use programs but would not eliminate or invalidate any valid existing development rights. The range of alternatives in the Draft RMPA/EIS includes the no-action alternative, Alternative 3 under which PHMA would be closed to nonenergy leasable minerals, and three other action alternatives with varying nonenergy leasable minerals management. All alternatives would meet the purpose and need that is stated in Section 1.3 of the Draft RMPA/EIS. Impacts on GRSG from minerals management under all alternatives are disclosed in Section 4.2.

22.2.30 Other Laws, Regulations, Policies

Summary: BLM should re-assess the document and impacts due to the new Public Lands Rule.

Response: The recently promulgated Public Lands Rule implements the BLM's longstanding statutory authority to manage lands for conservation, including by taking account of certain resource values explicitly addressed in the rule. As a result, the management actions considered here are consistent with the Public Lands Rule, notwithstanding that they are within the BLM's discretion with or without the rule. The process used to evaluate ACEC nominations in this planning effort is consistent with the updated ACEC regulations included in the Public Lands Rule. Changes to ACEC guidance in the Public Lands Rule would not affect ACECs considered under Alternatives 3 and 6 in the Draft RMPA/EIS. Although the Notice of Availability for the GRSG plan amendment EIS was published prior to the effective date of the PLR and is, therefore, not expected to incorporate all elements of the PLR, the Proposed RMP Amendment/Final EIS is largely consistent with the PLR (BLM IB 2024-048).

Summary: The BLM should revise the EIS to be consistent with Section 363 of the Energy Policy Act of 2005.

Response: Section 363 of the Energy Policy Act specifically requires lease stipulations to be "only as restrictive as necessary" to protect the resource for which stipulations are applied, not land use plans. The BLM complied with all applicable laws in developing the alternatives considered and the Proposed RMP

Amendment and will comply with all applicable laws in implementing the RMPAs. The BLM develops lease stipulations at the implementation and project level.

Summary: BLM should follow a decentralized land use planning approach where Field Managers make plans and State Directors approve. BLM should not use an HQ level planning effort because Planning 2.0 was overturned by Congress.

Response: The regulation changes the BLM made in Planning 2.0 was disapproved under the Congressional Review Act and is not effective. The BLM's existing land use planning regulations allow planning at any appropriate geographic scale. See 43 CFR 1610.1(b) ("A resource management plan shall be prepared and maintained on a resource or field office area basis, unless the State Director authorizes a more appropriate area."). See also BLM Land Use Planning Handbook ("State Directors may also establish regional planning areas that encompass several field offices and/or states, as necessary."). The planning area here, defined in coordination with relevant BLM state directors, includes ten Western states to enhance GRSG conservation. This planning area facilitates consistency across states in the West and updates the approach taken in the BLM's 2015 planning effort. Further, FLPMA (at 43 USC 1712(a)) directs the Secretary of the Interior to develop, maintain, and revise land use plans. While the Secretary has delegated land use planning authority to BLM Field Managers and State Directors through the planning regulations (43 CFR 1601.0-4), this delegation does not preclude a supervisor of the delegee (including the BLM Director) from exercising that authority. Programmatic environmental analysis is also appropriate under NEPA for actions that have common impacts, subject matter, and technology (40 CFR 1501.11).

This amendment effort recognizes the importance of including RMP actions that address GRSG threats on BLM-administered public lands in context of the 2010 and 2015 USFWS GRSG listing decisions. This effort also recognizes the legal and functional imperative of coordinating management with state, federal, tribal, and local plans and policies. The purpose of this land use planning process is to amend a sub-set of the GRSG management actions to ensure management actions on BLM-administered lands support GRSG conservation goals, respond to changing land uses in GRSG habitats, improve the efficiency and effectiveness of GRSG management actions, provide for consistent conservation outcomes in GRSG habitat, and provide the BLM with locally relevant decisions that accord with range-wide GRSG conservation goals. The purpose of this amendment is focused on cross-cutting management actions/topics that are applicable throughout the planning area with variations for local, state-specific variation. Records of Decision will be issued using a state-by-state approach that further accounts for site-specific variation.

Summary: BLM should recognize valid existing uses and rights and prioritize multiple use.

Response: The BLM complied with all applicable laws in developing this RMPA. Additionally, the BLM will continue to comply with all applicable laws in implementing this plan. As stated in the DEIS in Section 1.5, all proposed actions will be subject to valid existing rights. Accordingly, the BLM will ensure that its implementation of the management actions in the RMPA is consistent with the terms and conditions in existing leases or existing contracts, as appropriate. The definition of valid existing rights is included in the glossary of the Draft RMPA/EIS.

Summary: BLM should explain and justify new policies.

Response: As outlined in Chapter 1, despite years of management from multiple state and federal agencies, including the unprecedented recent planning efforts across the species range, GRSG habitat continues to be impacted and lost by public land uses, and GRSG populations that depend on the habitat managed by the

BLM continue to decline. The BLM manages the largest amount of remaining GRSG habitat and is committed to the long-term conservation of habitat to support healthy state-managed GRSG populations, preventing the need for a future listing under the Endangered Species Act.

This amendment effort recognizes the importance of including RMP actions that address GRSG threats on BLM-administered public lands in context of the 2010 and 2015 USFWS GRSG listing decisions. This effort also recognizes the legal and functional imperative of coordinating management with state, federal, tribal, and local plans and policies. Many actions from the 2015 and 2019 efforts already accomplish this. As a result, the purpose of the current BLM RMPA is to amend a sub-set of the GRSG management actions to ensure management actions on BLM-administered lands support GRSG conservation goals, respond to changing land uses in GRSG habitats, improve the efficiency and effectiveness of GRSG management actions, provide for consistent conservation outcomes in GRSG habitat, and provide the BLM with locally relevant decisions that accord with range-wide GRSG conservation goals.

Summary: The goals of the alternatives, especially Alternative 3, do not align with EO 14017 or the Inflation Reduction Act and conflicts with the statutory mandates including FLPMA's prioritization of domestic mineral development.

Response: Alternative 3 allows for the analysis of the effects of generally applying the most restrictive management to all GRSG habitat in the planning area, which complies with NEPA guidance to consider a wide range of alternatives. The range of alternatives developed is intended to meet the purpose and need, and address the issues; thereby, providing a basis for eventual selection of an alternative in a decision. Guidance in FLPMA designating mineral exploration and production as a principal or major use of public lands, as well as other guidance or goals, apply to the BLM resource management program as a whole. They do not prevent BLM from implementing management that would make certain areas unavailable to mineral leasing, sale or development where doing so is necessary to protect other resource values. FLPMA's multiple-use mandate does not require that all uses be allowed on all areas of the public lands. Instead, it provides the BLM discretion to evaluate and choose an appropriate balance of resource uses which involves tradeoffs between competing uses.

Summary: The BLM should update its instruction memorandum.

Response: This amendment effort considers changes language in the BLM's RMPs; it does not consider changes to instruction memoranda. The Draft EIS is clear that the No Action Alternative in this planning effort is the existing language contained in the BLM's RMPs. As described in the DEIS section 2.2.2, that is the 2019 ARMPAs. Prioritizing work associated with livestock grazing operations depends on staffing, budget, and the consideration of other resource issues that include, but are not limited to GRSG, other listed species, LHS, wildfire, or other resource concerns. Previous national level guidance for prioritization of renewals has always been to look at high resource value areas first. IM's such as WO 2009-018 and WO 2018-024 gave guidance on prioritization. Language regarding prioritization regarding livestock grazing and GRSG was retained in the BMP appendix. While it can help inform and guide prioritization during implementation, it is not an RMP-level decision.

22.2.31 Predation

Summary: The BLM should improve its predator management strategies, as they are currently inadequate, and adopt a more proactive approach. Predator control, particularly targeting ravens, should not be delayed for further evidence. Recommendations include developing a general response plan, reducing food and nesting substrates, and avoiding perch deterrents due to their inconsistent effectiveness. Enhanced planning

and collaboration are essential for timely and effective predator control. The analysis and management plans should include key predator species such as red foxes, ravens, eagles, and other raptors, whose introduction and increasing populations are contributing to the decline of Sage Grouse populations.

Response: Management actions specific to predator population management is outside the scope of the amendment, as state wildlife agencies have management authority and U.S. Fish and Wildlife Service has the management authority for ravens and other depredating migratory birds. However, the BLM has the authority to manage the habitat and has provided numerous management actions to address predation risk across the range of alternatives (see Section 2.5.9 of the Draft RMPA/EIS). Appendix 2 of the Draft RMPA/EIS identifies which predator management strategies from the 2015 RMPAs would continue to be implemented, along with the Required Design Features that would also be carried forward. The BLM will continue to implement the predator management strategies from the 2015 ARMPAs as well as the revised strategies included in this effort. Predator management actions are done proactively as best as possible. Additional collaboration could occur, and predation management plans could be developed at the implementation level. Section 3.2.1 has been revised to include a brief discussion of several additional GRSG predators.

Summary: The EIS should accurately represent the impact of predators on GRSG populations, acknowledging that predation remains a significant threat to egg and chick survival across all habitat types.

Response: Section 3.2.1 includes a discussion of predation as a threat to GRSG and relies on best available science to characterize the threat. That section has been revised to include additional discussion about the threat of predation on GRSG and a brief discussion of several additional GRSG predators.

Summary: The BLM should consider the provided information on raven/corvid populations and GRSG predation, including the association with livestock.

Response: We considered the references provided. While BLM has no management authority over predators, the Draft RMPA/EIS does include best management practices and Required Design Features (RDFs) for corvid minimization, requiring proponents/applicants to create predator management plans, and considers the FWS 2023 publication on raven conflict management. For corvid associations with livestock, BLM is aware of the issues presented in Coates et al 2016 and O'Neil et al 2018 - both studies utilized survey and modelling and are the best available science on the topic.

Summary: The EIS should include necessary clarifications and edits to the alternatives related to minimizing threats from predation.

Response: The BLM considered a reasonable range of alternatives during the planning process in full compliance with NEPA. While there are many possible alternatives or actions to manage public lands and GRSG in the planning area, the BLM fully considered the management opportunities presented in the planning issues and criteria developed during the scoping process to determine a reasonable range of alternatives. As a result, six alternatives were analyzed in detail in the Draft RMPA/EIS that best addressed the issues and concerns identified by the affected public. The range of alternatives in the Draft RMPA/EIS represented a full spectrum of options which address the issues of GRSG protection, including a no action alternative, up to a conservation of all PHMA (Alternative 3).

Adding management actions specifically to manage predators is outside the scope of the amendment as state wildlife agencies have management authority over many predators, and U.S. Fish and Wildlife Service has the management authority for ravens and other depredating migratory birds. Several comments were related to implementation activities, which are not included in the RMPA. Implementation of project BMPs is the

responsibility of the project proponent. While the BLM does not manage predators, the BLM has made several clarifying edits to the Chapter 2 discussion of predation in response to comments received.

22.2.32 Purpose and Need

Summary: Commenters requested clarification on what has changed since the 2015 and 2019 plan amendments that warrants this current effort. They state that this effort does not have the collaborative components included in the 2019 plan and that this plan is hard to understand.

Response: The BLM is not withdrawing a land use plan decision but is instead following its land use planning process under FLPMA and its land use planning regulations to amend existing land use planning decisions for sage grouse. Given continuing losses of habitat across all landownerships, and resulting long-term population declines, the BLM's purpose and need is to consider amending RMPs to update a sub-set of the GRSG goals, objectives, allocations, and management actions to ensure management on BLM-administered lands respond to changing land uses, improve efficiency and effectiveness of GRSG management, provide for consistent conservation based on ecological boundaries, and provide the BLM with locally relevant decisions that accord with rangewide GRSG conservation goals.

Section 1.2 describes the timeline for planning and changes since 2015 and 2019 that precipitated this current effort. Alternative 2 represents the 2019 plan and components of that alternative can be included in the decision. The EIS has been restructured to improve readability and to meet EIS page requirements. The manner in which this RMP Amendment amends the 2015 and 2019 RMP Amendment direction and the degree to which management direction from those plans remain in place, would be fully replaced by, or would be partially replaced by management direction and allocations in this RMP amendment has been clarified, by State, in Appendix 2. Comparison of Proposed RMP Amendment to Existing Greater Sage-Grouse RMP Management Direction.

Summary: The BLM should expand its purpose and need to include development**,** regulatory certainty, recognize county partners, and expressly clarify that RMP amendments only apply to BLM administered lands.

Response: The BLM has clarified the purpose and need in Section 1.4.2. The BLM's purpose and need is to consider amending RMPs to address a sub-set of the GRSG goals, objectives, allocations and management actions that need updates to ensure management on BLM-administered lands responds to changing land uses, improve efficiency and effectiveness of GRSG habitat management, provide for consistent conservation across state lines, and provide the BLM with locally relevant decisions that accord with range-wide GRSG conservation goals.

As stated in Section 1.6, the BLM develops land use plans through a planning and NEPA process that includes public involvement. Section 202 of FLPMA and its implementing regulations direct the BLM to develop and periodically revise or amend its RMPs, which guide management of BLM-administered public lands. (43 USC 1712, 43 CFR Part 1600). FLPMA further provides that the BLM "shall manage the public lands under principles of multiple use and sustained yield … except that where a tract of such public land has been dedicated to specific uses according to any other provisions of law it shall be managed in accordance with such law" (43 USC 1732(a)). FLPMA also directs the BLM to coordinate with other federal departments and agencies, state and local governments, and Tribal Nations to seek to promote consistency among land use plans across jurisdictions (43 CFR Subpart 1610.3-2). "Multiple use" does not mean every use on every acre.

In the DEIS, the preferred alternative, Alternative 5, considers other potential alignments of habitat management areas and associated management to try and balance GRSG conservation with public land uses.

Summary: BLM should only consider alternatives that are responsive to the purpose and need. Specifically, Alternatives 3 and 6 do not respond to the purpose and need.

Response: The BLM analyzed a reasonable range of alternatives that appropriately and adequately respond to the agency's purpose and need for considering these amendments, as described in Chapter 2. In accordance with NEPA, the BLM has discretion to establish the purpose and need for action (40 CFR 1502.13). CEQ regulations direct that an EIS "…shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action" (40 CFR 1502.13). Also, under the CEQ regulations, the BLM is required to "study, develop, and describe appropriate alternatives to recommended courses of action in any proposal which involves unresolved conflicts concerning alternative uses of available resources as provided by section 102(2)(E) of the Act [NEPA]." (40 CFR 1501.2(c)). The range of alternatives developed is intended to meet the purpose and need, and address the issue; thereby, providing a basis for eventual selection of an alternative in a decision.

As described in Chapter 2 and Appendix 21, Alternative 3 includes the greatest measures to protect and preserve GRSG and its habitat. It is the most restrictive alternative analyzed, which provides for the greatest protections for GRSG - including management actions such as all HMAs managed as priority HMA (PHMA); closing PHMA to new fluid mineral leasing, saleable minerals/mineral materials permits, and nonenergy leasable minerals leasing; PHMA recommended for withdrawal from location and entry under the Mining Law of 1872, and PHMA being unavailable for livestock grazing. In addition, under Alternative 3 the BLM would designate 11,139,472 acres of ACECs specific to the management of GRSG; the ACECs would include portions of PHMA and would have the same allocations (i.e., allowable uses) as the rest of PHMA.

As described in Chapter 2, under Alternative 6 management for all habitat management areas and the topics being considered in the range of alternatives would be the same as described for Alternative 5, the preferred alternative, but with the addition of ACECs. ACEC boundaries would be the same as described for Alternative 3, but management would be less restrictive compared to Alternative 3, though generally more restrictive than the rest of Alternative 6 PHMA.

Summary: The purpose and need is too narrow. The BLM should expand it to include addressing threats to wildfire and invasive species and acknowledge its multiple-use mandate.

Response: The BLM has clarified the purpose and need in Section 1.4.2. Table 2-1, Alternatives Considered but Not Analyzed in Detail notes that wildfire and invasive species were considered but not analyzed in detail.

The 2015 GRSG planning efforts included many management actions addressing the threat of wildland fire in GRSG habitat management areas. This included prioritization of suppression efforts to limit loss of GRSG habitat, guidance for suppression efforts, the need for proactive efforts such as fuel breaks and fuel reduction projects, and considerations and commitments associated with reclamation and restoration after wildland fires in GRSG habitat management areas. The management included requirements for use of prescribed fire in GRSG habitat management areas, as well as the importance of coordinating all levels of fire management (suppression, pre-suppression, and restoration) with partners across the landscape.

There were few, if any changes to these wildland fire management actions in the 2019 RMPA effort, as they were already consistent with state strategies. Similarly, reviewing existing wildland fire and invasive species

RMP management actions, in context of the new literature, existing wildland fire and invasive species management action are sufficient for RMP-level decision-making, and no changes need to be considered. Any management changes necessary in wildland fire management to reduce wildland fire risk to GRSG would be made at the project/implementation level.

While changes to existing wildland and invasive species management actions will not be considered, changes to other management actions will be considered based on the threats from wildland fire and invasive species. For example, management actions that could limit the potential for ignition sources or the prevalence of or spread of fine fuels and invasives that contribute to uncharacteristically large and intense wildfires will be considered. Additionally, the effect of wildland fire on GRSG habitat quantity and quality will also be considered when evaluating habitat management areas. This includes the potential for habitat management areas to be durable in the face of changing conditions associated with climate change.

Analysis of the effects of the range of alternatives on Wildland Fire Ecology and Management can be found in Chapters 3 and 4 and Appendix 10. For instance, Section 3.2 discusses the threats to GRSG from increasing wildfire frequencies. Further, the potential effects of the alternatives on the number, size and intensity of wildfires and the spread of invasive species and their impacts on GRSG habitat quality and quantity will be considered in this EIS.

22.2.33 Range of Alternatives

Summary: The BLM should clarify how GRSG management would differ between SFAs, PHMAs, and ACECs and which designation would be the most protective.

Response: SFAS, ACECs and PHMAs are all different habitat designations. BLM made clarifying edits to Chapter 2 and in Appendix 2. Comparison of Proposed RMP Amendment to Existing Greater Sage-Grouse RMP Management Direction to clarify what is being addressed by the amendment and what the proposed changes to management direction are and how they dovetail with the management direction identified in 2015 and 2019 that is not being amended by this planning effort. Chapter 2 includes an updated comparison of alternatives that more clearly compares the alternatives. Appendix 2 has been updated to show how the management actions being addressed in the RMP Amendment would dovetail with the entire set of existing direction in the 2015 and 2019 amendments. This amendment only addresses a subset of the management allocations and management direction and the comparison of those changes are described in the comparison of the alternatives 3, 4, 5, 6, and Proposed RMP Amendment to alternative 1 which represents the corresponding management direction from the 2015 Plan Amendment and alternative 2 which displays the corresponding management direction from the 2019 Plan Amendment. This comparison of alternatives is appropriately carried out in Chapter 3 and Chapter 4. The effects analysis of the alternatives appropriately considered the ongoing implementation of the 2015 and 2019 amendments when comparing the alternatives. Appendix 2 is simply a guide to help the reader understand how the management actions being proposed by this amendment would dovetail with the full set of management direction in the 2015 and 2019 amendments. Additional analysis and the comparison of alternatives in this appendix would be duplicative of the analysis in Chapters 3 and 4 and at odds with the clarifying objective of the Appendix.

The effects of these different habitat designations described in Chapter 3, Chapter 4 and Appendix 10. The effects analysis of the management direction on the ACECs proposed in Alternatives 3 and 6 has been clarified and updated in Appendix 5, Areas of Critical Environmental Concern for Greater Sage-grouse Habitat. Appendix 5 also details how SFAs were considered in the identification of potential ACECs for this planning effort. A map of the SFAs can be found in Appendix 1, Maps, (Part 1:Maps1.2a-2.41b).

Summary: The BLM should clarify the differences between the alternatives.

Response: The BLM has clarified the differences between the alternatives by adding a summary of the management direction and allocations for all of the alternatives in Table 2-14 in Chapter 2. The BLM has also updated the summary of alternatives in Chapter 2 section 2.2 and clarified the alternatives so they are more easily understood in Appendix 21, Detailed Description of Draft EIS Alternatives.

Summary: BLM should take a state-by-state approach rather than amend all the RMPs. The BLM should not allow so much state variation.

Response: The BLM's is amending a sub-set of the 2015 and 2019 GRSG RMP Amendment goals, objectives, allocations and management actions in order to respond to updated scientific information and changing land uses and provide for consistent and effective rangewide conservation based on biological information that is responsive to locally relevant habitat variability. The decision to amend a subset of the management direction is based on an internal review of the effectiveness of 2015 and 2019 RMP Amendment decisions and the degree to which those existing decisions sufficiently and appropriately addressed existing threats to GRSG habitat, continued population decline, and updated scientific findings; and was informed by feedback BLM received during the scoping period for this amendment effort from Tribal, Federal, State, and local agencies and the public. The goal is to provide all the BLM states with GRSG habitat management with consistent, updated management direction where it is needed while also allowing for state-specific differences and variation. The BLM believes this approach appropriately addresses our FLPMA requirements to promote consistency with Tribal, State, and local plans while also upholding our responsibilities to promote a consistent habitat conservation strategy for the GRSG which is a Bureau-identified sensitive species and was identified as "warranted but precluded" from Endangered Species Act listing by the US Fish and Wildlife Service in 2015. The management direction in the RMPA/EIS is based on updated GRSG science, population trends, and habitat data which provides the BLM with the necessary information to address rangewide needs of the species as well as the variances that occur across the habitat range.

Summary: The Draft EIS alternatives are difficult to understand.

Response: In developing the Proposed RMP Amendment/Final EIS the BLM has clarified language in order for the reader to better understand the alternatives being considered and how those alternatives would amend the 2015 and 2019 GRSG Amendment Decisions. These clarifications are found throughout the document including in the Chapter 1, Chapter 2, Appendix 2, and Appendix 21. The BLM has clarified the differences between the alternatives by adding a summary of the management direction and allocations for all of the alternatives in Table 2-14 in Chapter 2. The BLM has also updated the summary of alternatives in Chapter 2 section 2.2 and clarified the alternatives so they are more easily understood in Appendix 21, Detailed Description of Draft EIS Alternatives. The manner in which this RMP Amendment amends the 2015 and 2019 RMP Amendment direction and the degree to which management direction from those plans remain in place, would be fully replaced by, or would be partially replaced by management direction and allocations in this RMP amendment has also been clarified, by State, in Appendix 2, Comparison of Proposed RMP Amendment to Existing Greater Sage-Grouse RMP Management Direction.

Summary: The BLM should clarify the range of alternatives. The EIS should better articulate the entirety of GRSG management under all of the RMP amendments to date.

Response: The purpose and need in Chapter 1, Section 1.4.2 has been clarified to address why certain actions are rangewide and others are state specific. Chapter 2, Table 2-1, Alternatives Considered but Not

Analyzed in Detail has been updated with additional detail on the alternatives that were considered but not analyzed in detail. Appendix 2, Comparison of Proposed RMP Amendment to Existing Greater Sage-Grouse RMP Management Direction has been updated to identify the manner in which this RMP Amendment amends the 2015 and 2019 RMP Amendment direction and the degree to which management direction from those plans remain in place, would be fully replaced by, or would be partially replaced by management direction and allocations in this RMP amendment.

Summary: The BLM should address lek buffers in an alternative.

Response: Table 2-1, Alternatives Considered but Not Analyzed in Detail in Chapter 2 discusses the rationale for considering but not analyzing in detail lek buffers at the rangewide scale for this amendment. It is noted in Table 2-1 that there is no single buffer distance that would be appropriate for all populations and habitats across the range of GRSG (Manier et al. 2014). Lek buffers are generally used to conserve breeding and nesting habitats and are developed and applied as a uniform tool used in the lack of more accurate local information. As more specific data are collected on nesting habitats the applicability of generalized buffers across GRSG range will become less important to identifying and managing seasonal habitats. As described above, lek buffers are not the only or final conservation tool to avoid or minimize disturbance. The purpose and need was clarified to note that lek buffers were considered and addresses in State-specific circumstances. There is state-specific management direction for lek buffers for Colorado, Idaho, and Nevada/California (refer to Chapter 2, Section 2.5). Further the BLM is proposing to adopt the Western Association of Fish and Wildlife Agencies lek definitions (Cook et. al., 2022) (refer to Chapter 2, Table 2-4, and the Glossary). Appendix 4 provides a comparison of the lek buffer definitions for ease of reference.

The BLM reorganized the presentation of the management direction in the Proposed RMPA and is hopeful that this reorganization will allow the reader to more easily see where specific lek buffer distances are used in the rangewide management direction and also where BLM-states have applied state-specific lek buffers that differ from the rangewide management direction. For example, in the rangewide PHMA management direction Table 2-2; lek buffers are used regarding fluid mineral exceptions, applying the disturbance cap, or considering impacts from fences. In the fluid mineral section, multiple states also identify specific lek buffers that will apply in their states when considering fluid mineral exceptions to the broader PHMA no surface occupancy stipulation.

Further, throughout most of the GRSG range on public lands, lek buffers in PHMA have no additional conservation purpose because disturbance from most major uses is not allowed in all of PHMA, not just within buffers. In addition, buffers are only one conservation tool the BLM uses in managing GRSG habitat. Others include disturbance caps, managing uses to achieve habitat objectives, application of required design features, noise restrictions, and seasonal constraints. The BLM has a variety of conservation tools to manage the various threats to GRSG and does not rely on just one management tool to achieve its conservation goals and objectives.

In the Draft RMP Amendment and Final EIS, BLM Idaho considered adjusting their lek buffer definitions and how they are applied in that state. Appendix 19 describes the changes BLM Idaho considered making to their lek buffer definitions. In the Proposed RMP Amendment, Idaho would re-adopt the lek buffer definitions from the 2015 GRSG RMP Amendment. Refer to Chapter 1 and the rangewide and state specific management direction in Chapter 2.

Summary: The BLM should consider additional oil and gas development alternatives in detail.

Response: The BLM analyzed a reasonable range of alternatives to address the agency's purpose and need for considering these amendments, as described in Chapter 2. In Alternative 3, the BLM closes PHMAs to fluid mineral leasing. In the Proposed RMP Amendment, PHMAs is open with No Surface Occupancy. Under the Proposed RMP Amendment, the BLM identifies possible exceptions to this management direction within 0.6 miles of leks in PHMA if it can be demonstrated that development and surface occupancy would have no direct impacts to or disruption of GRSG or its habitat based on a series of criteria (refer to Chapter 2, Table 2-2). The BLM states of Colorado, Idaho, Montana/Dakotas, Oregon, and Nevada/California all apply state-specific differences in their application of this exception and increase the buffer distance that can be applied using this exception. In PHMA with limited exceptions, described in Chapter 2, Table 2-3, there is NSO allowed and there are no exceptions. The Proposed RMP Amendment revises the fluid mineral Objective. The Objective, described in Table 2-2 in Chapter 2 says, *Manage fluid mineral leasing and development (including geothermal) in GRSG habitat management areas to avoid, minimize, and compensate for adverse impacts to GRSG habitat to the extent practical under the law and BLM jurisdiction*. DEIS Alternatives 1, 2 (in some states), and 4 consider language to guide leasing. Alternative 3 closes all HMAs to leasing. Under the Proposed RMP Amendment, no specific objective or management action would specify a fluid mineral leasing strategy. However, its absence does not remove the desired condition to manage public lands to provide suitable GRSG habitat at the HAF mid-, fine- and site-scales.

Fluid mineral leasing would be considered in GRSG habitat management areas consistent with the Secretary's discretion under the Mineral Leasing Act (as amended), as well as applicable BLM regulations and policies, and in conformance with RMP goals, objectives, stipulations, and required design features to avoid, minimize, and compensate impacts to GRSG. Table 2-1, Alternatives Considered but Not Analyzed in Detail in Chapter 2 discusses the rationale for considering but not analyzing in detail oil & gas potential as criteria for addressing fluid mineral leases.

Summary: The Preferred Alternative in the Draft RMPA/EIS does not provide sufficient protections for GRSG in Oregon and did not sufficiently address threats to GRSG from climate change.

Response: In addition to the strengthened protections in PHMA and PHMA with Limited Exceptions which bring the Proposed RMP Amendment in alignment with Oregon GRSG plans and policies, the BLM has identified nine state-specific differences for rangewide management within the management direction for PHMA and GHMA (refer to Tables 2.2 and 2.4) as well as additional State specific management direction in Table 2.9). The rangewide and state-specific changes made in the Proposed RMP Amendment promote consistency with State of Oregon GRSG plans and policies. The BLM clarified in the Proposed RMP Amendment that State Director approval, rather than Authorized Officer approval, is needed in several of the management direction sections in Chapter 2, Table 2-2 including within the Disturbance Cap, Predation, Adaptive Management, and Criteria Based Management for Non-Habitat sections.

The BLM's purpose and need in Chapter 1 has been clarified to address the fact that one of BLM's primary needs in this RMP Amendment effort is to address updated science relative to drought and climate change (refer to Chapter 1, Section 1.4.2). This information on addressing drought and climate change previously preceded the Purpose and Need in Chapter 1. It has been moved to the Purpose and Need to clarify BLM's intent. The effects of drought on GRSG are also described in Chapters 3 and 4. The BLM believes the alternatives and Proposed RMP Amendment do address drought and provide for the ability for BLM to adapt to changing habitat conditions.

The BLM has identified an adaptive management approach in the Proposed RMP Amendment, refer to Chapter 2, Table 2-2, the Objective for which is to address unanticipated negative impacts to GRSG from

potential changes in habitat conditions before consequences become severe or irreversible. This includes addressing habitat conditions that result from the effects of climate change, including drought. The adaptive management strategy provides BLM with a process for addressing habitat loss or population anomalies and identifying the underlying cause. Then BLM may change management or preclude new activities depending on local data and conditions. In addition, the BLM will continue to implement the vegetation and invasive species management direction from the 2015 and 2019 RMP Amendments that address habitat conditions and where not proposed for amendment in this planning effort (refer to discussion of alternatives considered but not analyzed in detail regarding vegetation and ecosystem resilience in Chapter 2, Table 2-1).

Summary: The BLM did not consider a reasonable range of alternatives, including one that analyzes a lower disturbance cap.

Response: The BLM considered a reasonable range of alternatives during the planning process. in full compliance with NEPA. The CEQ regulations (40 CFR 1502.1) require that the BLM consider alternatives that would avoid or minimize adverse impacts or enhance the quality of the human environment. While there are many possible alternatives or actions to manage public lands and GRSG in the planning area, the BLM fully considered the management opportunities presented in the planning issues and criteria developed during the scoping process to determine a reasonable range of alternatives. In light of the BLM's purpose and need, the BLM specifically partnered with USGS to review the best available information regarding GRSG since 2015 and incorporate the management implications of that information into this EIS. Citations are provided throughout the EIS to justify the management proposed and impacts stated.

As a result, six alternatives were analyzed in detail in the Draft RMPA/EIS that best addressed the issues and concerns identified by the affected public. The range of alternatives in the Draft RMPA/EIS represented a full spectrum of options which address the issues of GRSG protection, including a no action alternative, up to a conservation of all PHMA (Alternative 3). Suggested alternatives that fit within the range of alternatives are considered to have been adequately analyzed and were not addressed separately.

Summary: Alternative 1 must be removed from the range of alternatives as it has been determined to have failed and violates NEPA because it is not a reasonable alternative.

Response: Alternative 1 represents the 2015 RMP Amendment that BLM is currently implementing due to the court injunction of the 2019 Amendment. The BLM is analyzing Alternative 1 in order to provide an appropriate representation of both the management that has been developed in 2019 and is currently enjoined from being implemented (No Action, Alternative 2) and the 2015 management direction the BLM is currently implementing (Alternative 1). Analyzing both Alternative 1 and Alternative 2 are wholly appropriate and contribute to an appropriate range of alternatives analyzed in the Draft and Final EISs

Summary: Alternative 3 must be removed from the range of alternatives because it is not "economically feasible" alternative based on increases in costs to ranchers and farmers who would have to find alternatives for federal forage for livestock.

Response: All of the proposed management direction and designations identified in Alternative 3 comply with FLPMA. While there are many possible alternatives or actions to manage public lands and GRSG in the planning area, the BLM fully considered the management opportunities presented in the planning issues and criteria developed during the scoping process to determine a reasonable range of alternatives in compliance with NEPA. The range of alternatives in the Draft RMPA/EIS represent a full spectrum of options which

address the issues of GRSG protection, including a no action alternative, up to full conservation of all PHMA (Alternative 3).

Alternative 3 in the Draft EIS removes livestock grazing in PHMA and provides the BLM with the opportunity to analyze and compare effects to GRSG habitat in areas that are not grazed by livestock and those that are grazed under the other alternatives. Refer to Appendix 10, section 10.2 for a description of the effects of the alternatives on GRSG. While there are many possible alternatives or actions to manage public lands and GRSG in the planning area, the BLM fully considered the management opportunities presented in the planning issues and criteria developed during the scoping process to determine a reasonable range of alternatives in compliance with NEPA. The range of alternatives in the Draft RMPA/EIS represent a full spectrum of options which address the issues of GRSG protection, including a no action alternative, up to full conservation of all PHMA (Alternative 3). The Proposed RMP Amendment does not propose the removal of livestock in PHMA. Please refer to Chapter 2, Table 2-2 for the livestock grazing management direction.

Summary: BLM should/should not select a particular alternative. The BLM should consider an alternative that achieves no further loss of GRSG habitat, a true conservation alternative, including no oil and gas development, wind or solar installations, grazing, and hard rock mining.

Response: NEPA directs the BLM to analyze a range of reasonable alternatives for management, based on the Purpose and Need, as outlined in Chapter1, Section 1.4.2. As described in the DEIS, Alternative 3 includes the greatest measures to protect and preserve GRSG and its habitat - including closing all PHMA to fluid mineral leasing, exclusion for wind and solar installations, unavailable for grazing, and consideration of withdrawal from location and entry under the Mining Law of 1872. As noted, the preferred alternative in the Draft EIS was Alternative 5, but that is not the BLM's final decision about management of BLM lands. BLM retains the discretion to make a reasoned choice among the alternatives in a final decision for management based on public comments and the analysis.

Further, BLM considered a number of alternatives and issues during scoping that the agency determined not to carry forward, as detailed in Chapter 2, Table 2.1, Alternatives Considered but Not Analyzed in Detail. The BLM added further explanatory detail in Section 2.1 in response to public comments.

Regarding concerns raised by commenters on restrictions to mineral exploration under the project alternatives, only Alternative 1, 2 and 3 consider a recommendation for withdrawal from location and entry under the Mining Law of 1872.

Summary: The BLM should include the analysis of the alternative proposed by the State of Wyoming.

Response: As detailed in Section 2.1, Alternatives Considered but Not Analyzed in Detail, the BLM reviewed the alternative proposed by the State of Wyoming and determined most of the actions were already evaluated among other alternatives, were substantially similar to the language already being considered, would result in substantially similar effects, were not consistent with the BLM's purpose and need, included recommendations that were not consistent with BLM policy, or would be addressed during the implementation process.

Because the RMP-level actions in the Wyoming submission are already considered in the range of alternatives, developing a stand-alone state alternative is not necessary for consideration of effects. The BLM therefore did not separately analyze the alternative proposed by the State of Wyoming.

Summary: The BLM should consider exclusion areas for utility scale wind and solar.

Response: The BLM has included PHMA as exclusion for solar and wind in the Proposed RMP Amendment, with some exceptions and in PHMA with limited exceptions areas, solar and wind are exclusion with no exceptions (refer to Chapter 2, Tables 2-4 and 2-5. Exclusion of solar and wind is also proposed in PHMA in Alternatives 1, 2, 3, and 4.

Summary: The BLM should consider an alternative that closes wild horse and burro herd management areas to livestock grazing.

Response: The purpose and need of this land use planning effort is focused on a sub-set of the GRSG goals, objectives, allocations and management actions. There are no alternatives that specifically propose closing wild horse and burro herd management areas to livestock grazing, as that would not be in line with the purpose and need. The Draft RMPA/EIS does however include Alternative 3 which has similar results through all PHMA being identified as unavailable to grazing, although Alternative 3 also proposed removal of wild horses and burros in PHMA.

Summary: BLM should consider only actual, scientifically verifiable direct and indirect GRSG impacts when evaluating disturbance caps and assessing mitigation. The GRSG Table 2-7, page 2-31 of the Draft EIS arbitrarily states that the full corridor under the width of transmission line conductors would be considered disturbed for purposes of calculating disturbance caps.

Response: The text referenced in the Draft RMPA/EIS states: "Where such data are available, this disturbance is measured by the footprint of direct disturbance of the PHMA (and IHMA in ID) area where habitat is removed (including staging areas, dispersed structures, parking lots, equipment storage areas, etc.), or by the distance between the outermost lines."

If project specific disturbance footprint is available, that information could be used.

Summary: The BLM should incorporate additional information to assist in reviewing the alternatives, such as components of the previous RMP amendments that would be carried forward, which ones were implemented, and which ones were effective.

Response: The BLM has clarified the differences between the alternatives by adding a summary of the management direction and allocations for all of the alternatives in Table 2-14 in Chapter 2. The BLM has also updated the summary of alternatives in Chapter 2 section 2.2 and clarified the alternatives so they are more easily understood in Appendix 21, Detailed Description of Draft EIS Alternatives. The manner in which this RMP Amendment amends the 2015 and 2019 RMP Amendment direction and the degree to which management direction from those plans remain in place, would be fully replaced by, or would be partially replaced by management direction and allocations in this RMP amendment has also been clarified, by State, in Appendix 2, Comparison of Proposed RMP Amendment to Existing Greater Sage-Grouse RMP Management Direction.

Summary: Commenters requested that the BLM provide an explanation of the reasoning for amending the 2015 and 2019 RMPs, not following the 2021 ROD, updating the RMPA/EIS, particularly Alternatives 1 and 2, to use the best available science, and addressing why implementation of the 2015 plans has been ineffective in reversing declines in GRSG populations and habitat.

Response: This amendment effort recognizes the importance of including RMP actions that address GRSG threats on BLM-administered public lands in context of the 2010 and 2015 USFWS GRSG listing decisions. Refer to Chapter 1, Section 1.2of the Final EIS for a full overview of the GRSG planning background. Alternative 1 represents the 2015 GRSG planning process and Alternative 2 represents the 2019 GRSG

planning process. One of the primary purposes of this current RMPA/EIS is to update GRSG management using the best available science. In 2017, the BLM decided to amend the 2015 plans to better align with state plans, after discussions with governors in affected States. Those plans were enjoined in 2019. Because those plans remain enjoined, the BLM is implementing the 2015 plans in the interim. However, unless that temporary injunction is lifted, the BLM cannot implement the 2019 plans. Rather than continue with an interim implementation while waiting to resolve that litigation, the BLM decided to undergo land use planning for a third time, which it initiated in 2021.

The 2021 GRSG "RODs" did not actually include any final decisions. After conducting supplemental NEPA on the 2019 plans, the 2021 documents simply concluded that the analysis demonstrated no further process was necessary to support the 2019 decisions however, it was not an official planning decision and did not amend the 2019 plans. The 2019 Approved RMP Amendments remain under a temporary injunction and thus the BLM may not implement them. That injunction may only be lifted by a federal court decision. The Sagebrush Focal Area withdrawal EIS, initiated in 2015 and cancelled in 2017, was a completely separate process that addresses the recommendation in the 2015 RMP Amendment to withdraw Sagebrush Focal Areas from mineral development under the 1872 Mining Act. A separate court decision required the BLM to "re-initiate" the NEPA process for that proposal. That EIS process is ongoing.

Summary: The preferred alternative would weaken GRSG protections that are already insufficient. The BLM should modify the preferred alternative by changing lek buffers, the nonhabitat identification process, and renewable energy exclusion zones.

Response: The BLM analyzed a reasonable range of alternatives adequate to address the agency's purpose and need for considering these amendments, as described in Chapter 1, Section 1.4.2. The action alternatives, including the preferred alternative, were developed based on the best available data and the latest science in order to further GRSG conservation. The effects of the Proposed RMP Amendment on GRSG are described in Chapter 4, Section 4.2 and the effects of Alternatives 1 through 6 are described in Appendix 10. The analysis acknowledges when the preferred alternative from the Draft RMPA/EIS (Alternative 5) would result in greater effects on GRSG compared to existing management (Alternative 1).

The BLM developed the Proposed RMP Amendment in response to public and cooperating agency comments and in consideration of important habitat factors such as connectivity, population strongholds, and the potential for threats from development. The Proposed RMP Amendment proposed increased protections for GRSG in comparison to the preferred alternative (Alternative 5) in the Draft EIS. The BLM made adjustments to the Priority Habitat Management Areas (PHMA) allocation and made PHMA exclusion to solar and wind development with exceptions, No Surface Occupancy for oil and gas development with waivers, exceptions, and modifications, and avoidance areas for major rights of way with exceptions. The BLM has also identified areas within PHMA that will benefit from additional protection. These areas within PHMA will have more limited exceptions than the rest of PHMA. These areas will be called "PHMA with limited exceptions." The associated management direction provides strengthened protections by removing exceptions described in the PHMA exclusion language for Utility Scale Solar, Utility Scale Wind, and Fluid Mineral No Surface Occupancy direction. In addition, the management direction for Major Rights of Way is "exclusion with exceptions" rather than "avoidance with exceptions and conditions" as described in PHMA. Management of lek buffers and non-habitat remains unchanged to remain aligned with best available science.

Summary: BLM should not be pre-decisional by making Alternative 5 preferred.

Response: Pursuant to the requirements in the BLM's planning regulations, a preferred alternative was identified in the Draft RMPA/EIS (43 CFR 1610.4-7). The preferred alternative represents those goals, objectives, and management direction determined to be most effective at resolving planning issues and balancing resource uses and meeting the purpose and need. However, identification of a preferred alternative does not indicate any final decision or commitments from the BLM. The public was provided an opportunity to comment on all management alternatives presented in the Draft RMPA and Draft EIS during the public comment period.

22.2.34 Reasonably Foreseeable Development Scenario (RFD)

Summary: The data BLM is presenting for the number of wells drilled in Wyoming has issues and was not cleaned up sufficiently before analysis, it shows significant differences from data from WOGCC. BLM should examine and clarify data sources as problems with inputs can result in downstream issues for other parts of the document that depend on the RFD.

Response: BLM worked with the Wyoming Oil & Gas Conservation Commission (WOGCC) to update well information from Wyoming. To demonstrate the difference between the data sources, the document will clarify that the WOGCC data are considered more accurate but also note that activities such as workovers, recompletions, and wells which were spud but then abandoned, may have some impact on GRSG from the preparation of the drills site and mobilization of the workover or drill rig. BLM has clarified data sources and information used in the final Appendix 12.

Summary: The BLM should consider the impacts of the recommendation for withdrawal from minerals entry.

Response: As required by NEPA, BLM is analyzing the impacts of the proposed withdrawal from mineral entry under the Sagebrush Focal Area Withdrawal Environmental Impact Statement (NEPA # DOI-BLM-WO-WO3500-2016-0002-EIS, https://eplanning.blm.gov/eplanning-ui/project/70697/510). The recommendation for withdrawal in Alternatives 1, 2 and 3 are not management decisions and have no impact. Only the Secretary of the Interior may withdraw lands from location and entry under the Mining Law of 1872 through a separate process. BLM is correctly analyzing the impacts of a separate action under a separate NEPA analysis. This separate withdrawal EIS effort is included in this GRSG RMPA/DEIS in the Cumulative Effects analysis (Section 4.21 and Appendix 4).

Summary: The BLM should apply a decline curve to base production from existing wells, not doing so artificially reduces the negative economic impacts of reduced well development. The BLM should also clarify if RFD considers the entirety of the planning area (including state and private lands) or if the wells are projected solely on federal surface and minerals.

Response: BLM will examine ways to incorporate a decline curve while recognizing the difficulty of accurately declining production of wells across different areas of the state, differing formations, and different well ages. The BLM has clarified data sources and information used in the final Appendix 12 to clarify where production is from federal estate and where it reflects production from both federal and non-federal mineral estate.

Summary: The BLM should clarify how many of the existing leases in Wyoming are under litigation. Greater clarification of inputs should also be provided.

Response: BLM will examine if data are available to determine which leases are under litigation, however the fact that a lease is under litigation does not lay the basis to conclude and assess the outcome, or length

of time litigation may be ongoing. BLM has already clarified data sources and information used in the Proposed RMPA/Final EIS Appendix 12.

Summary: The lack of a list of pending projects and applications in the RFD is an omission that will be a problem for the cumulative effects analysis.

Response: The RFD is specific to the development of oil and gas and renewable energy resources. A list of reasonably foreseeable future actions can be included in the main body of the document where it can be more easily referenced for cumulative impacts. In addition, applications and actions pending a final decision are still uncertain in nature until a final decision or permit is rendered.

Summary: The RFD should include descriptions and map locations for high, medium, and low mineral potential in the planning area. This would help to inform the potential range of direct, indirect, and cumulative effects of mineral development to PHMAs in the next 20 years, whether there are regions/populations/leks that are particularly at risk, the potential cumulative effects of locatable mineral development in combination with other mineral development (fluid, solid, etc.), and their location with respect to proposed ACECs, and other considerations. The RFD should also detail existing information and projections about future locatable mineral development.

Response: The GRSG RMPA/EIS includes information about mineral potential for oil and gas and certain leasable minerals, potential for locatable minerals is very difficult to accurately determine due to the wide range of what falls into the locatable mineral category and the constant variability of values of various metals and gems. Information available about locatable mineral development is limited and it is not feasible to use to develop trends needed to project future locatable mineral development. As such, information on the number, location and size of existing locatable mining claims, notices and plans of operations are not included in the EIS.

Summary: The BLM may be understating potential surface disturbance because the level of development could be higher than GAO report 21-13844. The BLM should assume that all leases with medium and high oil and gas potential, and a percentage of low oil and gas potential will be developed at some point and incorporate those estimates into their baseline disturbance estimates. Failing to do so could result in exceeding disturbance caps with limited recourse to avoid further degradation of greater sage grouse habitat because too many use authorizations would have been approved.

Response: The reasonably foreseeable development scenario must rely on trends to develop estimates of potential future surface disturbance. GAO Report 21-13844 is based on existing conditions and trends. Because many leases expire before being developed, it is not reasonable to assume that all leases with medium and high oil and gas potential and a percentage of low oil and gas potential will be developed. Some leases are speculative. While some of the expired leases might be re-leased at a later date, management from this planning effort would apply and they might not be developed within the life of this document.

Summary: BLM should better describe sources used in the RFD, including sources from the previous planning effort.

Response: BLM has clarified data sources and information used in the final Appendix 12.

22.2.35 Recreation and Visitor Services

Summary: The BLM should update the analysis to include impacts to recreation.

Response: The Draft RMPA/EIS and the Proposed RMP Amendment/Final EIS both include analysis of the impacts to Recreation and Visitor Services (Chapter 4, Section 4.19 and Appendix 10, Section 10.9) and Travel and Transportation Management (Chapter 4, Section 4.20 and Appendix 10, Section 10.20). Additionally, Chapter 2, Table 2-1 explains why travel and recreation were not carried forward as topics for rangewide amendment. Furthermore, the DEIS in Section 4.19.2 states, "Under all alternatives, disturbance caps which restrict the construction of recreation infrastructure would decrease access for recreation experiences that depend on road and trail development and could inhibit management objectives where developments are part of the desired conditions." The recreation effects of each alternative are described.

Recommendations for recreation and travel management received during public scoping are either already in the existing RMP language from 2015 and 2019 or are not RMP-level decisions. Such actions would be consistent with existing management or are not applicable at the RMP-level so no changes in RMP management actions need to be considered. The BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use. The 2015 and 2019 travel and transportation management decisions were not identified as needing amendment.

To respond to a specific comment requesting that the BLM identify the importance of wildlife watching, wildlife viewing is specifically mentioned as a dispersed recreation activity on BLM-administered lands in Chapter 3, Section 3.19.

Summary: The BLM should update the analysis to reflect post-COVID recreation trends and the BLM's Blueprint for the 21st Century Outdoor Recreation.

Response: Chapter 3, Section 3.19.1 was updated with this information.

Summary: Restrictions on road and trail development may be inconsistent with state and local resource management plans, transportation plans, RS 2477 rights, and trail master plans. The BLM should avoid decreasing access to recreation experiences unless agreed to by state and local authorities.

Response: The BLM works to find a balance among uses and needs as reflected in these local government plans and has done so in the preparation of the DEIS. BLM is aware that there are State or local laws relevant to aspects of public land management that are discrete from, and independent of, federal law. However, the BLM is bound by federal law. FLPMA requires that BLM's land use plans be consistent with State and local plans "to the extent…practical." In a situation where State and local plans conflict with federal law, there will be an inconsistency that cannot be resolved. Thus, while State, county, and federal planning processes under FLPMA are required to be as integrated and consistent as practical, the federal agency planning process is not bound by or subject to county plans, planning processes, or planning stipulations.

22.2.36 Renewable Energy

Summary: The BLM should include more restrictions on renewable energy, since they have large impacts on GRSG and to improve consistency with fluid minerals management.

Response: The BLM analyzed a reasonable range of alternatives adequate to address the agency's purpose and need for considering these amendments, as described in Chapter 2. Further, BLM considered a number of alternatives and issues during scoping that the agency determined not to carry forward, as detailed in Section 2.3. As described under Best Available Information and Baseline Data of this comment report, the BLM considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. The data needed to

support broad-scale analysis of the planning area are substantially different than the data needed to support site-specific analysis of projects.

Impacts from renewable energy on GRSG are described in Section 4.2 of the DEIS. While there are some similarities in impacts between renewable energy and fluid mineral development, these are separate uses permitted and managed under different laws and policies. The renewable energy and lands and realty sections are combined in many areas in the EIS, though impacts from renewable energy on GRSG are split into a separate section given the importance of this issue. In a separate NEPA process, the BLM is currently updating the BLM RMPs for solar energy development in the Solar Programmatic Environmental Impact Statement (PEIS). In that analysis of impacts the Solar PEIS considers existing management associated with the 2015 GRSG amendments as those direct current GRSG habitat management on BLM- administered lands. However, the Solar PEIS update defers to this GRSG planning effort to decide how solar energy development would be conducted in GRSG habitat management areas.

Summary: Restrictions on renewable energy would restrict the energy transition to renewable energy and would increase development pressure on adjacent lands. The BLM needs to include better science regarding adverse effects of renewable energy on GRSG.

Response: The DEIS analyzed a reasonable range of alternatives for renewable energy development and associated transmission adequate to address the agency's purpose and need for considering these amendments, as described in Chapter 2.5.8. Discussion of impacts of lands and realty decisions on adjacent and nonfederal lands has been added to the cumulative impacts analysis of the Proposed RMPA/Final EIS in Sections 4.21.1, Greater Sage-Grouse and 4.21.7, Lands and Realty.

As described under Best Available Information and Baseline Data of this comment report, the BLM considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land-use plan level. The data needed to support broad-scale analysis of the planning area are substantially different than the data needed to support site-specific analysis of projects. The RMPA/EIS data and information are presented in map and table form and are sufficient to support the broad-scale analyses required for land use planning.

Another commenter requested that the BLM should not exclude solar energy development in current and proposed utility corridors based on the presence of designated GRSG habitat. In the DEIS, Table 2-10 outlines the comparison of alternatives for wind and solar projects and Major ROWs. There is a reasonable range of management actions, with the preferred alternative identifying avoidance - not exclusion, as the commenter asserts.

Summary: The EIS should clarify restrictions in the RMPA compared with those in the Solar PEIS. These commenters also suggested that associated energy storage projects, such as pumped storage, should be addressed at the same level as wind and solar projects given their direct linkage and given they have very similar impacts, infrastructure, and function.

Response: In a separate planning and NEPA process, the BLM is currently analyzing potential land use plan amendments addressing solar energy development in the Solar Programmatic Environmental Impact Statement (PEIS), also known as the proposed Updated Western Solar Plan (DOI-BLM-HQ-3000-2023-0001-RMP-EIS). The Solar PEIS update defers to this GRSG planning effort to decide how solar energy development would be conducted in GRSG habitat management areas.

Summary: The Final EIS and RMPA should better explain what minimization measures and compensation would be used to maintain GRSG habitats consistent with state agency habitat designations and to preclude negative impacts to any adjacent PHMA habitats and describe how these would be protective of fish and wildlife.

Response: The prior GRSG amendment effort(s) included an appendix with a series of required design features (RDFs) to be considered and applied when considering authorizations. These RDFs were developed in coordination with state partners and cooperating agencies and were adjusted to the major issues associated with each BLM State Office's amendment effort. These RDFs have been considered as tools to avoid or minimize the effects of specific projects in each state. These existing RDF RMP decisions are not being considered for amendment in this process and therefore remain in the RMPs unchanged from the prior amendment(s). At the project level, the BLM will work with applicants to determine the needed minimization measures for GRSG and other fish and wildlife and ESA consultation would be conducted to ensure listed fish and wildlife are protected.

Summary: Geothermal resources should be considered a renewable resource, in the same category as wind and solar, and provided similar land use considerations in the EIS.

Response: While geothermal resources are renewable, they follow a leasing process very similar to fluid minerals. The regulations for geothermal are housed in 43 CFR 3000 – Minerals Management. Thus, it is addressed as such in the EIS.

Summary: The EIS should better characterize the beneficial impacts of renewable energy development on air quality and other resources.

Response: Sections 4.2.1, 4.12.2, and 4.13 have been revised to temper the discussion of adverse effects from renewable energy development and add discussion regarding the benefits.

Summary: The EIS should better characterize the adverse effects of renewable energy development, including associated storage projects, and present a discussion of projected energy demand associated with future renewable energy development, commensurate with the information provided for geothermal, oil, and gas.

Response: Renewable energy development is considered a right-of-way and is administered under the lands and realty program. As such, renewable energy is permitted differently than fluid minerals. However, Section 4.2.1 acknowledges the similar adverse impacts from renewable energy and fluid minerals on GRSG. The renewable energy and lands and realty sections are combined in many areas in the EIS, though impacts from renewable energy on GRSG are split into a separate section given the importance of this issue. The solar development RFD for this GRSG EIS incorporates and builds on the RFD from the 2023 Solar Programmatic EIS (PEIS), under concurrent development. Data to project the wind RFD were determined to be outdated, though an analysis of wind energy potential within HMAs by alternative is presented in Appendix 12.

Summary: The EIS should clarify whether BLM intends to apply stipulations to all transmission lines or just those associated with new renewable energy projects.

Response: Transmission lines will be considered major (greater than or equal to 100 kV transmission lines and greater than or equal to 24" pipeline) or minor (less than 100 kV transmission lines and less than 24" pipelines) ROWs, as defined in the EIS. Transmission lines would be covered under guidance for those ROWs.

Summary: State-specific mitigation measures should be presented explicitly in the EIS. For instance, commenters asked that the EIS state that protective lek buffers for GHMA specified in Appendix 19 will be implemented as exclusion areas in Idaho to provide GRSG conservation/minimization measures and protections from renewable energy development.

Response: State-specific management for renewable energy has been included in the EIS in Chapter 2 and in several appendices. The management included was determined to be needed for a given state. Other management would be applied rangewide and would be sufficient to protect GRSG habitat.

Summary: The BLM should reclassify some areas proposed for solar projects as open to renewable energy development.

Response: As informed by public input during scoping and review of the Draft RMPA/EIS, the BLM's purpose and need addresses a subset of the GRSG goals, objectives, allocations, and management actions. BLM considered a range of alternatives that respond to the purpose and need. The resulting Proposed RMPA/Final EIS includes updates to ensure management on BLM-administered lands responds to changing land uses; improves efficiency and effectiveness of GRSG habitat management; provides for consistent conservation across state lines; and provides the BLM with locally-relevant decisions that accord with range-wide GRSG conservation goals. BLM has identified that changes may be needed to address the continued GRSG habitat losses that are contributing to declines in GRSG populations; ensure habitat management areas and associated management incorporate recent relevant science to prioritize management where it will provide conservation benefit (including providing for durable planning decisions when considering the effects of climate change); provide continuity in managing GRSG habitats based on biological information versus political boundaries, while allowing for management flexibility to address different strategies in identifying habitat management areas with state agencies, as well as local habitat variability; and refine and clarify other aspects of RMPs.

Summary: The BLM should define valid existing rights related to renewable energy.

Response: As stated in the DEIS in Section 1.5, all proposed actions will be subject to valid existing rights. Accordingly, the BLM will ensure that its implementation of the management actions in the RMPA is consistent with the terms and conditions in existing leases or existing contracts, including those associated with FLPMA ROW grants. The definition of valid existing rights is included in the glossary of the Draft RMPA/EIS.

Summary: The BLM should update the affected environment related to renewable energy.

Response: The BLM has relied on the best available information in developing the RMPA/EIS. A land use planning-level decision is broad in scope and, therefore, does not require an exhaustive presentation of baseline data or impacts analysis. The baseline data and impacts analysis provide the necessary basis to make informed land use plan-level decisions. Land use plan-level analyses are typically broad and qualitative rather than focused on site-specific actions (BLM Land Use Planning Handbook H-1601-1, Chapter II, A-B at 11-13 and Chapter IV, B at 29). NEPA directs the BLM to analyze a range of reasonable alternatives for management, based on the Purpose and Need, as outlined in Chapter 2, sections 2.1- 2.5. As noted, the preferred alternative in the Draft EIS was Alternative 5, but that is not the BLM's final decision about management of BLM lands. BLM retains the discretion to make a reasoned choice among the alternatives in a final decision for management based on public comments and the analysis.

In the DEIS, Chapter 3, Section 3.9 includes a discussion of the affected environment for Lands and Realty, including solar energy, wind energy, and ROW grants. Chapter 4 identifies and discloses environmental impacts resulting from selection of the alternatives presented in Chapter 2 - including an analysis of renewable energy options within those alternatives.

To respond to a comment stating that there is a complete lack of assumptions related to the exploding interest in Renewable Energy development, Section 10.9 of Appendix 10 in the DEIS outlines the indicators and assumptions associated with Lands and Realty, including wind and solar development, one of which states: Federal energy policies including (42 USC Section 13201 et seq. [2005], Executive Order 14008, and the Energy Act of 2020), would continue to support and promote domestic energy production, including renewable energy such as wind and solar.

22.2.37 Request Cooperating Agency Status

Summary: The BLM should ensure coordination with tribal authorities, as outlined by Council on Environmental Quality (CEQ) regulations, specifically 40 C.F.R. § 1508.5, which recognizes Indian tribes as cooperating agencies when impacts occur on or near their reservations. Given that BLM's management of Sage-Grouse populations and habitats on lands within and adjacent to these reservations will affect the reservations, the BLM is responsible for involving tribal authorities as cooperating agencies in the planning process.

Response: Both the CEQ and BLM planning regulations define cooperating agency status, including what it is, who is eligible to become a cooperating agency, and how the lead agency should invite participation as a cooperating agency (40 CFR 1501 and 1508; 43 CFR 1601.0-5). Cooperating agency relationships are limited to government entities, state agencies, local governments, tribal governments, and other federal agencies that have jurisdiction by law or special expertise.

BLM sent letters to tribal governments inviting them to be cooperating agencies. The BLM also sent letters to local, state, and federal agencies inviting them to participate as cooperating agencies. Cooperating agency status provides a formal framework for these government units to engage in active collaboration with a lead federal agency in the planning process. Invitations were sent to potential cooperating agencies in December 2021 and January 2022. The BLM has set up MOUs with all tribes who have requested to be a cooperating agency. Cooperating agency relationships are described in Section 5.3 of the RMPA/EIS and formal consultation efforts with tribes are described in Section 5.2.1. The BLM invited many other cooperators to engage in this effort who either did not reply or chose not to participate.

22.2.38 Socioeconomics

Summary: The BLM should consider impacts on socioeconomic conditions from changes to private and state lands and minerals due to BLM decisions on ACECs.

Response: In Section 4.12.1, Nature and Type of Effects as well as Appendix 10, Section 10.12.4, Alternative 3, of the Final EIS, the BLM added a qualitative discussion on the potential for impacts on socioeconomic conditions on adjacent private lands and minerals due to restrictions that affect the development of federal lands and minerals, including restrictions related to ACEC designations. In the Final EIS, under the Proposed RMP Amendment, the BLM is not carrying forward ACECs, so there will be no impacts on socioeconomic conditions due to restrictions on activities and land use from ACEC designations.

Summary: The BLM should consider impacts on economic and social conditions from changes to private and state lands and minerals due to BLM decisions.

Response: In Section 4.10.1, of the Final EIS, the BLM added a discussion on the potential for impacts to adjacent private lands and minerals due to restrictions that affect the development of federal lands and minerals, and in Section 4.12.1, Nature and Type of Effects as well as Appendix 10, Section 10.12.4, Alternative 3, of the Final EIS, the BLM added a qualitative discussion on the potential for impacts on social and economic conditions on adjacent private lands and minerals due to restrictions that affect the development of federal lands and minerals, including development of pipelines and transmission lines. Additionally, in Section 4.12.3, Cumulative Effects, the BLM explained how these impacts on social and economic conditions could have cumulative impacts on the surrounding communities.

Summary: The BLM should consider the impacts on royalties, rents, bonus bids, severance taxes, ad valorum taxes, sales and use taxes, labor income, and employment from changes in mineral activity due to BLM-management decisions.

Response: Section 4.12 of the Draft EIS provides an analysis on the impacts on royalties, severance taxes, ad valorum taxes, employment income, and direct and indirect employment from changes in resources due to management decisions. In the Final EIS, the BLM added qualitative discussion on impacts on rents and bonus bids and sales and use tax. Due to data limitations, these impacts are not able to be quantitatively analyzed. Additionally, based on BLM guidance, the analysis was conducted commensurate with the level of decision making.

Summary: The BLM should analyze the impacts on the economy from adding ACECs in Alternatives 3 and 6.

Response: In the Final EIS, under the Proposed RMP Amendment, the BLM is not carrying forward ACECs, so there will be no impacts on socioeconomic conditions due to restrictions on activities and land use from ACEC designations, under this alternative. The impacts of closing lands on mineral development, under Alternative 3, is discussed and analyzed in Appendix 10, Section 10.10.1 and the RFD, Appendix 12 of the DEIS, and the impacts on economic and social conditions from changes in mineral exploration due to BLM-management decisions related to ACECs are discussed in Sections 4.12.1 and 4.12.4 of the DEIS. Under Alternative 6, the impacts on economic and social conditions from the requirement of plan of operations for exploration operations disturbing five acres or less in ACECs is discussed in Sections 4.12.1 and 4.12.7 of the DEIS.

Summary: Socioeconomic impacts must consider effects of the restriction on development of geothermal energy, particularly in Nevada.

Response: Section 4.12 of the Draft EIS, under the subheaders "Renewable Energy (Geothermal, Wind, and Solar) Management", provides analysis on the impacts on economic conditions, such as jobs, income, and economic output, due to potential changes in geothermal activity based on BLM decisions on GRSG.

Summary: The BLM should include an analysis of impacts on social and economic conditions at a more granular level, such as at the county level or for rural communities.

Response: Based on BLM guidance, the analysis was conducted commensurate with the level of decision making. Additionally, the BLM used the best available data at the time of preparing the Draft EIS for the baseline socioeconomic discussion and the impacts on social and economic conditions.

Summary: The BLM should analyze cumulative impacts on economic and social conditions, including impacts of recent rulemakings, such as the Renewable Energy Rule, Public Lands Rule, and the Utility-Scale Solar PEIS.

Response: Section 4.21.11, under the Economic Interest and Conditions subheader, of the DEIS, discusses the cumulative impacts on economic and social conditions due to changes that could be implemented from the Solar Programmatic EIS. The BLM added a discussion on cumulative impacts on economic and social conditions due to changes that could be implemented from the Public Lands Rule and the Renewable Energy Rule.

The recently promulgated Public Lands Rule implements the BLM's longstanding statutory authority to manage lands for conservation, including by taking account of certain resource values explicitly addressed in the rule. As a result, the management actions considered here are consistent with the Public Lands Rule, notwithstanding that they are within the BLM's discretion with or without the rule.

Summary: The BLM should include an analysis of impacts on social and economic conditions at a more granular level, such as at the county level or for rural communities. The BLM should use county-level data in the baseline discussion, such as the data provided in the Nevada Economic Assessment Project (NEAP) reports. Additionally, the BLM should analyze the cumulative impacts with other recent BLM rulemakings.

Response: Based on BLM guidance, the analysis was conducted commensurate with the level of decision making. Additionally, the BLM used the best available data at the time of preparing the Draft EIS. Most of the data in the socioeconomic baseline report (Appendix 13) come from the same source as the data in the NEAP reports (i.e., population and housing availability data). Because the NEAP reports were published in 2022 and more recent data from the original sources are available, the BLM collected and used the most up-to-date data from these sources for the socioeconomic baseline discussions. In Appendix 13 Section 4.1, on page 13.4-1 of the DEIS, there is a footnote that refers readers to view the NEAP reports for more information on social and economic conditions in Nevada Counties in the analysis area. Additionally, Section 4.21.11, under the Economic Interest and Conditions subheader, of the DEIS, discusses the cumulative impacts on economic and social conditions due to changes that could be implemented from other recent BLM rulemakings.

Summary: The BLM should analyze cumulative impacts on economic and social conditions.

Response: Section 4.12.3, Cumulative Effects, of the Proposed RMP Amendment/Final EIS, discusses the cumulative impacts on economic and social conditions.

Summary: The BLM should clearly outline the methodology for calculating economic impacts from changes in recreation.

Response: Section 4.19, Recreation and Visitor Services, discusses the impacts on recreation due to BLM-management decisions. Management decisions related to GRSG are not expected to affect visitor use levels. Recreation related economic impacts would stem from changes in potential visitor use; however, since there are no expected changes in visitor use across the alternatives, there would be no expected change in visitor spending or economic activity supported by recreation on BLM-administered lands (see Section 10.12 in Appendix 10, for more information on assumptions used in the analysis on impacts on economic conditions related to recreation). See Appendix 18 for a detailed description of the technical methodology that was used to analyze impacts on economic conditions due to changes in other resources.

Summary: The commenters provided data and sources for the BLM's consideration regarding recreation on BLM lands and the importance of recreation.

Response: Management decisions related to GRSG are not expected to affect visitor use levels (see Section 4.19, Recreation and Visitor Services, for a discussion on the impacts on recreation due to BLM-management decisions). Recreation related economic impacts would stem from changes in potential visitor use; however, since there are no expected changes in visitor use across the alternatives, there would be no expected change in visitor spending or economic activity supported by recreation on BLM-administered lands (see Section 10.12 in Appendix 10, for more information on assumptions used in the analysis on impacts on economic conditions related to recreation). Because there would be no expected change in visitor spending or economic activity supported by recreation due to BLM decisions on GRSG, impacts on economic and social conditions due to potential changes in recreation were not carried forward to a detailed analysis.

Summary: The BLM should add statements that all mining jobs tend to be high paying in rural communities.

Response: The BLM revised the statements in the coal, nonenergy leasable, and locatable mineral sections to say, "jobs associated with mining, including [coal, nonenergy leasable minerals, locatable minerals] tend to be high paying compared with other types of employment in rural communities." This statement was also added to the fluid minerals and mineral materials sections.

Summary: One commenter expressed concerned with the impacts on economic conditions and the way of life of the local communities and individuals in these communities due to changes in oil and gas activity due to BLM decisions.

Response: Section 4.12.5 of the Draft EIS provides a detailed discussion on the impacts on economic and social conditions, such as jobs, income, tax revenue, access to public services, way of life, and quality of life, from potential changes in oil and gas activity due to BLM decisions under Alternative 5.

Summary: The BLM should add employment data for a typical wind or solar project.

Response: The BLM added language in Section 3.12.2 and Appendix 13 of the Final EIS pointing to the baseline data on jobs and labor income by industry. The BLM explained that renewable energy, such as wind and solar development, supports jobs in various industries, such as the construction industry, however, these jobs are not reported as a separate renewable energy sector.

Summary: The BLM should compare Payments in Lieu of Taxes (PILTs) across states in the analysis area or refer to a table that shows PILTs across states in the analysis area.

Response: In Section 3.12 of the Final EIS, the BLM added a reference to Table 3-15 in Appendix 13 that shows the PILTs by county and state.

Summary: The BLM should analyze impacts on environmental justice populations and economic conditions due to impacts on the cost of transportation and heating fuels, the energy market, and rising energy costs.

Response: The BLM focused the discussion of impacts on socioeconomic conditions and environmental justice due to increased costs for trona-related household products and did not include a discussion regarding the impacts on the cost of transportation and heating fuels, the energy market, and rising energy costs due to the unique geographical characteristics of trona that makes it different from other types of minerals or energy sources that may be used for transportation and heating fuels.

Trona is unique because trona deposits only exist in a handful of locations across the globe, and the largest known deposit is located in Green River, Wyoming, which is responsible for supplying 90% of U.S. soda ash used by domestic manufacturing, food, cosmetic, and pharmaceutical sectors. Trona from Southwest Wyoming is also exported to international markets around the world. Restrictions to limit surface disturbances within PHMA could significantly affect the feasibility of mining the Wyoming deposit and there is less likelihood of geographic substitution being able to offset production declines in PHMA due to the rarity of trona deposits. Therefore, there is a higher likelihood that restricting trona production in Southwest Wyoming would have a perceptible impact on the price for a wide range of household products.

In contrast, oil and gas deposits and other sources of minerals and energy that are used for transportation and heating fuels are located in many regions of the U.S. (both within and outside of GRSG PHMA) and across the world. While management actions considered under the alternatives could restrict production of these resources within PHMA (the impacts of these restrictions on economic conditions are discussed in Section 4.12 of the Draft EIS), there is a high likelihood that geographic substitution would mitigate some of the production losses discussed within the EIS. Since these resources exist outside of PHMA, production losses associated with new restrictions on leasing and developing minerals or energy supply in PHMA could be partially offset by increases in production from federal minerals on federal land outside PHMA, state and private minerals on non-federal land in the U.S. outside of PHMA, or from foreign sources. The degree to which geographic substitution would offset production declines within PHMA and the net price effects associated with geographic changes in mineral and energy production are not known.

Because the impacts on net price effects for transportation and heating fuels are not known for the general public, the BLM cannot determine that these impacts will have disproportionate effects on environmental justice populations.

Summary: The BLM underestimates the economic contributions from the oil and gas industry, and the BLM should use data from the Utah Petroleum Association.

Response: The economic analysis prepared for the Utah Petroleum Association that the commenters referenced analyzed the impact on the economy from the petroleum industry across the state of Utah, regardless of whether or not the petroleum extraction would be impacted by BLM decisions on GRSG management. Whereas, for the impact analysis in the Draft and Final EIS, the BLM focused on the impacts on economic conditions due to changes in oil and gas activity in GRSG habitat, which would be directly impacted by BLM decisions. The results from the study prepared for the Utah Petroleum Association project larger economic contributions from petroleum because they include petroleum that would not be impacted by the alternatives. If the BLM were to include these additional data, the comparison across alternatives of the change in economic contributions would not differ from the analysis in the Draft and Final EIS.

Summary: The BLM should consider the impacts on price increases due to restrictions in other nonenergy leasable minerals.

Response: The BLM focused the economic impacts analysis discussion on impacts associated with increased in price for trona-related consumer products since there are very few, if any, geographical substitutes for extracting trona other than in the KLSA in Wyoming (which is located in GRSG habitat), including globally. Because of the small amount of geographical substitutes, restricting leasing of trona in the KLSA could directly impact the regional supply of trona and trona-related products (i.e., baking soda). Other types of nonenergy minerals, such as phosphate, sodium, potassium, and sulfur do not have the geographical limitations that trona has. For example, Idaho and Utah are large producers of phosphate; however,

phosphate is also found in Florida, North Carolina, and other countries such as in China and Morocco. Gilsonite only occurs in the Uinta Basin in eastern Utah; however, as discussed in Section 3.10.2, gilsonite is used mostly for oilfields and printing ink industries, which have more substitutes and tend not to be direct consumer products.

Summary: The analysis on social and economic conditions due to changes in locatable minerals is insufficient. The BLM should make the analysis more adequate through actions such as quantifying the impacts from changes in locatable minerals, providing more detailed baseline information on locatable minerals, and using more concrete language to describe effects (i.e., use "will impact" rather than "might impact"). Additionally, the BLM should analyze impacts on state compensatory mitigation systems, the ability of mine operators to seek mitigation credits, mining operations due to changes in realty actions (i.e., transmission rights-of-way, access roads, etc.), and cumulative impacts to mining activities.

Response: As described in Sections 4.12.1, 4.12.2, and 4.12.4, recommending areas for withdrawal from the mining laws for locatable exploration or development does not restrict any activities and therefore, such recommendation does not have any impacts. The Secretary of the Interior makes a withdrawal of land from location and entry through a separate process pursuant to Section 204(a) of FLMPA. This process is separate from the BLM land-use planning process. Should there be a proposal for the Secretary to make a withdrawal, the proposal would require environmental and other analysis under NEPA and other applicable authorities before the land could be withdrawn. For purposes of this planning initiative, the alternatives analysis includes a discussion of the likely effects should the separate process be conducted, and the Secretary make a withdrawal in the future. These effects include impacts on economic and social conditions such as impact on employment, labor income, and taxes. The discussion of these impacts is included in Section 4.12 of the DEIS, under the Locatable Minerals Management sub-header.

Summary: The BLM should acknowledge in the analysis that restrictions on mineral materials disposal would push development to other areas, which would still cause climate effects, and often times these areas are more residential, so there would be more adverse impacts on environmental justice populations.

Response: The BLM added language that states if mineral materials operations shift to state or private lands, then impacts on social conditions and quality and access to nonmarket values could shift as well.

Summary: The BLM should use 2022 U.S. Census of Agriculture data in their analysis on economic impacts due to changes in livestock grazing.

Response: The BLM added language and updated data to explain the change in percentages of farms and ranches by type in each state. 2012 data were used for the baseline percentages of ranch types in the Draft EIS, because 2012 is the last year that USDA NASS data separated small family ranches into retirement ranch, off-ranch primary occupation, and ranch primary occupation categories. As explained in Section 3.5 of Appendix 13, the data from USDA NASS includes farms and ranches on all lands, regardless of whether they are in or outside of the analysis area, on or off BLM-managed lands, and regardless of whether they are impacted by BLM decisions. The data from USDA NASS were provided for illustrative purposes. In Appendix 18, a detailed description is provided of the input data that were used for the analysis of impacts on economic conditions by alternative. As a proxy for forage use, the BLM use billed AUMs on BLM-managed lands, where PHMA accounted for at least 15 percent of the acreage. Because the input data on billed AUMs was limited to the allotments where PHMA accounted for at least 15 percent of the acreage, the data used captures the allotments that would be directly impacted by BLM decisions.

Summary: The statement that explains that demand for renewable development on public lands will likely increase as fossil fuel use is transitioned away is concerning.

Response: The BLM revised the sentence in question to say, "As there continues to be an increased diversification of energy sources, there will likely be an increase in demand for renewable development on public lands."

Summary: The BLM should mention that renewable energy projects generate fewer jobs than mining projects.

Response: The BLM does not have sufficient evidence that renewable energy projects generate and support lower levels of overall regional employment than mining and power generation from other fuel sources in the long-term.

Summary: The statement that environmental justice communities, especially low-income households, often live closer to mineral developments is incorrect.

Response: In the Draft EIS, the BLM included citations for the statements that were made that environmental justice populations would likely be disproportionately impacted by changes in access to clean air due to mineral development because of where low-income populations tend to be located. The BLM was not provided any other sources or updated data for consideration to show how this statement is incorrect. In the Final EIS, the BLM added language that the specific impacts on environmental justice populations would likely depend on other site-specific factors that cannot be determined in this analysis and will be analyzed further during implementation-level NEPA analysis.

Summary: The BLM's analysis of impacts on social and economic conditions is inadequate and there are concerns with how the summary of environmental consequences in the Executive Summary for Social and Economic Conditions is phrased.

Response: The BLM quantitatively analyzed the impacts on economic conditions, including impacts on jobs, income, output, and tax revenue, due to changes in livestock grazing and mining in Section 4.12 of the Draft EIS. The analysis included a discussion on the magnitude of these impacts. Additionally, the BLM discussed the impacts on social conditions, access, and quality of nonmarket values associated with changes in livestock grazing and mining in Section 4.12 of the Draft EIS. In the Final EIS, the BLM revised the discussion in the Executive Summary to better reflect the analysis that was described in detail in Chapter 4 and Appendix 18.

Summary: The difference in economic data in the DEIS versus those reported by the USDA 2017 Census of Agriculture is concerning.

Response: Appendix 18 provides a detailed description on the input data that were used for the analysis of impacts on economic conditions due to potential changes in livestock grazing from BLM-management decisions by alternative. As a proxy for forage use, the BLM used billed AUMs on BLM-managed lands, where PHMA accounted for at least 15 percent of the acreage. This land would be directly impacted by BLM decisions. Data from the USDA Census of Agriculture can provide contextual information on ranching in the area, however, these data were not used in the modeling of impacts on economic conditions because it is not specific to the land that would be directly impacted by BLM-management decisions. Data from the USDA Census of Agriculture includes data on farms and ranches on all lands, regardless of whether they are in or outside of the analysis area, on or off BLM-managed lands, and regardless of whether they are impacted by BLM decisions.

Summary: The BLM should include an analysis of impacts on social and economic conditions at a more granular level, such as at the county level or for rural communities. Additionally, the BLM should use county-level data in the baseline discussion, such as the data provided in the Nevada Economic Assessment Project reports.

Response: Based on BLM guidance, the analysis was conducted commensurate with the level of decision making. Additionally, the BLM used the best available data at the time of preparing the Draft EIS. Most of the data in the socioeconomic baseline report (Appendix 13) come from the same source as the data in the NEAP reports (i.e., population and housing availability data). Because the NEAP reports were published in 2022 and more recent data from the original sources are available, the BLM collected and used the most up-to-date data from these sources for the socioeconomic baseline discussions. In Section 4.1 of Appendix 13, on page 13.4-1 of the DEIS, there is a footnote that refers readers to view the NEAP reports for more information on social and economic conditions in Nevada Counties in the analysis area.

Summary: The BLM should include language that recognizes the impact of litigation on Wild Horses and Burros.

Response: The BLM cannot anticipate or project impacts due to potential future litigation. The BLM revised text on page 4-136 of the Draft EIS to say, "The timeline for implementation of any management changes, if approved, would be impacted by congressional funding and the associated wild horse management including gathers, storage capacity, and adoption rate."

Summary: The BLM should consider the impacts on increased costs for constructing power transmission lines, under Alternative 3.

Response: Section 4.12.4 in the Draft EIS, under the subheader "Renewable Energy (Geothermal, Wind, and Solar) Management," includes a discussion on the potential impacts on costs of constructing transmission lines due to BLM decisions under Alternative 3.

Summary: The BLM should add language to the cumulative impacts section stating that there is a higher potential for severe wildfire under Alternative 3.

Response: The BLM revised language to: "Potential for severe wildfire could result in damage to GRSG habitat, which could result in cumulative impacts on access to nonmarket values associated with GRSG and GRSG habitat, such as values from cultural and subsistence resources and nonuse values. The risk of wildfires could be higher under Alternative 3 due to the reduction lands available for livestock grazing, which would limit the ability to use livestock to reduce fine fuels on a large portion of the landscape (see Section 4.4 for further analysis on the impacts of grazing on wildfires)."

Summary: The analysis should include quantitative impacts on economic contributions due to changes in wind and solar energy production.

Response: As discussed in Appendix 12, Reasonably Foreseeable Development Scenario, due to data limitations, the BLM was not able to project the amount of wind and solar power plants on federal lands across alternatives, so they were also unable to provide a quantitative analysis on impacts on economic conditions, such as jobs, labor income, and economic output. Instead, these impacts were discussed qualitatively.

Summary: The BLM should consider the adverse impacts that ACECs have on public services as well as on the ability to develop infrastructure that is necessary for public health and safety.

Response: In Section 4.12.1 of the Draft EIS, under the "Fluid Minerals (Oil and Gas) Management" subheader, there is a discussion on the potential impacts on public services from BLM decisions that reduce mining opportunities on federal land. In Section 4.12.4, there is another discussion on impacts on public services due to BLM decisions under Alternative 3, including impacts on maintaining infrastructure that help provide access to educational opportunities, health care, and social safety net programs. There is also a discussion on impacts on public services in Wyoming, in Section 4.12.7, due to BLM decisions under Alternative 6. The Proposed RMP Amendment does not propose to designate any ACECs, so there will be no impacts on socioeconomic conditions due to restrictions on activities and land use from ACEC designations.

Summary: The BLM should include an analysis of impacts on social and economic conditions at a more granular level, such as at the county level or for rural communities. The BLM should use county-level data in the baseline discussion, such as the data provided in the Nevada Economic Assessment Project reports. Additionally, the BLM should consider the impacts on economic and social conditions due to management actions regarding ACECs.

Response: Based on BLM guidance, the analysis was conducted commensurate with the level of decision making, and the BLM used the best available data at the time of preparing the Draft EIS. Most of the data in the socioeconomic baseline report (Appendix 13) come from the same source as the data in the NEAP reports (i.e., population and housing availability data). Because the NEAP reports were published in 2022 and more recent data from the original sources is available, the BLM collected and used the most up-to-date data from these sources for the socioeconomic baseline discussions. In Appendix 13 Section 4.1, on page 13.4-1 of the DEIS, there is a footnote that refers readers to view the NEAP reports for more information on social and economic conditions in Nevada Counties in the analysis area. Additionally, the BLM is not carrying forward ACECs in the Final EIS under the Proposed RMP Amendment, so there will be no impacts on socioeconomic conditions due to restrictions on activities and land use from ACEC designations under this alternative. The impacts of closing lands to mineral development under Alternative 3 are discussed and analyzed in Section 4.10.1, the RFD, and Appendix 12 of the DEIS. The impacts on economic and social conditions from changes in mineral exploration due to BLM-management decisions related to ACECs are discussed in Sections 4.12.1 and 4.12.4 of the DEIS. Sections 4.12.1 and 4.12.7 of the DEIS discuss the impacts on economic and social conditions due to changes that could occur from the BLM's decision regarding the requirement of plan of operations for exploration operations disturbing five acres or less in ACECs.

Summary: The BLM should include an analysis of impacts on social and economic conditions at a more granular level, such as at the county level or for rural communities. Additionally, the BLM should discuss social conditions and nonmarket values of livestock grazing, in addition to economic conditions of livestock grazing.

Response: Based on BLM guidance, the analysis was conducted commensurate with the level of decision making. Additionally, the BLM used the best available data at the time of preparing the Draft EIS for the baseline socioeconomic discussion and the impacts on social and economic conditions. In Appendix 13 and Section 3.12 of the Final EIS, under the Livestock Grazing Management subheading, the BLM discusses baseline information on economic, nonmarket, and social conditions related to livestock grazing on BLM-administered lands. Section 4.12 and Appendix 18 of the Final EIS discuss impacts on economic conditions,

social conditions, and access and quality of nonmarket values associated with livestock grazing due to BLM-management decisions under each alternative.

Summary: The BLM did not provide adequate opportunity for meaningful involvement and fair treatment of environmental justice populations. Additionally, the BLM should consider the impacts on environmental justice populations due to mining workers leaving the areas due to changing economic conditions.

Response: In Section 3.12 and Section 5.3 of Appendix 13, the BLM added language to further highlight the meaningful, public engagement and outreach that has included and involved environmental justice (EJ) populations that the BLM has conducted and organized to date. Section 4.12.1 includes a detailed analysis on impacts on economic conditions—including those outlined by the commenters—that affect all communities, including those in rural towns across the analysis area. In Section 4.12.1, the BLM explains that additional screening and consideration of environmental justice populations and analysis of disproportionate and adverse impacts will occur at the implementation stage—at which point, the communities with EJ concerns may change, depending on the conditions at the time of implementation.

Summary: The analysis of impacts on economic and social conditions due to changes in livestock grazing is inadequate. In the socioeconomic section, the BLM should quantify the impacts on the costs from range improvement maintenance or installation incurred by permittees, the likely economic loss of restricting turnout and turn in dates, the loss or relocation of water developments or resources, and the proposed reductions in percent utilization. Additionally, the BLM should qualitatively evaluate how these alterations to livestock grazing on public lands would affect the culture of landowners and permittees, in addition to the surrounding communities.

Response: In Section 4.12 of the Draft EIS, under the Livestock Grazing Management subheader, the BLM provided a detailed analysis on the impacts on economic conditions as well as social conditions and nonmarket values, including impacts on the culture of the rural communities. Due to data limitations, the BLM is not able to quantify all of the costs incurred by permittees due to BLM decisions. However, the BLM added language qualitatively discussing the impacts on some of the costs highlighted by the commenters in Section 4.12.1, Nature and Types of Effects. As stated in Section 2.3, Alternatives Considered but Not Analyzed in Detail, decisions that limit livestock grazing utilization were not carried forward in any of the alternatives analyzed in detail. Additionally, the BLM added further discussion on the impacts on social condition and quality and access of nonmarket values of livestock grazing on the surrounding communities in Section 4.12.1 of the Proposed RMP Amendment/Final EIS.

Summary: For alternatives that are open to livestock grazing, the BLM should analyze the cost of restoring areas due to damage from livestock grazing.

Response: The BLM did not include management actions on required restoration management in any of the alternatives in the Draft RMPA/EIS and Proposed RMP Amendment/Final EIS, so there would be no impact on economic conditions from changes in BLM decisions regarding restoration requirements under alternatives that are open to livestock grazing.

Summary: The BLM should consider impacts on economic conditions from changes in on livestock grazing activity due to operators relocating transmission lines onto lands used for grazing due to BLM decisions on GRSG management. The impact analysis should include a discussion on changes in costs and burdens associated with construction and operation of transmission lines as well as impacts on economic conditions such as jobs and income, including low income and minority workers.

Response: The BLM added language in Section 4.12.1 stating that indirect impacts on economic and social conditions due to changes in livestock grazing could occur from BLM decisions regarding ROW exclusion and avoidance areas if development of ROWs is relocated to areas outside of GRSG habitat but still within a grazing allotment. These areas may see an increase in construction-related disturbance or displacement of livestock, which could lead to increased costs to ranchers. There are no transmission lines being proposed as part of this EIS, so there will be no impacts from BLM management decisions on GRSG on the issues specific to transmission line easements and construction. Section 4.12 discusses impacts of BLM management decisions regarding GRSG on economic conditions such as jobs and income, which includes impacts on all communities including those who identify as low income and minority.

Summary: Land use decisions that push transmission line development onto agricultural land will have negative impacts to food supply, which should be analyzed in the NEPA document.

Response: The degree to which transmission lines will move onto private agricultural lands due to BLM decisions on GRSG depends on several site-specific factors which are not known to the BLM, including value of the land for agriculture compared with the value of the land for transmission line development (which in turn depends on the demand, supply, and price of agricultural products compared with the demand, supply, and price of energy), existing contracts and rights, and availability and feasibility of other nearby land substitutions. Because the degree to which transmission lines will shift to private agricultural lands due to BLM decisions on GRSG is unknown, the BLM cannot determine the impacts on economic and social conditions from this change.

Summary: The section title "Social and Economic Conditions, including Environmental Justice" should be changed to "Social and Economic Conditions, including Environmental Justice and Agriculture."

Response: Agriculture as it relates to livestock grazing is discussed in Section 3.8 and 4.8, of the Draft EIS, rather than Sections 3.12 and 4.12, Social and Economic Conditions, including Environmental Justice. Section 4.12, Social and Economic Conditions, including Environmental Justice, discusses impacts on social and economic conditions that stem from changes in activity related to resources, such as livestock grazing, minerals, renewable energy.

Summary: The BLM's statement that there is no evidence that farming and ranching sectors employ a higher percentage of people who identify as minority or low income is concerning. The BLM should use data from the US Census, as reported in the Hispanic Profile Data Book, and the Idaho Department of Labor for baseline data on agricultural workers who identify as minority. Additionally, the BLM should consider impacts on environmental justice populations due to changes in economic conditions from relocating transmission lines onto agricultural lands due to BLM decisions on GRSG management.

Response: The BLM revised the language in Sections 3.12.2, 4.12.1, 10.12.4 of Appendix 10, and 5.3 of Appendix 13, to clarify that there is a lack of evidence that the types of operations (rather than the sectors as a whole) that are most likely to be impacted by BLM management decisions—such as small-family owned ranching and livestock operations—employ a higher level of individuals who identify as part of an environmental justice population. The data that the commenter provided are on the agricultural industry as a whole rather than ranching and livestock operations. While many agricultural and crop farms tend to hire a large percentage of wage workers—who tend to include higher levels of individuals who identify as part of an environment justice population—this is not the case for most small family-owned ranches and livestock operations, which tend to employ more family workers. The degree to which transmission lines will move onto private agricultural lands due to BLM decisions on GRSG depends on several site-specific factors which

are not known to the BLM, including value of the land for agriculture versus the value of the land for transmission line development—which are related to demand for and price of agricultural products versus energy—and availability and feasibility of other nearby land substitutions. Because the impacts on private agricultural lands from shifting transmission lines due to BLM decisions on GRSG are not known, the BLM cannot determine that these impacts will have disproportionate effects on environmental justice populations.

Summary: The BLM should consider the information to support the argument that the agriculture industry employs a higher percentage of people who identify as minority or low income. The BLM should use data from the US Census, as reported in the Hispanic Profile Data Book, and the Idaho Department of Labor for baseline data on agricultural workers who identify as minority.

Response: The BLM revised the language in Section 3.12.2, 4.12.1, and Appendix 13, to clarify that the impacts on economic conditions associated with changes in livestock grazing are focused on ranches and livestock operations, and the biggest impacts will occur on small family-owned ranches and livestock operations, which tend to employ lower levels of wage-workers, who include higher levels of individuals who identify as part of an environment justice population, than agricultural and crop farms. The data that the commenter provided are on the agricultural industry as a whole rather than ranching and livestock operations.

Summary: The BLM should consider the impacts on jobs in secondary industries that would be affected by changes in the oil and gas industry, especially due to BLM decisions on ACECs.

Response: In the Proposed RMP Amendment, the BLM is not carrying forward ACECs, so there will be no impacts on socioeconomic conditions due to restrictions on activities and land use from ACEC designations under this alternative. Impacts on secondary jobs are included in the numbers for indirect and induced impacts. Indirect impacts include impacts on jobs in industries that are needed to support an industry that was directly impacted (for example, manufacturing industries that sell supplies to the oil and gas sector). Induced impacts include impacts on jobs in industries that are affected by changes in household spending (for example, jobs in the service-related sectors such as those associated with restaurants and grocery stores). These impacts are discussed in detail in Section 4.12.2. See Appendix 18 for more details on the methodology for calculating impacts on economic conditions as well as for tables that break out the total impacts by state into direct, indirect, and induced impacts.

Summary: The BLM should revise the language in Section 3.10.4, Minerals, that says that the BLM has limited information regarding the existing conditions of locatable mineral development. Additionally, the BLM should revise the language in Appendix 13 that says that coal accounts for a small percentage of total economic contributions and employment.

Response: In Section 3.10.4 of the Proposed RMPA/Final EIS, the BLM revised the language to say, "Because locatable minerals are governed under the requirements of the Mining Law of 1872, as amended, the BLM has limited baseline data on the production and revenue associated with locatable minerals." In the Appendix 13 of the Final EIS, the BLM revised the language to say, "Coal production and development activities can be an important contributor to local jobs, labor income, and tax revenue, especially in rural communities. Additionally, the jobs associated with coal mining tend to be high paying compared with other types of employment in these rural communities."

Summary: The BLM should consider impacts on economic and social conditions from changes in funding to state educational systems due to impacts on state trust lands.

Response: In Section 4.12.1, Nature and Type of Effects, as well as Appendix 10, Section 10.12.4, Alternative 3, of the Final EIS, the BLM added a qualitative discussion on the potential for impacts to adjacent non-federal lands due to a change in development of non-federal minerals. The BLM also discussed that a change in development of non-federal minerals could impact public services, including education, which can be funded by mineral production on state trust lands.

Summary: The language in the impacts analysis needs to be revised to clarify that trona extraction cannot be moved to another location. Additionally, the BLM should analyze the impacts on lithium batteries and other infrastructure needed for renewable energy development due to changes in restrictions on nonenergy leasable minerals.

Response: The BLM added language to clarify that trona in the U.S. is located in the KSLA, and there is limited ability to shift large scale operations to deposits outside of the KSLA. Additionally, the BLM added that lithium batteries represent one of the uses for soda ash in Section 4.12.1 of the Final EIS.

Summary: The BLM needs to include the Net Proceeds of Minerals Taxes in Nevada in Table A-29 from the socioeconomic baseline appendix and analyze the impacts on economic conditions from changes in Net Proceeds of Minerals Taxes in Nevada.

Response: The BLM added Net Proceeds of Minerals Taxes in Nevada to Table A-29 from the socioeconomic baseline appendix. Net Proceeds of Minerals Taxes were analyzed in the Draft EIS but mislabeled as "severance tax". The BLM corrected the name of the tax revenue in the Final EIS. As described in Sections 4.12.1, 4.12.2, and 4.12.4, recommending areas for closure to the mining laws for locatable exploration or development does not restrict any activities and therefore, such recommendation does not have any impacts. Only the Secretary of the Interior may withdraw lands from location and entry under the Mining law of 1872 through a separate process. This process is separate from the BLM land use planning process. Should there be a proposal for the Secretary to make a withdrawal, the proposal would require environmental and other analysis under NEPA and other applicable authorities before the land could be withdrawn. For purposes of this planning initiative, the alternatives analysis includes a discussion of the likely effects should the separate process be conducted, and the Secretary make a withdrawal in the future. These effects include impacts on economic and social conditions such as impact on employment, labor income, and taxes. The discussion of these impacts is included in Section 4.12 of the DEIS, under the Locatable Minerals Management subheader.

Summary: The BLM should prepare a Supplemental Draft RMPA/DEIS that eliminates Alternative 3 from detailed consideration on the grounds that it is economically infeasible and that it is also inconsistent with FLPMA's multiple-use mandates.

Response: The BLM analyzed a reasonable range of alternatives, as required by the NEPA process, that are feasible for the BLM to implement and adequate to address the agency's purpose and need for considering these amendments, as described in Chapter 2. Further, BLM considered a number of alternatives and issues during scoping that the agency determined not to carry forward, as detailed in Section 2.3. Impacts on economic conditions under Alternative 3 were analyzed and discussed in detail in Appendix 10, Section 10.12.4. The Proposed RMP Amendment does not propose closing land to grazing or locatable mineral development.

Summary: The BLM should analyze the impacts on additional costs from increased risk of multiple system failures (e.g., network redundancy and service reliability) and construction costs due to the requirement of co-locating infrastructure in existing ROWs and corridors in certain alternatives.

Response: In Section 4.12.1, the BLM added that under alternatives that encourage co-locating infrastructure in existing ROWs and corridors, there could be impacts on economic conditions due to increased risk of multiple system failures and issues with service reliability as well as potential increased construction costs due added transmission line length to route the transmission line to existing corridors. Due to data limitations, the BLM is not able to quantify impacts on costs or economic risks associated with co-locating transmission lines.

Summary: The BLM should include an analysis of impacts on social and economic conditions at a more granular level, such as at the county level or for rural communities. Additionally, the BLM should consider impacts on economic conditions of changes in mineral development, especially for Native Americans and environmental justice populations.

Response: Based on BLM guidance, the analysis was conducted commensurate with the level of decision making. Additionally, the BLM used the best available data at the time of preparing the Draft EIS for the baseline socioeconomic discussion and the impacts on social and economic conditions. In Appendix 13 and Section 4.12, the BLM discusses the economic conditions and impacts on economic conditions under each alternative associated with mining throughout the analysis area, including impacts on employment and economic output. As discussed in these sections, these impacts on economic conditions affect many individuals in the surrounding communities, especially in communities that rely on mining for economic stability and growth. As stated in Section 5.3 of Appendix 13 and Section 3.12.4, of the DEIS, the BLM does not have evidence that individuals employed in the sectors that are most likely to be impacted by BLM management decisions (such as the mining sector) have a higher percentage of people who identify as a minority, low-income, or American Indian and Alaska Native, so the BLM did not determine there would be disproportionate and adverse impacts on environmental justice populations due to potential changes in economic conditions from BLM-management decisions that could affect mineral development.

Summary: The Executive Summary should include a discussion of impacts on social and economic conditions and environmental justice populations due to changes in livestock grazing across alternatives.

Response: In the Final EIS, BLM revised the discussion in the Executive Summary to better reflect the analysis that was described in detail in Chapter 4 and Appendix 18. As stated in Section 5.3 of Appendix 13 and Section 3.12.4, of the Draft EIS, the BLM does not have evidence that individuals employed in the sectors that are most likely to be impacted by BLM management decisions (such as the farming and ranching sector) have a higher percentage of people who identify as a minority, low-income, or American Indian and Alaska Native, so the BLM did not determine there would be disproportionate and adverse impacts on environmental justice populations due to potential changes in economic conditions from BLM-management decisions that could affect livestock grazing.

Summary: The BLM should update the baseline data on rights-of-way for wind and solar projects.

Response: In the Final EIS, the BLM updated data on rights-of-way for wind and solar projects based on data from Fiscal Year 2023, which is the most recent publicly available data at the time of the Final EIS.

Summary: The BLM should analyze the impacts on economic conditions due to changes in locatable mineral activity from BLM-management decisions under Alternatives 4, 5, and 6.

Response: As discussed in Sections 4.12.5 and 4.12.6 of the DEIS, there are no areas recommended for withdrawal from locatable mineral entry under Alternatives 4 and 5, so there would be no impact on jobs, income, economic output, and social conditions under these alternatives from locatable mineral activity. As discussed in Section 4.12.7, there are also no areas recommended for withdrawal from locatable mineral entry under Alternative 6, however, there would be a requirement for a plan of operation for exploration operations that disturb five acres or less in ACECs. The impacts on socioeconomic conditions from potential changes in locatable mineral activity due to this requirement are discussed in Section 4.12.7.

Summary: The impacts on economic conditions due to using HAF fine-scale delineation areas were not adequately analyzed.

Response: The impact analysis on economic conditions, as described in Section 4.12.2 and Appendix 18, uses data from the RFD on oil and gas activity, such as number of oil and gas wells produced in the area and production of oil and gas wells. Impacts on economic conditions due to changes associated with HAF fine-scale delineation areas are incorporated into the economic analysis through reduced potential development in the area.

Summary: The BLM should stop doing repetitive studies and helicopter gathers, and removals that result in costs to warehouse the animals. The BLM should compare costs of using helicopters for gathers with costs of doing bait and water trapping. The BLM should remove the incorrect statement that says that the FLPMA amended the WHBA.

Response: Thank you for your comment. The Federal Land Policy and Management Act amended the Wild Free-roaming Horses and Burros Act by allowing the Secretaries of the Interior and Agriculture to use or contract for the use of helicopters and motorized vehicles for the purpose of managing wild horses and burros on public lands. The commenter did not provide evidence for why the statement is incorrect, so this statement was not removed. BLM activities associated with wild horse and burros that were mentioned in the comment, such as research and use of helicopters for wild horse gathers, and funding for management of wild horse and burros are outside the scope of this project.

22.2.39 Soil Resources

Summary: The BLM should consider the provided science when analyzing indirect impacts of grazing/disturbance on biological soil crusts.

Response: Biological soil crusts are included in the analysis in the Draft RMPA/EIS in Sections 3.14, 4.2.2, and 4.14. The BLM revised Section 3.14 to consider additional science regarding impacts on biological soil crusts.

Summary: The BLM should consider the suggested edits to the soil resources analysis.

Response: In the Draft RMPA/EIS, Section 3.14 includes a description of the affected environment for soil resources and Section 4.14 includes the environmental consequences analysis for each alternative. The Draft RMPA/EIS does not propose any soil resource specific management actions. Sections 3.14, 4.14 and 4.2, and associated sections of Appendix 10 were updated with additional information regarding direct, indirect, and cumulative impacts to soil resources.

22.2.40 Travel and Transportation

Summary: The BLM cannot simply assume that the act of signing a travel management plan alone will be protective of sage-grouse. The plans must meet the BLM's minimization criteria and be followed up with

restoration of undesignated trails, increased trail maintenance, and adequate funding for outreach, education and enforcement.

Response: Area-specific travel and transportation management decisions are outside the scope of this document. However, committing adequate resources and staff to achieve the conservation goals and objectives remains a top priority for the BLM. BLM is committed to the continued implementation of sage-grouse habitat and sagebrush steppe management. Each Field Office is in charge of prioritizing staff time to accomplish their identified workload associated with implementation level projects. All implementation level travel and transportation plans will follow all applicable BLM handbooks and manuals for conducting travel and transportation planning.

Summary: The BLM should update the access analysis in areas that are closed or limited to OHV use to reflect safety and search and rescue concerns.

Response: Section 3.20.1 and 4.20 were updated to provide clarification. The BLM is not proposing to amend the 2015 GRSG RMP Amendment management direction for travel and transportation. The existing management direction that limits OHV use to existing roads in GHMA and PHMA remains in place. The effects of changes in HMA allocations across the alternatives and how that would change the manner of travel and transportation allocations has been added to the effects analysis in Chapter 4 and Appendix 10. The BLM's existing 2015 GRSG RMP Amendment management direction does not propose OHV closures and none are being proposed in this RMP Amendment.

Recommendations for recreation and travel management received during public scoping are either already in the existing RMP language from 2015 and 2019 or are not RMP-level decisions. Such actions would be consistent with existing management or are not applicable at the RMP-level so no changes in RMP management actions need to be considered. The BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use. The 2015 and 2019 travel and transportation management decisions were not identified as needing amendment.

As noted, the travel and transportation allocations of open, limited, and closed are not being addressed by this RMPA. Nor does the RMPA make any implementation level travel and transportation decisions and, as such, is not addressing any existing travel and transportation plans. However, changes in HMA boundaries in the alternatives and the Proposed RMP Amendment could potentially change areas where the 2015 and 2019 RMP Amendment allocations are applied. For example, an area that is currently open (and not designated as an open off-highway vehicle area) could become limited due to an area that was not previously identified as habitat (in 2015 or 2019) and is identified as either GHMA or PHMA in an alternative (including the Proposed RMP Amendment) in this RMPA. Areas that are identified as GHMA and PHMA follow the limited allocation and management direction identified in the 2015 and 2019 Amendments. The effects of the HMA boundaries on travel and transportation allocations, by state, are described in the Transportation and Travel Management sections in Appendix 10 and Chapter 4, and in Appendix 9, Tables 4-4 – 4-7.

Summary: The BLM should update and clarify the analysis on travel and transportation management, including how maintenance on existing roads would be considered, clarification of how RS2477 would be considered, and estimates of the number of GRSG vehicle collisions.

Response: BLM has revised language in the RMP Amendment and EIS affected environment and effects analysis for clarity including updates to sections 3.20 in Chapter 3 and 4.21.20 based on comments received.

Chapter 2, Table 2-1, Alternatives Considered but Not Analyzed in Detail explains why travel and recreation were not carried forward as issues for rangewide amendment (refer to comment response above). The BLM is not proposing to amend the 2015 GRSG RMP Amendment management direction for travel and transportation. The existing management direction that limits OHV use to existing roads in GHMA and PHMA remains in place. The effects of changes in HMA allocations across the alternatives and how that would change the manner of travel and transportation allocations has been added to the effects analysis in Chapter 4 and Appendix 10. The BLM's existing 2015 GRSG RMP Amendment management direction does not propose OHV closures and none are being proposed in this RMP Amendment. In the Draft RMPA/EIS Section 4.21.1 (Final EIS Appendix 10, Section 10.21.1 analyzes the potential for GRSG injury or mortality from vehicle collisions.

Summary: Road and transportation management in the RMPA is overly restrictive, not in compliance with several laws, and would have adverse effects on different types of developments.

Response: The BLM is not proposing to amend the 2015 GRSG RMP Amendment management direction for travel and transportation. The existing management direction that limits OHV use to existing roads in GHMA and PHMA remains in place. The effects of changes in HMA allocations across the alternatives and how that would change the manner of travel and transportation allocations has been added to the effects analysis in Chapter 4, Section 4.2 and Appendix 10, Section 10.2. The BLM's existing 2015 GRSG RMP Amendment management direction does not propose OHV closures and none are being proposed in this RMP Amendment. BLM's existing OHV management direction is fully compliant with existing laws, policies, and regulations. In the analysis the BLM recognizes that restrictions to major ROWs or other development could limit future creation of roads or ancillary facilities, however there is no proposal to close any current areas. There is nothing proposed that prohibits the maintenance of existing authorized roads.

Summary: The BLM should evaluate open OHV areas and unauthorized user-created routes to maintain recreation access.

Response: The BLM is not proposing to amend the 2015 GRSG RMP Amendment management direction for travel and transportation. The existing management direction that limits OHV use to existing roads in GHMA and PHMA remains in place. The effects of changes in HMA allocations across the alternatives and how that would change the manner of travel and transportation allocations has been added to the effects analysis in Chapter 4, Section 4.2, and Appendix 10, Section 10.2. The HMA allocations in Colorado, Idaho, Montana, and Wyoming would not change the OHV allocations currently in place under any of the alternatives, and, therefore, there are no anticipated effects by alternative and thus no effects are expected in those states (Refer to Appendix 9, Table 4-4).

In Nevada/California there is an increase in open areas when compared with the existing condition under Alternative 1 in all alternatives except Alternative 3, where there is a decrease in open areas (refer to Table 4-5 in Appendix 9). The increase in open areas is greatest under Alternative 4. Alternatives 5 and 6 both increase open areas by approximately two million acres (refer to Table 4-5 in Appendix 9). The fact that these areas are identified as open means they have moved from habitat to non-habitat, so there are no anticipated direct effects to GRSG or GRSG habitat by this increase in open areas and corresponding decrease in areas that are limited to existing routes. There could, however, be indirect effects to nearby habitat from potential increases in areas open to cross-country use.

In Oregon there is decrease in open areas and corresponding increase in limited areas from the existing acres in Alternative 1 in all of the alternatives except Alternative 2 (refer to Table 4-6). The largest decrease

in open areas occurs under Alternatives 5, 6, and the Proposed RMP Amendment with approximately 600,000 fewer acres identified as open. Under 4 and 5, there are approximately 500,000 fewer acres allocated as open. These decreases in open areas in what is identified as habitat under alternatives 3, 4, 5, 6, and the Proposed RMP Amendment would reduce impacts from cross country OHV use to GRSG and GRSG habitat from the potential noise and disturbance effects from cross-country travel. In Utah, like Oregon, there is a decrease in the amount of OHV areas that are open and a corresponding increase in areas that are limited as a result of changes in HMA allocations. The decrease in open areas is greatest under Alternative 3 followed by Alternative 4, and the Proposed RMP Amendment (refer to Table 4-7 in Appendix 9). These reductions in areas open to cross country OHV use would reduce negative impacts from noise and disturbance to GRSG and GRSG habitat.

22.2.41 Tribal Interests

Summary: The BLM should ensure that all relevant Tribes are engaged in the process, as they have previously requested inclusion in Sage-Grouse management efforts and have expressed concerns about the lack of consultation.

Response: Tribal consultation efforts are described in Section 5.2.1 of the Final EIS. As stated there, the BLM contacted Tribes in a variety of methods, twice mailing letters to 53 Federally recognized Tribes within or with cultural interest in the planning area notifying them of the effort. These letters provided a summary of the project and invited them to participation in government-to-government consultation and to be cooperating agencies in the planning effort. Subsequent outreach continued through emails, phone calls, and meetings with Tribal personnel, as they have expressed interest. Through these efforts, the BLM has and will continue to invite formal consultation on this process with interested Tribes. On September 4, 2024, the BLM held an online information session for Tribal governments to provide an update on the development of the Proposed RMPA/Final EIS.

In Colorado, the Ute Indian Tribe of the Uintah and Ouray Reservation expressed an interest in formal, government-to-government consultation and it was held during biannual consultation meetings in April 2023, August 2023, and April 2024. The Ute Mountain Ute Tribe was also present at these consultation meetings. In Nevada, formal, government-to-government consultation occurred with the following Tribes: Battle Mountain Band of the Te-Moak Tribe, Duckwater Shoshone Tribe, Lovelock Paiute Tribe, Modoc Nation, Reno-Sparks Indian Colony, Summit Lake Paiute Tribe, Timbisha Shoshone Tribe, Walker River Paiute Tribe, Yerington Paiute Tribe, and the Yomba Shoshone Tribe. In the other participating states, no formal, government-to-government consultation was requested.

Summary: The BLM should select Alternative 5, as it aligns with tribal land management goals and policies by balancing GRSG conservation with other land uses, including energy development.

Response: As described in Chapter 2, the BLM considered a reasonable range of alternatives for GRSG conservation during the planning process in full compliance with NEPA. The BLM analyzed six alternatives in detail in the Draft RMPA/EIS and identified Alternative 5 as the preferred alternative. In the Proposed RMP Amendment/Final EIS, the BLM has developed a seventh alternative, the Proposed RMP Amendment that draws on management direction from several of the alternatives analyzed in the Draft EIS including Alternative 5. As stated in Chapter 1, Section 1.6, the BLM will comply with all applicable laws and regulations, including Secretarial Order 3206. The BLM will continue to work collaboratively with Tribes as the RMPA is implemented.

Summary: The BLM should consider the suggested edits to the Tribal Interests section, such as adding Alternative 6 impacts and clarification that residential development does not occur on BLM administered lands.

Response: BLM has revised language in the RMP Amendment and EIS for clarity including updates to Appendix 10, Section 10.17 and Chapter 4, Section 4.21.17 based on comments received.

22.2.42 Vegetation

Summary: The BLM should incorporate and analyze conifer removal and incorporate more recent research about the effects of conifer encroachment.

Response: Vegetation treatments, including juniper removal, are not proposed rangewide in this RMPA/EIS. Chapter 2, Table 2-1, Alternatives Considered but Not Analyzed in Detail describes why vegetation management is not analyzed in detail during this RMPA. The 2015 GRSG RMPA included substantial vegetation/habitat management strategies in GRSG habitat. This included documentation before using sagebrush reduction treatment types and prescribed fire. Where pinyon/juniper encroachment is a concern management actions focused where treatments should be prioritized. Existing management also includes the critical need to coordinate treatments with partners, incorporate GRSG habitat objectives in monitoring treatments, and considers an array of treatment types to achieve GRSG habitat objectives, including the ability to consider the use of targeted livestock grazing. These actions were presented in the context of managing for GSRG habitat considering biological and ecological resistance and resilience when planning and applying treatments.

Because the 2015 management actions provided these sideboards, considerations, and desired conditions, few, if any changes to these actions were made in the 2019 RMPA effort. Similarly, after reviewing existing management actions, in context of new science, existing RMP management actions for vegetation/habitat management strategies are sufficient, and no changes need to be considered. The BLM is only proposing to amend a subset of 2015 and 2019 GRSG RMP Amendment decisions that the BLM found were not sufficiently and appropriately addressed and that did not need to be updated based on new scientific information or changes in land use. The 2015 and 2019 vegetation/habitat management decisions were not identified as needing amendment.

Summary: The BLM should consider provided GRSG data and management actions for vegetation treatments, including addressing site-specific potential and conditions when conducting vegetation treatments.

Response: Site-specific potential and conditions will be incorporated as decisions are implemented on a project-by-project or site-level basis. Please note that implementation level decisions - such as specific vegetation treatments for specific areas - are not part of this land use planning process. The 2015 GRSG RMPA included substantial vegetation/habitat management strategies in GRSG habitat. This included documentation before using sagebrush reduction treatment types and prescribed fire. Where pinyon/juniper encroachment is a concern management actions focused where treatments should be prioritized. Existing management also includes the critical need to coordinate treatments with partners, incorporate GRSG habitat objectives in monitoring treatments, and considers an array of treatment types to achieve GRSG habitat objectives, including the ability to consider the use of targeted livestock grazing. These actions were presented in the context of managing for GSRG habitat considering biological and ecological resistance and resilience when planning and applying treatments.

Because the 2015 management actions provided these sideboards, considerations, and desired conditions, few, if any changes to these actions were made in the 2019 RMPA effort. Similarly, after reviewing existing management actions, in context of new science, existing RMP management actions for vegetation/habitat management strategies are sufficient, and no changes need to be considered.

Summary: The EIS should incorporate citations and language changes related to vegetation impacts, including specific sub-species of big sagebrush and 3-tip sagebrush, and addition of ecological site descriptions, and associated state and transition models.

Response: Commenters asked for additional detail that is either not relevant to the current proposed management or not needed to make an informed plan-level decision. Such detail may be more appropriate for site-scale planning and decisions. Vegetation management wouldn't be restricted under Alternative 3. Vegetation management has been brought forward from the 2015 plans. Cheatgrass and other non-native invasive annual grasses are analyzed in Chapters 3 and 4 for GRSG, Vegetation, Wildland Fire Ecology and Management, Special Status Species, and Soil Resources. The BLM did make several revisions to Sections 4.3 and 4.21 of the EIS based on suggestions from commenters.

The DEIS is clear that GRSG are considered a sagebrush ecosystem-obligate species; they rely on sagebrush on a landscape level and on a micro-habitat scale for their survival. Throughout the document, Sagebrush ecosystems are described as comprised of sagebrush–steppe and Great Basin sagebrush which contain various plant species composition. And that GRSG distribution is strongly correlated with the distribution of sagebrush habitats (Schroeder et al. 2004; Connelly et al. 2011b; Doherty et al. 2016), especially with big sagebrush (e.g., Wyoming big sagebrush, mountain big sagebrush, and basin big sagebrush) (Braun et al. 1976; Connelly et al. 2000; Connelly et al. 2004; Miller et al. 2011). The DEIS does not list every plant species or subspecies which GRSG may use throughout its range or lifetime.

The Ecological Site Descriptions (ESDs) do not inform whether vegetation conditions are providing for GRSG needs. As described in the benchmarks and indicators appendix, ESDs and State and Transition Models s should help inform whether an area is capable of providing certain vegetation conditions, but not if the present conditions are providing for GRSG habitat needs.

Summary: The EIS should provide additional information about special status vegetation.

Response: Special status species are analyzed in the DEIS in Chapter 3, Section 3.6 and Chapter 4.6 and in the Proposed RMP Amendment/Final EIS in Appendix 10, Section 10.6 and Chapter 4, Section 4.6. Categories of special status species are the following:

- Federally listed threatened and endangered species and designated critical habitats
- Federally proposed species and proposed critical habitats
- Federal candidate species
- BLM sensitive species

The full list of all species included above can be found in Appendix 11 of the Draft RMPA/EIS and Proposed RMP Amendment/Final EIS.

Summary: The BLM should propose noxious weed management as a part of this process.

Response: Chapter 2, Table 2-1, Alternatives Considered but Not Analyzed in Detail addresses why these management actions are not addressed in this RMPA. Reviewing existing wildland fire and invasive species

RMP management action shows existing wildland fire and invasive species management action are sufficient for RMP-level decision-making, and no changes need to be considered.

While changes to existing wildland and invasive species management actions will not be considered, changes to other management actions will be considered based on the threats from wildland fire and invasive species. Management actions that could limit the potential for ignition sources or the prevalence of or spread of fine fuels and invasives that contribute to uncharacteristically large and intense wildfires will be considered. The effect of wildland fire on GRSG habitat quantity and quality will also be considered when evaluating habitat management areas. This includes the potential for habitat management areas to be durable in the face of changing conditions associated with climate change. The potential effects of the alternatives on the number, size and intensity of wildfires and the spread of invasive species and their impacts on GRSG habitat quality and quantity are considered in this EIS in Chapter 4 and Appendix 10.

Required design features for invasive weeds remain in place from existing 2015 and 2019 GRSG RMP Amendments Invasive species management is an implementation-level topic for the purposes of this RMPA/EIS process. Specific treatment techniques, target species, and restoration seed-mixes may vary across the range and would depend on local conditions and would be analyzed in a site-specific proposal.

Summary: BLM should establish range-wide requirements associated with vegetation and restoration plan components

Response: Chapter 2, Table 2-1, Alternatives Considered but Not Analyzed in Detail addresses why these management actions are not addressed in this RMPA. Refer to comment summary and response above.

Summary: The BLM should revise the BMP language in Appendix 15 language pertaining to implementation of livestock grazing rest periods for an undefined amount of time after vegetation treatments.

Response: For the Best Management Practice being referenced, the recommendation is not to rest areas for an undefined amount of time. The areas in question should be rested from livestock grazing until resource monitoring data verifies the treatment objectives specific to the purposes of the treatment are being met and an appropriate grazing regime has been developed.

Summary: The BLM should refine percent utilization to be determined by site condition, time of use, etc. rather than by species dominant habitat parameters. For example, it is a gross misjudgment to say that all Wyoming Basin big sage habitat only has an allowable percent utilization of 35% when some Wyoming Basin big stage stands pose the greatest wildfire risk and should be utilized more than 35% to mitigate that risk.

Response: While it is not clear what specifically the commenter is pointing to - a search of the Draft RMPA/EIS shows that the only reference to 35% utilization of Wyoming Basin big sage is in Appendix 2 - Section 2.12 which outlines Existing GRSG RMP Management in Nevada and Northeastern California. These references are pointing to current management decisions from the 2015 and 2019 GRSG RMP Amendments. By contrast, the associated Management Action in the current ARMP/EIS process is Management Action RM-2 which is described in the DEIS Draft Alternatives Table 2-12 and does not include specific utilization percentages. Instead, it outlines that the BLM should use criteria identified in the Sage-Grouse Habitat Assessment Framework and other BLM approved methodology to provide multiple lines of evidence for determining whether vegetation structure, condition, and composition are meeting or making significant progress towards meeting the Land Health Standards, referencing the appropriate ecological site description, associated State and Transition Model and existing ecological condition information.

22.2.43 Water Resources

Summary: The BLM should revise the discussion of existing conditions and impacts on water quality, such as the effects from woody invasive plants, impacts from non-motorized recreation, the potential to shift surface disturbance and associated impacts on water resources from BLM lands to state, tribal or private lands. In addition, the BLM should acknowledge that states manage water rights.

Response: As described under Best Available Information and Baseline Data, the BLM considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land use plan-level.

The BLM made several changes to Chapter 3, Sections 3.15, Appendix 10, Sections 10.15, and 10.21 in the Final EIS, including acknowledging additional sources of degradation and impacts and the potential to push impacts off BLM lands to other lands.

The BLM complies with state water law to the extent it does not conflict with federal law and honors existing water rights. The details for implementing water related design features will be made during implementation. The Proposed RMP Amendment/Final EIS Section 3.15.1 states: "States issue water rights for various beneficial uses for both groundwater and surface water. ... The BLM authorizes development of water-related infrastructure, such as ROWs, on BLM-administered lands, enabling applicants to apply water to beneficial use." Adjudicated RS2339 are considered valid existing rights.

22.2.44 Wild Horse and Burro Management

Summary: BLM should follow the 1971 Wild, Free-Roaming Horses and Burros Act.

Response: The BLM complied with all applicable laws in developing this Proposed RMP Amendment, including the Wild, Free-Roaming Horses and Burros Act of 1971.

Summary: The BLM should address identified issues with the analysis of GRSG interactions with wild horses and burros (WH&B) and provide additional science.

Response: The Draft RMPA/EEIS provides a range of WH&B management alternatives for analysis. The BLM strives to manage WH&B populations within AML because we are required to do so by the Wild Free-roaming Horses and Burros Act and by federal regulations. As analyzed in the EIS, wild horse presence, particularly when herds are at levels greater than appropriate management levels, can lead to impacts on the quality of GRSG habitat, and GRSG behavior and population demography. The types of effects that different large herbivores can have on rangeland ecosystems can be similar, even while the specific magnitude and spatial distribution of those effects may vary from species to species. The analysis did not in any way state that wild horses ana burros are the sole source of impacts to GRSG, nor did the analysis conclude that all such impacts are identical across all large herbivores. Reducing the magnitude of any of the uses or resources that impact GRSG has the potential to reduce the negative impacts.

The BLM utilized the best available science to analyze the impacts of WH&B populations on GRSG habitat - including research that documented overall reduction in time spent by other wild species at water sources where wild horses were present (Perry et al. 2015, Hall et al 2016); evidence that wild horses can cause behavioral disruptions to GRSG (Muñoz et al. 2020); and scientific summaries of effects such as wild horse influences on vegetation, water quality, and riparian areas (i.e., Beever and Aldridge 2011, Crist et al. 2019). One could speculate about what factors do or do not lead wild horses to limit water access for wildlife species (i.e., overall levels of water availability in the landscape), but such speculation does not mean that this type of negative interaction does not exist. Wild horses do have the capacity to travel long distances in

between watering, as noted in Crist et al. (2019). However, that does not mean that the impacts to riparian areas (or any other vicinity of water sources) are negligible. Such effects can reasonably be expected to increase at least in proportion to herd size.

Summary: There is not scientific evidence showing that wild horses and burros affect GRSG. The EIS overstates the adverse effects of wild horses and burros on GRSG and should acknowledge the beneficial effects. Wild horses and burros have legal protections and thus an alternative that removes them is not valid.

Response: As described under Best Available Information and Baseline Data, the BLM considered the availability of data from all sources, adequacy of existing data, data gaps, and the type of data necessary to support informed management decisions at the land use plan-level.

The DEIS provides a range of WH&B management alternatives for analysis. As analyzed in the EIS, wild horse presence, particularly when herds are at levels greater than appropriate management levels, can lead to impacts on the quality of GRSG habitat (i.e., Beever and Aldridge 2011), is associated with changes in GRSG behaviors (i.e., Muñoz et al. 2020), and can cause GRSG population-level declines (i.e., Coates et al 2021). Conversely, the BLM is not aware of any credible studies that have documented improved GRSG demographic rates as a function of increasing wild horse presence. The types of effects that different large herbivores can have on rangeland ecosystems can be similar, even while the specific magnitude and spatial distribution of those effects may vary from species to species. The analysis did not state that wild horses and burros are the sole source of impacts to GRSG, nor did the analysis conclude that all such impacts are identical across all large herbivores. Reducing any of the uses or resources that impact GRSG has the potential to reduce the negative impacts.

The BLM protects, manages, and controls wild horses in accordance with the Wild, Free-Roaming Horses and Burros Act of 1971 (Public Law 92-195, as amended), which requires the agency to "manage wild, free-roaming horses and burros in a manner that is designed to achieve and maintain a thriving natural ecological balance on the public lands." FLPMA further directs the BLM to manage wild horses and burros as one of numerous multiple uses including mining, recreation, domestic grazing, and fish and wildlife. Along with the Public Range Improvement Act (PRIA) of 1978, these laws allow for the reduction of wild horses and burros on BLM-administered lands, when appropriate. Regulatory and policy guidance to BLM management of wild horses and burros is found in 43 CFR 4700, Protection, Management, and Control of Wild Free-roaming Horses and Burros, and BLM Handbook H-4700-1, Wild Horses and Burros Management Handbook.

Summary: The BLM should change management of wild horses and burros within GRSG habitat. How will the BLM implement the changes proposed in the RMPA/EIS? The BLM should acknowledge the applicable laws and regulations.

Response: As defined in the BLM's Land Use Planning Handbook (H-1601), BLM makes two types of decisions, Land Use Plan-level decisions, which establish desired outcomes and actions needed to achieve them, reached using the planning process in 43 CFR 1600, and implementation-level decisions, which are decisions that take action to implement land use plan decisions. No implementation-level decisions are under consideration as part of the RMP Amendment effort.

This comment pertains to an implementation-level decision and is therefore outside the scope of the RMP Amendment and EIS, such as designating ranges that contain both wild horses and burros and PHMA for sage grouse as "Wild Horse and/or Burro Ranges", revisiting the scientific basis for AMLs, developing local

drought contingency plans, and prioritizing horse removals focused on critical Sage grouse habitat. Details regarding implementation are not plan-level decisions. No change has been made.

Summary: The EIS should clarify impacts on and from wild horses and burros and acknowledge additional impacts caused by wild horses and burros, including how the BLM plans to provide water for free-roaming horses and burros.

Response: The BLM has revised language in the RMP Amendment and EIS for clarity, incorporating several suggestions from commenters. The Draft RMPA/EIS Section 3.7 does not say that that the Wild and Free-Roaming Horses Act of 1971, as amended by FLPMA and the Public Range Land Improvement, requires that BLM provide water for free-roaming horses and burros. The section states, "The BLM periodically evaluates each HA to determine if it has adequate food, water, cover, and space to sustain healthy and diverse wild horse and burro populations over the long-term. The BLM may designate an appropriate management level (AML) and specifies an allowable range in horse numbers for each WHB HMA based upon available forage and other resources necessary to sustain the horse or burro populations, as well as resource objectives and other designated uses of the BLM-administered lands."

Summary: The EIS should include an appendix for wild horse and burro management.

Response: An appendix for wild horse and burro management was determined unnecessary since the changes and rationale could be succinctly incorporated into Chapter 2 of the Draft RMPA/EIS. A livestock grazing appendix was needed to further explain the changes and management and this language could not fit in the body of the RMPA/EIS without exceeding page limitations.

Summary: Use of the GonaCon-Equine vaccine is not safe.

Response: This comment pertains to an implementation-level decision and is therefore outside the scope of this RMPA/EIS. The EIS does not propose any decisions regarding the use of the GonaCon-Equine vaccine. No change has been made.

Summary: A recent court decision may affect the BLM's ability to conduct wild horse and burro gathers.

Response: Wild horse gathers are an implementation decision and outside the scope of this land use planning process. The BLM will comply with applicable laws, policies, and court rulings regarding wild horse and burro gathers.

Summary: The BLM should consider alternative recommendations to manage effects on GRSG from wild horses and burros.

Response: NEPA directs the BLM to analyze a range of reasonable alternatives for management, based on the Purpose and Need, as outlined in Chapter 2, sections 2.1- 2.5. As noted, the preferred alternative in the Draft EIS was Alternative 5, but that is not the BLM's final decision about management of BLM lands. BLM retains the discretion to make a reasoned choice among the alternatives in a final decision for management based on public comments and the analysis. Furthermore, BLM considered alternatives and issues during scoping that the agency determined not to carry forward, as detailed in Section 2.3.

Some wild horse and burro management would be carried forward from the 2015 ARMPAs (see Appendix 2 of the RMPA/EIS). Further, the BLM has additional tools for wild horse and burro management outside of land use plan direction. As such, the alternatives in this EIS would adequately address impacts to GRSG from wild horses and burros.

22.2.45 Wildland Fire Ecology and Management

Summary: The alternatives do not address the threat of wildfire.

Response: The 2015 GRSG ARMPAs addressed wildfire management and collaboration to address that important issue. Those actions have not been changed through previous efforts or this RMPA and thus they would continue to be implemented regardless of which alternative is chosen in this RMPA.

Summary: The analysis mischaracterizes the magnitude of the threat of wildland fire on GRSG.

Response: The BLM has clarified the role of fire as suggested by several commenters. As noted in the previous comment response, the BLM's management of fire in GRSG habitats was addressed in the 2015 ARMPAs and remains unchanged.

Summary: The EIS lacks mention of fire and fuels management actions retained from 2015 and 2019 plans.

Response: Appendix 2 in the Draft RMPA/EIS lists the management actions from the 2015 and 2019 plans that would remain unchanged through this RMPA.

Summary: The BLM should reference litigation regarding efforts to establish fuel and fire breaks across the west.

Response: The EIS references existing considerations for fuels management within the planning area. Consideration of pending litigation is outside the scope of this analysis and a decision has not been issued in the referenced litigation, thus the BLM has not considered the litigation in the EIS. The BLM will comply with applicable laws, policies, and court rulings regarding fuels management.

22.3 STATE-SPECIFIC COMMENT RESPONSES

22.3.1 Idaho

Summary: The BLM should update and clarify the analysis, including how the BLM would address developed agriculture, a key driver of Idaho's economy.

Response: Several commenters' concerns have been addressed with the Proposed RMP Amendment under Idaho-Additional Management Direction. Since agriculture does not occur on BLM-administered lands, direct impacts on agriculture are not analyzed in the EIS. However, some socioeconomic impacts on the agricultural sector are described in Appendix 10, Section 10.12, Social and Economic Conditions (Including Environmental Justice) and Appendix 18. Impacts on environmental justice are described in Section 10.12, Social and Economic Conditions (Including Environmental Justice) and in Chapter 4, Section 4.12.

Summary: The BLM should exclude Caldwell Canyon Mine from conservation measures.

Response: In the Proposed RMPA/Final EIS Section 1.9 was added, which details how the BLM anticipates applying this RMPA to ongoing actions. To maintain the orderly administration and management of the public lands, the BLM will be consistent with the GRSG Approved Plan RMP Amendments RODs unless the BLM issues a Draft EIS or Environmental Assessment for the project before the publication of the GRSG Approved RMP Amendments RODs. In addition, Section 1.9 of the Proposed RMP Amendment/Final EIS includes a list of projects that will not be subject to the decisions made in the GRSG Approved RMP Amendment RODs. This list includes Caldwell Canyon Revised Mine and Reclamation Plan (DOI-BLM-I000-2024-00041-EIS).

Summary: The BLM should issue a standalone management decision for PHMA, IHMA, and GHMA to be open to free use permitting for road-maintenance related sand and gravel pits.

Response: BLM Idaho has considered this carefully and discussed on multiple occasions with BLM Idaho leadership, State of Idaho, and other Cooperating Agencies. The Proposed RMP Amendment incorporates some of these suggestions (or slightly modified) under the previous MD MR 11. There will not be a separate MD for this but under Saleable Minerals.

Summary: An exception should be provided to allow for new and expansion of free use permits in IHMA.

Response: BLM Idaho has been working closely with the State of Idaho and other cooperating agencies to clarify this language in the Proposed RMP Amendment.

Summary: Additional information should be provided for readers to understand how protective lek buffers in Idaho would be applied if the lek itself is not on BLM administered lands.

Response: Even if a lek is not on BLM lands, there is a chance that the associated buffer could be. Whether a lek is on BLM land or not, a buffer would be applied to active and pending active leks within HMA (regardless of land ownership). Therefore, if a buffer or part of a buffer falls on BLM lands, BLM management would apply within the buffer on BLM lands.

Summary: The BLM should recognize the importance of agriculture to Idaho's economy, culture, and identity.

Response: The BLM has discussed impacts on agriculture in Section 4.12, Social and Economic Conditions.

22.3.2 Montana

Summary: Limit or prohibit fluid mineral leasing and development in the Upper Missouri Headwaters.

Response: Sage-Grouse HMAs in the Upper Missouri Headwaters in Southwest Montana would be closed to fluid mineral leasing under Alternatives 3, and PHMA would be subject to a NSO stipulation in Alternative 4, 5, 6, and the Proposed RMP Amendment (along with other limitations on development). The GRSG Plan amendment does not cover all of the BLM identified Missouri Headwaters Restoration Landscape and addressing leasing for the whole area would be outside the scope of the analysis.

Summary: Previous efforts in Montana determined that ACECs were not required to protect GRSG habitat.

Response: As described under ACECs and RNAs, the BLM has evaluated ACECs as described in Appendix 5, Areas of Critical Environmental Concern for Greater Sage-grouse Habitat. Potential ACECs were evaluated for designation in Alternative 3 and 6if they met both the relevance and importance criteria described in 43 CFR 1610.7-2 and BLM Manual 1613. In order to be designated as an ACEC, special management must be necessary to protect and prevent irreparable damage to those values. The Proposed RMP Amendment does not propose to designate any ACECs.

Summary: The BLM should include additional areas as HMAs in Montana or adjust the designations of specific areas.

Response: The BLM has reviewed the HMAs considered under the alternatives in the Draft RMPA/EIS. HMAs have been revised in coordination with Montana Fish Wildlife and Parks (MTFWP), Montana Sage

Grouse Habitat Conservation Program, and other cooperating agencies to capture key limiting and important habitats for GRSG. In addition to PHMA and GHMA in the Montana/Dakotas, the following HMAs have been identified in the Montana/Dakotas and are described in detail in Chapter 2, Table 2-3:

Unique HMAs: Areas identified that need different objectives or management to address unique challenges. These include three areas:

- **Little Missouri HMA**: Identified core area by the states of Montana and North Dakota. This area contained high-quality GRSG habitat in Montana and encompasses the remaining GRSG habitat in North Dakota.
- **South Carter HMA:** Identified core area by the state of Montana. However, this area is primarily developed or existing bentonite claims. Unique management is needed to balance GRSG habitat and mineral development, in the short term, while planning for longer-term reclamation.
- **Connectivity HMA**: Areas that provide regions of connectivity important to facilitate the movement of GRSG and maintain ecological processes, including between priority populations, adjacent states, and across international borders, including but not limited to Montana Connectivity areas.

The Carter-Crook area is designated as PHMA and will receive the associated management direction and allocations for PHMA described in Chapter 2, Table 2-5. Due to existing development and valid existing rights the BLM is unable to apply any additional restrictions, but we commit to working with project proponents on any new proposals to conserve the connectivity, and to restore habitats in that area as possible.

Summary: Alternative 5 ROW restrictions for major and minor ROWs would be more restrictive in Montana than in other states.

Response: As described under Range of Alternatives, the BLM considered the management opportunities presented in the planning issues and criteria developed during the scoping process to determine a range of alternatives. Differing management would be applied under each alternative, with some alternatives being less restrictive to ROWs than other alternatives. What is included in the Proposed RMP Amendment for Lands and Realty management actions is consistent with the State of Montana requirements.

22.3.3 Nevada/California

Summary: There are potential conflicts in Nevada between the location of proposed ACECs and existing and potential mining projects.

Response: ACEC management identified in the DEIS does not prevent or preclude current or future mining projects. ACEC boundary delineations can include consideration of active or future disturbances, which can increase the importance of surrounding non-disturbed habitat. The Proposed RMP Amendment does not propose to designate any ACECs.

Summary: The Nevada Conservation Credit System (CCS) is inadequate and does not account for or mitigate many of the impacts on GRSG.

Response: The BLM does not administer the CCS. The EIS acknowledges in the cumulative impacts section (Section 4.21 of the Draft RMPA/EIS) that the CCS is another mitigation tool applied by the state which may reduce impacts on certain resources. The BLM will continue working with the state and counties to the

extent possible and appropriate as projects are proposed. The Proposed RMP Amendment does not propose to designate any ACECs.

Summary: The BLM should have consulted with the Nevada Sagebrush Ecosystem Council (SEC) as a part of the RMPA/EIS process.

Response: The Sagebrush Ecosystem Council does not meet the regulatory definition of a cooperating agency. The Governor's initial executive order that created the SEC, includes that the committee "shall provide the Governor recommendations on policies and action" and does not have the jurisdiction by law to apply specific policies. The SEC is represented by the Nevada Department of Conservation and Natural Resources, which is a Cooperating Agency. Nonetheless, BLM coordinated with the SEC on specific topics included in the DEIS, such as habitat mapping, and provided presentations to the SEC regarding the DEIS and soliciting review.

Summary: The BLM should publish a supplemental EIS for Nevada because of the changes in habitat data.

Response: As described in DEIS Appendix 3 Section 3.4, the BLM anticipated using the updated data in the development of the Proposed RMPA/Final EIS.

"In late 2022, the BLM worked with the USGS and other state, local, and federal partners to begin updating the 2016 HMA model. This update is consistent with the approach from the previous two efforts while also incorporating new data and information related to habitat selection and space use. It also includes survival rates during reproductive life stages and specific seasons (e.g., brood-rearing or winter) and identifies corridors that link seasonal habitats. This update allows areas of high importance to current population dynamics (i.e., source areas) to be mapped. The final version of the USGS HMA model was not published in time for inclusion in the BLM's 2024 Draft EIS. However, USGS provided BLM with unpublished results for use in preparing the Draft EIS range of alternatives and impact analyses. This ensured that the BLM was using the best science available at the time."

USGS published their report with the final model on March 22, 2024, and that data have been incorporated into the Proposed RMP Amendment/Final EIS. The acres from the final USGS model fall within the range of HMA acres analyzed across the alternatives in the DEIS. Updating HMAs with the now-published USGS data resulted in some areas becoming HMA that were not analyzed as such in the Draft RMPA/EIS. This is limited to 41,936 acres of PHMA (0.24% of PHMA identified on NV/CA BLM-administered lands only), 233,840 acres of GHMA (1.35%), and 1,142,018 acres of OHMA (6.58%). These changes reflect consideration and application of new GRSG information based on data received since publication of the Draft RMPA/EIS.

The BLM has determined that this updated information does not constitute a substantial change to the alternatives or the environmental effects analysis.

22.3.4 Oregon

Summary: The BLM should include an alternative that includes the following Oregon ACEC nominations received during either scoping or the comment period on the Draft EIS:

- All areas within PHMA
- McDermitt Caldera
- Firestone Basin
- Ibex Butte
- Packsaddle Draw-Horseshoe Ridge

- Coyote Hills
- Irish Hill-Big Lake
- Catlow Valley
- Beatys Butte
- Riddle Creek
- West Steens
- Grassy Ridge
- Oregon Canyon Mountains
- Hog Creek Ridge
- Star Mountain
- Louse Canyon
- Table Mountain
- Juniper Ridge
- aa-Tiipi Flat

The BLM should also include an alternative that includes nominations for ACECs in Oregon previously evaluated in the 2015 Oregon RMP Amendment:

- Willow
- Virtue Flat
- Trout Creek
- Star Mountain
- Red Hills
- Lone Mountain
- Jackass
- Goose
- Frederick Butte
- East Warner
- Diable Peak
- Cow Creek
- Corner
- Buck Creek
- Beatys Butte
- Antelope
- Abert Rim

Response: The BLM reviewed all of the nominations received during the scoping and during the Draft EIS comment period The BLM considered areas identified as PHMA in Oregon as well as previously identified Oregon Sagebrush Focal Areas and Priority Areas of Conservation in order to determine if any areas within Oregon that were either newly nominated or previously nominated and evaluated in the 2015 RMP Amendment met the relevance and importance criteria. BLM Oregon's ACEC review, assessment, and evaluation process focused on the new GRSG scientific information on key population (e.g., Doherty et al. 2016, Coates et al., 2021), genetic (e.g., Cross et al., 2018, Oyler-McCance et al., 2022) connectivity (e.g., Row et al. 2018, Cross et al., 2023) habitat (e.g., Doherty et al., 2016, Wann et al., 2022, Doherty et al.,

2022) and climate change (Palmquist et al., 2021, Rigge et al., 2021) and coordinated with state authorities (such as wildlife agencies) to identify and update GRSG habitat management areas (HMA).

The BLM Oregon assessment considered all existing, designated ACECs and Research Natural Areas when located in PHMA (existing and new/proposed). This 2023 BLM Oregon review and assessment of all PHMA/PACs also included many of the proposed, analyzed, and not-designated ACEC areas from the 2014/2015 EIS alternatives (when located in existing or new PHMA and assessing based only on the new science information). During the assessment process BLM Oregon discussed and coordinated cross border issues and locations with the BLM Nevada and BLM Idaho. The BLM Oregon also discussed potential ACEC locations/areas using populations and habitat criteria with the Oregon Department of Fish and Wildlife during the assessment process. The BLM Oregon ACEC review, assessment, and evaluation process did not consider or consider in detail potential historic, cultural, scenic, or non-GRSG fish and wildlife values in accordance with the purpose and need for this planning effort. Nominations that addressed resource values beyond GRSG will be considered by the BLM during future planning efforts pursuant to 43 CFR 1610.7-2.

The BLM Oregon assessment process for all PHMA (existing and proposed) in Oregon resulted in identification of two areas as potentially meeting the relevance and importance criteria. After evaluating the two areas, the team concluded that both areas (Louse Canyon and Soldier Creek) met the relevance criteria for fish and wildlife resource (specific to GRSG and the new science), but that neither area met the importance criteria (more than locally significant). Because none of the nominated areas were identified as having relevance and importance, the BLM did not identify any of the nominated ACECs in Oregon as potential ACECs in the Draft EIS.

Summary: The BLM should keep ungrazed Key RNAs, exclosures, or rest pastures as reference areas to monitor the impacts of livestock grazing on GRSG and to facilitate habitat restoration. Additionally, grazing should not be allowed in areas previously designated as an ACEC since no justification for the removal of the ACEC designation has been provided by the BLM.

Response: As described in Appendix 17, the 2015 Oregon GRSG ARMPA allocated all or portions of 13 Key RNAs in Oregon as unavailable to livestock grazing. The 2019 RMPA reversed that decision and made all or portions of those 13 Key RNAs available to livestock grazing. These decisions affected approximately 22,000 acres within 13 existing, district designated, RNAs. The 2019 RMPA was and remains enjoined by the United States District Court for the District of Idaho and the 2015 ARMPA decision for these 13 Key RNAs remains in effect. In addition, two existing RNAs were designated as Key RNAs in the 2015 planning process. However, these two additional Key RNAs were previously excluded from livestock grazing and neither the 2015 nor 2019 RMP amendment processes proposed changing these underlying district-level land use plan decisions. Both the Foster Flat Key RNA in the Burns District and Guano Creek-Sink Lakes Key RNA in the Lakeview District were, and will remain, allocated as unavailable for livestock grazing. In addition, under the Proposed RMP Amendment, all or portions of the following Key RNAs would be unavailable for livestock grazing: East Fork Trout Creek (Burns District); Fish Creek Rim (Lakeview District); Foley Lake (Lakeview District); Lake Ridge (Vale District); Mahogany Ridge (Vale District); Rahilly-Gravelly (Lakeview District); South Bull Canyon (Vale District); and Toppin Creek Butte (Vale District). On BLM grazing allotments, grazing activities are managed through several mechanisms (permit terms and conditions, allotment management plans, annual pre-turnout authorization meetings, and ongoing monitoring) to ensure that grazing meets or move towards meeting Land Health Standards. Management for meeting land health standards avoids long-term and wide-spread improper grazing. In addition, the Proposed RMP Amendment/Final EIS includes three new 5-acre or less grazing exclosures that would remove livestock use

and other permitted activities to allow for nonmanipulative research and baseline data gathering within or in proximity to the North Ridge Bully Creek, South Ridge Bully Creek, and Spring Mountain key RNAs to acts as ungrazed comparison areas for evaluating effects of livestock on those vegetative communities identified as important for GRSG. This RMP Amendment does not remove nor discourage BLM districts from constructing exclosures, rest pastures, etc. for the purposes of allowing and managing for reference sites.

There is no law, policy, or regulation that prohibits grazing within ACECs or RNAs.

Summary: The BLM should publish a supplemental EIS for Oregon because of the changes in habitat data.

Response: As described in Draft RMPA/EIS Appendix 3 Section 3.5, the BLM anticipated using the updated data in the development of the Proposed RMPA/Final EIS and we did so. Oregon BLM uses the final ODFW habitat designation for PHMA and GHMA in the action alternatives and the Proposed RMP Amendment in the Proposed RMPA/Final EIS. The range of variance between the acres identified between the Draft EIS and the Final EIS were within the range of alternatives analyzed in the Draft EIS. The BLM has determined that this updated information does not constitute a substantial change to the alternatives or the environmental effects analysis.

22.3.5 Wyoming

Summary: Wyoming should be exempt from the 3% disturbance cap.

Response: The preferred alternative and Proposed RMP Amendment include a 5% disturbance cap at the project scale (equivalent to the DDCT assessment area) in Wyoming. Agriculture and fire are included in the calculation of disturbance at the project scale. The disturbance cap is 3% in PHMA at the HAF fine scale in Wyoming, but the calculation of disturbance at this scale does not include agriculture or fire. There is a provision in the Proposed RMP Amendment for addressing situations where the disturbance cap is reached at one scale but not the other.

GRSG are sensitive to increasing levels of anthropogenic disturbance. Recent studies indicate that GRSG will move out of an area when it reaches the 3% threshold (Kirol et al., 2020). Additionally, Knick identified a relationship between disturbance and leks being abandoned. The BLM does appreciate the concern identified, but if disturbance results in loss of greater than 3% of the functional habitat at the broad HAF fine scale, habitat function for GRSG in the area may be lost, and thus it may be difficult for BLM management to be responsive to changing land uses, improve efficiency and effectiveness of GRSG habitat management, provide for consistent conservation across state lines, and provide the BLM with regionally relevant decisions that accord with range-wide GRSG conservation goals.

The DEIS analyzes a range of alternatives for the disturbance cap process. The preferred alternative outlines the relationship between the disturbance cap at the project scale and the HAF Fine Scale habitat selection in Table 2-7.

Summary: The BLM did not evaluate the State of Wyoming's alternative language submitted for adaptive management. TAWS is not appropriate to rely on for adaptive management. The BLM should modify its reliance on TAWS.

Response: The current language explicitly states the BLM will collaborate with the State wildlife agency should a threshold be met considering data and analyses provided by the state (in addition to other available population trend information). TAWS provides a consistent, objective and quantitative tool that allows

comparisons across political boundaries. As stated in the current language, when TAWS demonstrates a population anomaly the State wildlife agency and the BLM will work together to confirm the results of the TAWS. Further, the TAWS itself is not a decision point, but rather a data-driven mechanism to start a conversation with the State wildlife agencies about population status and potential anomalies.

Summary: A Wyoming-specific plan should be developed.

Response: One aim of the RMPA is to ensure consistent GRSG management across the species range. The BLM does not intend to apply the management in the RMPA as a one-size-fits-all approach, but instead includes flexibility throughout the management direction to allow appropriate application of GRSG protections based on State-specific and site-specific conditions.

Summary: The WOGCC, the BLM Wyoming State Office, and the BLM Reservoir Management Group examined methodologies and suggested improvements to the Reasonably Foreseeable Development Scenario methodology for Wyoming. BLM should incorporate these suggestions.

Response: BLM worked with the Wyoming Oil & Gas Conservation Commission (WOGCC) to update well information from Wyoming, and it is important to highlight the difference between the data sources, so the document will clarify that the WOGCC data are considered more accurate but also note that activities such as workovers, recompletions, and wells which were spud but then abandoned, may have some impact on GRSG from the preparation of the drills site and mobilization of the workover or drill rig. BLM will clarify data sources and information used in the final EIS.

22.4 SUBMITTED CORRESPONDENCE

As described in **Section 22.1**, **Table 22-4** provides a list of all publics who submitted comments on the Draft RMPA/EIS and the topics addressed in their correspondence.

Table 22-4. Correspondence Submitted on the Draft RMPA/EIS Containing Unique Content

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
Advocates for Wild Equines Lobby Coalition	BLM-GRSG RMP/EIS-00012	Best available information-baseline data, Wild Horse and Burro Management
Albany County Conservancy	BLM-GRSG RMP/EIS-00062	ACECs and RNAs, Disturbance Cap, Wildland Fire Ecology and Management
Alliance For the Wild Rockies	BLM-GRSG RMP/EIS-00139	Air Resources and Climate Change, Best available information-baseline data, Cumulative Impacts, ESA-(Consultation), Fish and Wildlife, General Consultation (e.g., SHPO, etc.), Greater Sage-grouse, Habitat Objectives, Livestock Grazing, Socioeconomics, Soil Resources, Vegetation, Water Resources
Ambrose, Skip	BLM-GRSG RMP/EIS-00006	Best available information-baseline data
American Clean Power Association	BLM-GRSG RMP/EIS-00098	ACECs and RNAs, Air Resources and Climate Change, GIS data and analysis, Mitigation, Renewable Energy, Socioeconomics, Travel and Transportation

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
American Exploration & Mining Association (AEMA)	BLM-GRSG RMP/EIS-00193	ACECs and RNAs, Adaptive Management, Cumulative Impacts, Direct/Indirect Impacts, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), FLPMA, GIS and data analysis, Lands and Realty, Locatable Minerals, Mitigation, NEPA, Range of Alternatives, Travel and Transportation
American Exploration & Mining Association et al	BLM-GRSG RMP/EIS-00164	Comment Period Extension
American Petroleum Institute	BLM-GRSG RMP/EIS-00107	ACECs and RNAs, Adaptive Management, Best available information-baseline data, FLPMA, Fluid Minerals, General Consultation (e.g., SHPO, etc.), GIS data and analysis, Other Laws, Predation
American Production & Exploration Council	BLM-GRSG RMP/EIS-00152	Adaptive Management, Best available information-baseline data, FLPMA, Fluid Minerals, GIS data and analysis, Lands and Realty
Amphibian Refuge	BLM-GRSG RMP/EIS-00002	Fish and Wildlife
Audubon Rockies	BLM-GRSG RMP/EIS-00169	ACECs and RNAs, Adaptive Management, Best available information-baseline data, Disturbance Cap, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Fluid Minerals, General Consultation (e.g., SHPO, etc.), Greater Sage-Grouse, Habitat Boundary/Habitat Management Area Designations, Lands and Realty, Livestock Grazing, Locatable Minerals, Mitigation, Other Laws, Predation, Range of Alternatives, Renewable Energy, Vegetation
Baker County, Oregon	BLM-GRSG RMP/EIS-00126	Mitigation, Livestock Grazing, Best available information-baseline data, ACECs and RNAs, General Consultation (e.g., SHPO, etc.)
Barrick Gold North America, Inc.	BLM-GRSG RMP/EIS-00030	ACECs and RNAs, Comment Period Extension Request, Cumulative Impacts, FLPMA, General Consultation (e.g., SHPO, etc.), Lands and Realty, Locatable Minerals, NEPA (National Environmental Policy Act), Nevada/California, Socioeconomics, Renewable Energy
Barrick Gold of North America, Inc. & Nevada Gold Mines, LLC	BLM-GRSG RMP/EIS-00192	Comment Period Extension Request, General Consultation (e.g., SHPO, etc.), Range of Alternatives, NEPA (National Environmental Policy Act), Purpose and Need, Other Laws, Nevada/California, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), GIS data and analysis, Direct/Indirect Impacts, Best available information-baseline data, FLPMA, Locatable Minerals, Socioeconomics, Disturbance cap, Cumulative Impacts, Mitigation, Habitat Objectives, Adaptive Management, Greater Sage-Grouse, Livestock Grazing, Habitat Boundary/Habitat Management Area Designations, ACECs and RNAs, Montana, Lands and Realty
Beaver County	BLM-GRSG RMP/EIS-00112	ACECs and RNAs, Livestock Grazing
Bedke, Eric	BLM-GRSG RMP/EIS-00095	Predation
Bentley, Don	BLM-GRSG RMP/EIS-00025	Range of Alternatives

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
Bentz, Linda	BLM-GRSG RMP/EIS-00122	Livestock Grazing, Habitat Objectives, Adaptive Management, Best available information-baseline data
Bertram, Aubrey	BLM-GRSG RMP/EIS-00023	ACECs and RNAs, Best available information-baseline data, Habitat Boundary/Habitat Management, Locatable Minerals, Montana, Range of Alternatives, Vegetation
Black, Caspen	BLM-GRSG RMP/EIS-00020	Best available information-baseline data
BlueRibbon Coalition	BLM-GRSG RMP/EIS-00211	ACECs and RNAs, Greater Sage-grouse, Recreation and Visitor Services
Brabec, Dennis	BLM-GRSG RMP/EIS-00024	Greater Sage-grouse, Predation, Vegetation
Brackett, Kim	BLM-GRSG RMP/EIS-00007	Habitat Objectives, Livestock Grazing, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Best available information-baseline data
Bradfute, American Exploration and Production Council	BLM-GRSG RMP/EIS-00040	Fluid Minerals, Socioeconomics, FLPMA, Other Laws, ACECs and RNAs, GIS data and analysis, Fluid Minerals
California Cattlemen's Foundation	BLM-GRSG RMP/EIS-00144	ACECs and RNAs
California Farm Bureau	BLM-GRSG RMP/EIS-00143	Wild Horse and Burro Management, ACECs and RNAs
Campbell County Government	BLM-GRSG RMP/EIS-00206	General, Consultation (e.g., SHPO, etc.), FLPMA, Disturbance Cap, Range of Alternatives, Livestock Grazing, Adaptive Management, Other Laws, Cumulative Impacts, Fluid Minerals, Wild Horse and Burro Management, ACECs and RNAs, Reasonably Foreseeable Development Scenario (RFD)
Carpenter, Kelly	BLM-GRSG RMP/EIS-00042	Predation
Carson, Andrew	BLM-GRSG RMP/EIS-00057	ACECs and RNAs
Carson, Nancy	BLM-GRSG RMP/EIS-00056	ACECs and RNAs
Case, Dudley	BLM-GRSG RMP/EIS-00055	Habitat Boundary/Habitat Management Area Designations
Cassia and Power Counties, Idaho	BLM-GRSG RMP/EIS-00150	ACECs and RNAs, Air Resources and Climate Change, Cumulative Impacts, Direct/Indirect Impacts, Disturbance cap, Editorial Comments, FLPMA, General Consultation (e.g., SHPO, etc.), Greater Sage-grouse, Idaho, Lands and Realty, NEPA (National Environmental Policy Act), Predation, Socioeconomics, Soil Resources
Catlin, James	BLM-GRSG RMP/EIS-00178	ACECs and RNAs, Best available information-baseline data, Adaptive Management, Fluid Minerals, Disturbance Cap, Livestock Grazing, Greater Sage-grouse, Vegetation, Cumulative Impacts, Monitoring, Habitat Objectives, Range of Alternatives
CHRISTIANSEN, TOM	BLM-GRSG RMP/EIS-00157	Livestock Grazing

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
Churchill County	BLM-GRSG RMP/EIS-00197	Purpose and Need, GIS data and analysis, Range of Alternatives, Nevada/California, ACECs and RNAs, Other Laws, Comment Period Extension Request, Mitigation, Best available information-baseline data, NEPA (National Environmental Policy Act), General Consultation (e.g., SHPO, etc.), Adaptive Management, Renewable Energy, Predation, Livestock Grazing, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Fish and Wildlife, Wild Horse and Burro Management, Habitat Objectives, Reasonably Foreseeable Development Scenario (RFD), Socioeconomics, Cumulative Impacts
Coalition for Healthy Nevada Lands, Wildlife, and Free-Roaming Horses	BLM-GRSG RMP/EIS-00124	Wild Horse and Burro Management
Coeur Mining Inc.	BLM-GRSG RMP/EIS-00195	Comment Period Extension Request, Purpose and Need, Locatable Minerals, GIS data and analysis, FLPMA, Mitigation, Greater Sage-grouse, Best available information-baseline data, Socioeconomics, Habitat Boundary/Habitat Management Area Designations, ACECs and RNAs
Collier, Bob	BLM-GRSG RMP/EIS-00052	Idaho
Colorado Cattlemen's Association/Colorado Public Lands Council	BLM-GRSG RMP/EIS-00181	Range of Alternatives, FLPMA, Livestock Grazing, Habitat Objectives, Other Laws, ACECs and RNAs, Adaptive Management, Best available information-baseline data
Colorado Department of Agriculture	BLM-GRSG RMP/EIS-00118	Best available information-baseline data, Livestock Grazing, General Consultation (e.g., SHPO, etc.)
Colorado Mountain Club - Western Slope Group	BLM-GRSG RMP/EIS-00187	Habitat Boundary/Habitat Management Area Designations
Colorado Parks & Wildlife	BLM-GRSG RMP/EIS-00161	Best available information-baseline data, Habitat Boundary/Habitat Management Area Designations, Mitigation, General Consultation (e.g., SHPO, etc.), Livestock Grazing, ACECs and RNAs
Colorado Wildlife Federation, Inc.	BLM-GRSG RMP/EIS-00176	Other Laws, Habitat objectives, General Consultation (e.g., SHPO, etc.), Habitat Boundary/Habitat Management Area Designations, ACECs and RNAs, Mitigation, Greater Sage-Grouse, Adaptive Management, Best available information-baseline data, Fluid Minerals, Range of Alternatives, Locatable Minerals, Renewable Energy, Lands and Realty, Wild Horse and Burro Management
Conservation Campaigns	BLM-GRSG RMP/EIS-00230	ACECs and RNAs
Converse County, Wyoming	BLM-GRSG RMP/EIS-00142	General Consultation (e.g., SHPO, etc.), Disturbance Cap, Range of Alternatives, Adaptive Management, Cumulative Impacts, ACECs and RNAs, Reasonably Foreseeable Development Scenario (RFD)
Cooke, Daniel	BLM-GRSG RMP/EIS-00109	General Consultation (e.g., SHPO, etc.)
Cooper, T. Douglas	BLM-GRSG RMP/EIS-00022	Predation

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
Council on Wildlife and Fish	BLM-GRSG RMP/EIS-00138	Air Resources and Climate Change, Best available information-baseline data, Cumulative Impacts, ESA - (Consultation), Fish and Wildlife, General Consultation (e.g., SHPO, etc.), Greater Sage-grouse, Habitat Objectives, Livestock Grazing, Socioeconomics, Soil Resources, Vegetation, Water Resources
County Government, Big Horn County Wyoming	BLM-GRSG RMP/EIS-00128	General Consultation (e.g., SHPO, etc.), Range of Alternatives, Best available information-baseline data, Disturbance Cap, Livestock Grazing, Adaptive Management, Mitigation, Lands and Realty, ACECs and RNAs, Reasonably Foreseeable Development Scenario (RFD), Socioeconomics
County of Modoc	BLM-GRSG RMP/EIS-00215	Predation, ACECs and RNAs, FLPMA
Culliton, Les T.	BLM-GRSG RMP/EIS-00021	ACECs and RNAs, Adaptive Management, Consistency with State and Local Plans, Livestock Grazing, Mitigation, Range of Alternatives, Socioeconomics
Custer County	BLM-GRSG RMP/EIS-00153	Comment Period Extension Request
Custer County, Idaho	BLM-GRSG RMP/EIS-00028	ACECs and RNAs
Darling Geomatics	BLM-GRSG RMP/EIS-00222	FLPMA, General Consultation (e.g., SHPO, etc.), Mitigation, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Lands and Realty, GIS data and analysis, Predation
Defenders of Wildlife	BLM-GRSG RMP/EIS-00041	Best available information-baseline data, ACECs and RNAs, FLPMA, GIS data and analysis, Livestock Grazing, Habitat Boundary/Habitat Management Area Designations, Range of Alternatives, Greater Sage-grouse, Disturbance Cap, Fluid Minerals, Renewable Energy, Cumulative Impacts, Mitigation, Adaptive Management, Reasonably Foreseeable Development Scenario (RFD), Locatable Minerals, Vegetation
Deuter, Tim	BLM-GRSG RMP/EIS-00068	ACECs and RNAs, Habitat Boundary/Habitat Management Area Designations
Devish, Fred M.	BLM-GRSG RMP/EIS-00100	General Consultation (e.g., SHPO, etc.), FLPMA, Wyoming, Disturbance Cap, Range of Alternatives, Adaptive Management, Mitigation, Cumulative Impacts, ACECs and RNAs, Fluid Minerals, Reasonably Foreseeable Development Scenario (RFD), Socioeconomics
DeWitt, Jim	BLM-GRSG RMP/EIS-00054	Range of Alternatives
Dietzmann, Cynthia	BLM-GRSG RMP/EIS-00049	Habitat Boundary/Habitat Management Area Designations
District, Niobrara	BLM-GRSG RMP/EIS-00066	Range of Alternatives, General Consultation (e.g., SHPO, etc.), FLPMA, Disturbance Cap, NEPA (National Environmental Policy Act), Livestock Grazing, Other Laws, Adaptive Management, Cumulative Impacts, Mitigation, Fluid Minerals, Socioeconomics, ACECs and RNAs, Lands with Wilderness Characteristics
Dobric, Nick	BLM-GRSG RMP/EIS-00111	Best available information-baseline data

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
Dorsey & Whitney LLP	BLM-GRSG RMP/EIS-00232	Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), GIS data and analysis, Socioeconomics, Disturbance Cap, Mineral (Salable) Materials, Mitigation, Montana, Greater Sage-grouse, Habitat Boundary/Habitat Management Area Designations, Range of Alternatives, ACECs and RNAs, Other Laws
Duchesne County	BLM-GRSG RMP/EIS-00090	Predation, ACECs and RNAs, Livestock Grazing, Best available information-baseline data, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Greater Sage-grouse, General Consultation (e.g., SHPO, etc.), Habitat Boundary/Habitat Management Area Designations, Mitigation, FLPMA, Fluid Minerals, Range of Alternatives, Adaptive Management, Wild Horse and Burro Management, Fish and Wildlife, Nonenergy Leasable Minerals, Coal, Socioeconomics, Water Resources, Cultural Resources, Lands with Wilderness Characteristics, Recreation and Visitor Services, Travel and Transportation, Lands and Realty, Disturbance Cap, Air Resources and Climate Change, Vegetation, Renewable Energy, Editorial Comments, Mineral (Salable) Materials, Cumulative Impacts, Wildland Fire Ecology and Management, Locatable Minerals, Soil Resources, Tribal Interests
East Cascades Audubon Society	BLM-GRSG RMP/EIS-00148	ACECs and RNAs, Range of Alternatives, Best available information-baseline data, Adaptive Management, Oregon
Eckberg, Eric	BLM-GRSG RMP/EIS-00047	Range of Alternatives, ACECs and RNAs
Elko County	BLM-GRSG RMP/EIS-00105	Best available information-baseline data, Greater Sage-grouse, Purpose and Need, ACECs and RNAs, Socioeconomics
Energy & Wildlife Action Coalition	BLM-GRSG RMP/EIS-00102	General Consultation (e.g., SHPO, etc.), Best available information-baseline data, Renewable Energy, Mitigation, Habitat Boundary/Habitat Management Area Designations
EPA	BLM-GRSG RMP/EIS-00225	Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Disturbance Cap, General Consultation (e.g., SHPO, etc.), Greater Sage-grouse, Mitigation, Fluid Minerals, Lands and Realty, Livestock Grazing, Vegetation, Direct/Indirect Impacts, Fish and Wildlife, Renewable Energy, Recreation and Visitor Services, Travel and Transportation, Other Laws
Essential Minerals Association	BLM-GRSG RMP/EIS-00101	Habitat Boundary/Habitat Management Area Designations, Range of Alternatives Locatable Minerals, FLPMA, Mitigation

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
Eureka County, NV	BLM-GRSG RMP/EIS-00117	Comment Period Extension Request, Range of Alternatives, Purpose and Need, Best available information-baseline data, GIS data and analysis, Habitat Boundary/Habitat Management Area Designations, General Consultation (e.g., SHPO, etc.), Mitigation, Nevada/California, Adaptive Management, Livestock Grazing, Habitat Objectives, Wildland Fire Ecology and Management, Vegetation, Wild Horse and Burro Management, Fish and Wildlife, Predation, Fluid Minerals, Locatable Minerals, ACECs and RNAs, FLPMA, Socioeconomics, Cumulative Impacts, Disturbance Cap, Greater Sage-Grouse, Other Laws, NEPA (National Environmental Policy Act), Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Lands and Realty, Water Resources
Faeo, Vic	BLM-GRSG RMP/EIS-00166	Range of alternatives, Greater Sage-grouse, Wild Horse and Burro Management
Fairless, Judy	BLM-GRSG RMP/EIS-00116	Greater Sage-Grouse
Falk, Rebecca	BLM-GRSG RMP/EIS-00080	Wild Horse and Burro Management
Falls, Melanie	BLM-GRSG RMP/EIS-00070	Habitat Boundary/Habitat Management Area Designations, Range of alternatives, Disturbance Cap, Mitigation, Travel and Transportation, GIS data and analysis, Renewable Energy, Best available information-baseline data, Greater Sage-grouse
Fervo Energy	BLM-GRSG RMP/EIS-00171	Renewable Energy, Fluid Minerals
Fite, Katie	BLM-GRSG RMP/EIS-00026	ACECs and RNAs, FLPMA, Best available information-baseline data, Cumulative Impacts, Range of Alternatives, Livestock Grazing, Greater Sage-grouse
Fitzpatrick, Erika	BLM-GRSG RMP/EIS-00123	Livestock Grazing, Habitat Objectives, Adaptive Management, Best available information-baseline data
Fitzpatrick, Samuel	BLM-GRSG RMP/EIS-00067	Livestock Grazing
Friends of Nevada Wilderness	BLM-GRSG RMP/EIS-00191	ACECs and RNAs, Cumulative Impacts, Livestock Grazing, Fish and Wildlife, Best available information-baseline data
Garfield County	BLM-GRSG RMP/EIS-00221	General Consultation (e.g., SHPO, etc.), Adaptive Management, GIS data and analysis, Predation, Mitigation, Livestock Grazing, Other Laws, Habitat Boundary/Habitat Management Area Designations, Best available information-baseline data
Golden Eagle Audubon Society	BLM-GRSG RMP/EIS-00063	Best available information-baseline data, ACECs and RNAs
Gravance, Rochelle	BLM-GRSG RMP/EIS-00082	Montana
Great Old Broads for Wilderness	BLM-GRSG RMP/EIS-00036	ACECs and RNA, Greater Sage-grouse, Disturbance Cap
Great Old Broads for Wilderness, Grand Junction Broadband	BLM-GRSG RMP/EIS-00179	Best available information-baseline data

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
Hadlock, Becky	BLM-GRSG RMP/EIS-00119	General Consultation (e.g., SHPO, etc.), FLPMA, Range of Alternatives, Disturbance Cap, Adaptive Management, Other Laws, Mitigation, Lands and Realty, Cumulative Impacts, Adaptive Management, ACECs and RNAs, Reasonably Foreseeable Development Scenario (RFD), Socioeconomics, Livestock Grazing, Mitigation
Helms, Todd	BLM-GRSG RMP/EIS-00015	General Consultation (e.g., SHPO, etc.)
HiTech Minerals, Inc	BLM-GRSG RMP/EIS-00203	General Consultation (e.g., SHPO, etc.), Habitat Boundary/Habitat Management Area Designations, Locatable Minerals, Mitigation, NEPA (National Environmental Policy Act), FLPMA, Other Laws, Range of Alternatives
Holland & Hart LLP on behalf of Anschutz Exploration Corporation	BLM-GRSG RMP/EIS-00156	Fluid Minerals, Adaptive Management, FLPMA, Purpose and Need, Range of Alternatives, Greater Sage-grouse, Disturbance Cap, Habitat Boundary/Habitat Management Area Designations, Habitat Objectives, ACECs and RNAs, Socioeconomics
Hostetler, Michael Arias	BLM-GRSG RMP/EIS-00078	Mitigation
Hot Springs County	BLM-GRSG RMP/EIS-00159	Range of alternatives, Livestock Grazing, Adaptive Management, Mitigation, Alternatives, ACECs and RNAs, Socioeconomics
Humboldt County Board of Commissioners	BLM-GRSG RMP/EIS-00029	Comment Period Extension Request
Humboldt County, Nevada	BLM-GRSG RMP/EIS-00091	Range of Alternatives, Wildland Fire Ecology and Management, Nevada/California, NEPA (National Environmental Policy Act), FLPMA, Habitat Boundary/Habitat Management Area Designations, ACECs and RNAs, Lands and Realty, Other Laws, Habitat Objectives, Locatable Minerals, GIS data and analysis, Disturbance Cap, General Consultation (e.g., SHPO, etc.), Socioeconomics, Mitigation, Cumulative Impacts, Adaptive Management, Renewable Energy, Livestock Grazing, Best available information-baseline data, Purpose and Need, Predation, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.)
Huntington, Michelle	BLM-GRSG RMP/EIS-00133	Wyoming, General Consultation (e.g., SHPO, etc.), Greater Sage-grouse, Livestock Grazing
Idaho Cattle Association	BLM-GRSG RMP/EIS-00085	Livestock Grazing, Best available information-baseline data, Habitat Objectives, Adaptive Management, ACECs and RNAs, Monitoring, Habitat Boundary/Habitat Management Area Designations, Disturbance Cap
Idaho Conservation League	BLM-GRSG RMP/EIS-00141	General Consultation (e.g., SHPO, etc.), Disturbance Cap, Habitat Boundary/Habitat Management Area Designations, Range of Alternatives, Travel and Transportation, Mitigation, Renewable Energy

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
Idaho Mining Association	BLM-GRSG RMP/EIS-00188	Habitat Boundary/Habitat Management Area Designations, GIS data and analysis, Greater Sage-grouse, Locatable Minerals, Disturbance Cap
Idaho Power Company	BLM-GRSG RMP/EIS-00083	ACECs and RNAs, Lands and Realty, Mitigation, Predation
Idaho State Legislature	BLM-GRSG RMP/EIS-00182	Comment Period Extension Request
Iron County	BLM-GRSG RMP/EIS-00218	Range of Alternatives, Adaptive Management, Wild Horse and Burro Management, Mitigation, ACECs and RNAs
James, Alison	BLM-GRSG RMP/EIS-00092	Wild Horse and Burro Management
Johnson County, Wyoming	BLM-GRSG RMP/EIS-00196	Disturbance Cap, Range of Alternatives, Adaptive Management, Livestock Grazing, General Consultation (e.g., SHPO, etc.), Socioeconomics, ACECs and RNAs, Fluid Minerals, Reasonably Foreseeable Development Scenario (RFD)
JR Simplot Company, Land & Livestock Division	BLM-GRSG RMP/EIS-00104	Livestock Grazing, Habitat Boundary/Habitat Management Area Designations, Habitat Objectives, Adaptive Management, Mitigation, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.)
Kirby, Chris	BLM-GRSG RMP/EIS-00005	Best available information-baseline data
Koenig, Eric	BLM-GRSG RMP/EIS-00151	ACECs and RNAs
Lahontan Audubon Society	BLM-GRSG RMP/EIS-00058	ACECs and RNAs, Best available information-baseline data, Disturbance Cap, General Consultation (e.g., SHPO, etc.), Greater Sage-grouse, Habitat Boundary/Habitat Management Area Designations, Mitigation, NEPA (National Environment Policy Act), Range of Alternatives
Leeden, Cherie	BLM-GRSG RMP/EIS-00172	Locatable Minerals, Lands and Realty, General Consultation (e.g., SHPO, etc.), Fluid Minerals, NEPA (National Environmental Policy Act), FLPMA, Range of Alternatives, Best available information-baseline data, Habitat Boundary/Habitat Management Area Designations, ACECs and RNAs, Disturbance Cap, Socioeconomics, Cumulative Impacts
Lish, Christopher	BLM-GRSG RMP/EIS-00086	ACECs and RNAs
Lithium Nevada Corp	BLM-GRSG RMP/EIS-00213	GIS data and analysis, Wildland Fire Ecology and Management, Habitat Boundary/Habitat Management Area Designations, FLPMA, Lands and Realty, Air Resources and Climate Change, Socioeconomics, Range of Alternatives, Mitigation, Disturbance Cap, Adaptive Management, ACECs and RNAs, Locatable minerals, Cumulative Impacts
Liverman, Marc	BLM-GRSG RMP/EIS-00180	Range of Alternatives, Habitat Boundary/Habitat Management Area Designations, Air Resources and Climate Change, ACECs and RNAs, Best available information-baseline data

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
LS Power	BLM-GRSG RMP/EIS-00229	Habitat Boundary/Habitat Management Area Designations, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Habitat Objectives, Lands and Realty, Adaptive Management, Predation, Mitigation, Greater Sage-Grouse, Idaho, Purpose and Need, Disturbance Cap, Range of Alternatives, NEPA (National Environmental Policy Act), Socioeconomics, Renewable Energy, Fluid Minerals, Nevada/California, GIS data and analysis, Direct/Indirect Impacts, Reasonably Foreseeable Development Scenario (RFD)
Mackenzie Ranch	BLM-GRSG RMP/EIS-00226	Livestock Grazing
Madden, Elizabeth	BLM-GRSG RMP/EIS-00019	Montana
Mann, Lindsay	BLM-GRSG RMP/EIS-00016	Wild Horse and Burro Management
Marud, Darcy	BLM-GRSG RMP/EIS-00160	GIS data and analysis, Other Laws, Locatable Minerals, Reasonably Foreseeable Development Scenario (RFD), FLPMA, Fluid Minerals, NEPA (National Environmental Policy Act), Habitat Boundary/Habitat Management Area Designations, General Consultation (e.g., SHPO, etc.), Travel and Transportation, ACECs and RNAs, Purpose and Need, Socioeconomics
Maryland Ornithological Society	BLM-GRSG RMP/EIS-00064	ACECs and RNAs
Materi, Sandra	BLM-GRSG RMP/EIS-00001	ACECs and RNAs
McElligott, Matt	BLM-GRSG RMP/EIS-00174	Best available information-baseline data, Wildland Fire Ecology and Management
Mesa County, Colorado	BLM-GRSG RMP/EIS-00081	Disturbance Cap, Mitigation, Renewable Energy, Adaptive Management, Livestock Grazing, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.)
Mills, Katie	BLM-GRSG RMP/EIS-00198	Range of Alternatives, NEPA (National Environmental Policy Act), Comment Period Extension Request, General Consultation (e.g., SHPO, etc.), ACECs and RNAs, Mitigation, Disturbance Cap, Best available information-baseline data, Greater Sage-grouse, Habitat Boundary/Habitat Management Area Designations, Adaptive Management, Mitigation
Moffat County	BLM-GRSG RMP/EIS-00168	General Consultation (e.g., SHPO, etc.), Livestock Grazing, Habitat Objectives, Best available information-baseline data, Disturbance Cap, Renewable Energy
Montana Electric Cooperatives' Association	BLM-GRSG RMP/EIS-00132	Best available information-baseline data, Cumulative Impacts
Montana Farm Bureau Federation	BLM-GRSG RMP/EIS-00231	Livestock Grazing
Montana Mining Association	BLM-GRSG RMP/EIS-00038	Comment Period Extension Request
Montana Natural Resource Coalition of Counties	BLM-GRSG RMP/EIS-00145	ACECs and RNAs, Montana, FLPMA, Other Laws, Livestock Grazing

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
Montana Stockgrowers Association	BLM-GRSG RMP/EIS-00135	Livestock Grazing, Disturbance Cap, Best available information-baseline data
MORGAN, CARREN	BLM-GRSG RMP/EIS-00013	Best available information-baseline data
Motorcycle Industry Council	BLM-GRSG RMP/EIS-00162	Habitat Boundary/Habitat Management Area Designations, Recreation and Visitor Services
Moulder, Karen	BLM-GRSG RMP/EIS-00060	Wild Horse and Burro Management
Mt Wheeler Power	BLM-GRSG RMP/EIS-00149	Range of Alternatives, Predation, Habitat Boundary/Habitat Management Area Designations
N-2 State Grazing Board	BLM-GRSG RMP/EIS-00044	Comment Period Extension Request, ACECs and RNAs, GIS data and analysis, Other laws, Livestock Grazing, Best available information-baseline data, Habitat Objectives, Wild Horse and Burro Management, Socioeconomics
N-4 State Grazing Board	BLM-GRSG RMP/EIS-00043	Comment Period Extension Request, ACECs and RNAs, Nevada/California, GIS data and analysis, NEPA (National Environmental Policy Act), Habitat Boundary/Habitat Management Area Designations, Habitat Objectives, Livestock Grazing, Vegetation, General Consultation (e.g., SHPO, etc.), Wild Horse and Burro Management, Socioeconomics, Range of Alternatives, Predation, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Monitoring
National Audubon Society/Audubon Rockies	BLM-GRSG RMP/EIS-00134	Habitat Boundary/Habitat Management Area Designations, ACECs and RNAs, Mitigation, General Consultation (e.g., SHPO, etc.), Best available information-baseline data, Greater Sage-grouse, Fluid Minerals, Renewable Energy
Native Ecosystems Council	BLM-GRSG RMP/EIS-00140	Livestock Grazing, Best available information-baseline data, Soil Resources, Greater Sage-grouse, Air Resources and Climate Change, Vegetation, Fish and Wildlife, Cumulative Impacts, Water Resources, General Consultation (e.g., SHPO, etc.), Socioeconomics, ESA - (Consultation), Habitat Objective
Nemeth, Linda	BLM-GRSG RMP/EIS-00009	Wild Horse and Burro Management
Nevada Association of Counties	BLM-GRSG RMP/EIS-00061	General Consultation (e.g., SHPO, etc.), Purpose and Need, Other Laws, FLPMA, ACECs and RNAs, GIS data and analysis, Socioeconomics, Best available information-baseline data, Comment Period Extension Request, Range of Alternatives, Livestock Grazing, Vegetation
Nevada Cattlemen's Association	BLM-GRSG RMP/EIS-00039	ACECs and RNAs, Best available information-baseline data, Comment Period Extension Request, Consistency with State and Local Plans, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), GIS data and analysis, Habitat Objectives, Livestock Grazing, Monitoring, Nevada/California, Predation, Purpose and Need, Socioeconomics, Vegetation, Wild Horse and Burro Management

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
Nevada Department of Agriculture	BLM-GRSG RMP/EIS-00223	Socioeconomics, Livestock Grazing, Range of Alternatives, Greater Sage-grouse, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Habitat Objectives, Adaptive Management, Vegetation, General Consultation (e.g., SHPO, etc.), Best available information-baseline data, Wild Horse and Burro Management
Nevada Department of Wildlife	BLM-GRSG RMP/EIS-00189	Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Habitat Boundary/Habitat Management Area Designations, Direct/Indirect Impacts, ACECs and RNAs, Mitigation, Range of Alternatives, Disturbance Cap, Best available information-baseline data, Locatable Minerals, Fluid Minerals, Lands and Realty, Greater Sage-grouse, Renewable Energy, Adaptive Management
Nevada Division of Minerals	BLM-GRSG RMP/EIS-00096	Fluid Minerals, Range of Alternatives, GIS data and analysis, Locatable Minerals, Habitat Boundary/Habitat Management Area Designations, Renewable Energy, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), ACECs and RNAs, General Consultation (e.g., SHPO, etc.)
Nevada Farm Bureau	BLM-GRSG RMP/EIS-00131	ACECs and RNAs, Nevada/California
Nevada Mining Association	BLM-GRSG RMP/EIS-00033	ACECs and RNAs, Comment Period Extension Request, Consistency with State and Local Plans, Cumulative Impacts, General Consultation (e.g., SHPO, etc.), Habitat Boundary/Habitat Management Area Designations, Locatable Minerals, Mitigation, NEPA (National Environmental Policy Act), Purpose and Need, Range of Alternatives, Socioeconomics
Nevada Rural Electric Association	BLM-GRSG RMP/EIS-00097	Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Predation, Habitat Boundary/Habitat Management Area Designations
Nevada State Grazing Boards Central Committee	BLM-GRSG RMP/EIS-00228	GIS data and analysis, General Consultation (e.g., SHPO, etc.), Livestock Grazing, Wild Horse and Burro Management
Nevada Wildlife Federation	BLM-GRSG RMP/EIS-00093	Best available information-baseline data, Vegetation, General Consultation (e.g., SHPO, etc.), ACECs and RNAs, Fluid Minerals, Coal, Locatable Minerals, Renewable Energy, Lands and Realty, Livestock Grazing
NextEra Energy Resources, LLC	BLM-GRSG RMP/EIS-00175	Best available information-baseline data, GIS data and analysis
Niobrara County Commissioners	BLM-GRSG RMP/EIS-00110	FLPMA, General Consultation (e.g., SHPO, etc.), Disturbance Cap, Range of Alternatives, Livestock Grazing, Adaptive Management, Cumulative Impacts, Mitigation, Socioeconomics, Wild Horse and Burro Management, ACECs and RNAs, Fluid Minerals
North American Grouse Partnership	BLM-GRSG RMP/EIS-00072	Best available information-baseline data

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
Not Provided, Carbon County, Wyoming	BLM-GRSG RMP/EIS-00186	Alternatives, FLPMA, Range of Alternatives, General Consultation (e.g., SHPO, etc.), Disturbance Cap, Livestock Grazing, Adaptive Management, Other Laws, Cumulative Impacts, Mitigation, Socioeconomics, ACECs and RNAs, Fluid Minerals
Not Provided, Coalition of Local Governments	BLM-GRSG RMP/EIS-00037	ACECs and RNAs, Locatable Minerals, Livestock Grazing, Habitat Objectives, Greater Sage-grouse, Range of Alternatives, Fluid Minerals, Disturbance Cap, Mitigation, Adaptive Management
Not Provided, Concerned conservationist	BLM-GRSG RMP/EIS-00032	Cumulative Impacts
Not Provided, JRB LLC	BLM-GRSG RMP/EIS-00184	ACECs and RNAs, Fluid Minerals, Livestock Grazing, Disturbance Cap, Adaptive Management, Habitat Objectives
Not Provided, Not Provided	BLM-GRSG RMP/EIS-00008	Range of Alternatives, ACECs and RNAs, Preferred Alternative, Tribal Interests, Request Cooperating Status, Renewable Energy, Comment Period Extension Request, Direct/Indirect Impacts, FLPMA, Purpose and Need, Best available information-baseline data, Habitat Boundary/Habitat Management Area Designations, Cumulative Impacts, Livestock Grazing, Wildland Fire Ecology and Management, Mitigation, Alternatives, Wild Horse and Burro Management, Fluid Minerals, Greater Sage-grouse, Disturbance Cap, General Consultation (e.g., SHPO, etc.), Adaptive Management, Other Laws, Socioeconomics
Not Provided, Please do what is necessary	BLM-GRSG RMP/EIS-00065	Best available information-baseline data
Not Provided, Uintah County, Utah	BLM-GRSG RMP/EIS-00103	Other Laws
Not Provided, Ute Indian Tribe of the Uintah and Ouray Reservation	BLM-GRSG RMP/EIS-00014	Tribal Interests, Request Cooperating Status
NRECA	BLM-GRSG RMP/EIS-00073	Cumulative Impacts, Best available information-baseline data, Mitigation
Nye County Natural Resources and Federal Facilities	BLM-GRSG RMP/EIS-00003	General Consultation (e.g., SHPO, etc.)
Office of Governor Mark Gordon	BLM-GRSG RMP/EIS-00158	General Consultation (e.g., SHPO, etc.), Adaptive Management, ACECs and RNAs, Wyoming, Best available information-baseline data, Livestock Grazing, Habitat Objectives, Editorial Comments, Air Resources and Climate Change, Other Laws, Vegetation, Socioeconomics, Renewable Energy, Lands and Realty, Fluid Minerals, Predation, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Mitigation, Disturbance Cap, Range of Alternatives, Lands with Wilderness Characteristics, Wild Horse and Burro Management, Greater Sage-grouse, Fish and Wildlife

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
ORBA, SEMA, TPA, COHVCO et al	BLM-GRSG RMP/EIS-00088	Best available information-baseline data, Recreation and Visitor Services, NEPA (National Environmental Policy Act), Socioeconomics, General Consultation (e.g., SHPO, etc.), Range of Alternatives
Oregon Department of Fish and Wildlife	BLM-GRSG RMP/EIS-00200	Range of Alternatives, Habitat Boundary/Habitat Management Area Designations, Mitigation, Disturbance Cap, Best available information-baseline data, Greater Sage-grouse, Mineral (Salable) Materials, Direct/Indirect Impacts, General Consultation (e.g., SHPO, etc.), Fluid Minerals, Lands and Realty, Habitat Objectives, ACECs and RNAs, Adaptive Management
Oregon Department of Transportation	BLM-GRSG RMP/EIS-00202	Mineral (salable) Materials, Disturbance Cap
Oregon Natural Desert Association; Anne White	BLM-GRSG RMP/EIS-00210	Range of Alternatives, Habitat Boundary/Habitat Management Area Designations, Best available information-baseline data, Disturbance Cap, Water Resources, Air Resources and Climate Change, ACECs and RNAs, Habitat Objectives, Livestock Grazing, Greater Sage-Grouse, Oregon, FLPMA
Oregon Natural Desert Association; Mark Salvo	BLM-GRSG RMP/EIS-00046	ACECs and RNAs, Range of Alternatives, FLPMA, Oregon
Oregon Wild	BLM-GRSG RMP/EIS-00227	Best available information-baseline data
Oregon Wild Horse Organization	BLM-GRSG RMP/EIS-00235	FLPMA, Livestock Grazing, Wild Horse and Burro Management, Socioeconomics, Tribal Interests
Ormat Technologies	BLM-GRSG RMP/EIS-00059	FLPMA, Mitigation, Best available information-baseline data, Lands and Realty, Range of Alternatives, Socioeconomics, Fluid Minerals
Owyhee Board of County Commissioners	BLM-GRSG RMP/EIS-00120	Livestock Grazing, Habitat Objectives
Parsons Behle & Latimer	BLM-GRSG RMP/EIS-00031	Comment Period Extension Request, ACECs and RNAs, General Consultation (e.g., SHPO, etc.), NEPA (National Environmental Policy Act), FLPMA, Socioeconomics, Locatable Minerals, Lands and Realty, Renewable Energy, Nevada/California, Cumulative Impacts
Peterson, Collin	BLM-GRSG RMP/EIS-00053	Habitat Boundary/Habitat Management Area Designations, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.)
Petroleum Association of Wyoming	BLM-GRSG RMP/EIS-00035	Best available information-baseline data, Cumulative Impacts, Air Resources and Climate Change, ACECs and RNAs, Fluid Minerals, Socioeconomics, Adaptive Management, Greater Sage-grouse, Range of Alternatives, Lands and Realty, Disturbance Cap, General Consultation (e.g., SHPO, etc.)
Pheasants Forever and Quail Forever	BLM-GRSG RMP/EIS-00204	Best available information-baseline data, Greater Sage-grouse
Prairie County Montana Commissioners	BLM-GRSG RMP/EIS-00050	Habitat Boundary/Habitat Management Area Designations, Mitigation

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
Prairie Hills Audubon Society	BLM-GRSG RMP/EIS-00207	Recreation and Visitor Services
Price, Sean	BLM-GRSG RMP/EIS-00077	General Consultation (e.g., SHPO, etc.)
Public Land Council	BLM-GRSG RMP/EIS-00234	Comment Period Extension Request
Public Lands Council & National Cattlemen's Beef Association	BLM-GRSG RMP/EIS-00205	Comment Period Extension Request, NEPA (National Environmental Policy Act), Range of Alternatives, Wild Horse and Burro Management, Livestock Grazing, Habitat Objectives, Adaptive Management, Other Laws, Mitigation, ACECs and RNAs, Predation, General Consultation (e.g., SHPO, etc.)
Quetchenbach, Bernard	BLM-GRSG RMP/EIS-00045	Habitat Boundary/Habitat Management Area Designations, ACECs and RNAs
Rait, Ken	BLM-GRSG RMP/EIS-00076	Best available information-baseline data, Greater Sage-grouse, Disturbance Cap, Montana
Rait, Patrick	BLM-GRSG RMP/EIS-00115	Mitigation
Reichard, Chris	BLM-GRSG RMP/EIS-00121	Predation, Lands and Realty, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Mitigation, Adaptive Management, Fluid Minerals
Repsol Renewables North America	BLM-GRSG RMP/EIS-00155	Habitat Boundary/Habitat Management Area Designations, Renewable Energy, Purpose and Need, Best available information-baseline data
Rhoads, Matthew	BLM-GRSG RMP/EIS-00018	Montana, Alternatives
Rosenthal, Cathy	BLM-GRSG RMP/EIS-00208	Greater Sage-grouse, Predation, Habitat Boundary/Habitat Management Area Designations, ACECs and RNAs
Rosentreter, Roger	BLM-GRSG RMP/EIS-00154	ACECs and RNAs, Vegetation, Livestock Grazing, Best available information-baseline data
Saratoga-Encampment-Rawlins Conservation District - Wyoming	BLM-GRSG RMP/EIS-00146	General Consultation (e.g., SHPO, etc.), Best available information-baseline data, ACECs and RNAs, Livestock Grazing, Range of Alternatives, Habitat Boundary/Habitat Management Area Designations, Greater Sage-grouse, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Mitigation, Predation, Editorial Comments
Schweigert, Robert	BLM-GRSG RMP/EIS-00201	Livestock Grazing, Habitat Objectives, Best available information-baseline data
Select Committee on Federal Natural Resource Management	BLM-GRSG RMP/EIS-00074	Habitat Boundary/Habitat Management Area Designations, Socioeconomics, Renewable Energy, Predation, Best available information-baseline data
Sierra Club	BLM-GRSG RMP/EIS-00170	Mitigation, FLPMA, ACECs and RNAs
Sierra Club Wyoming Chapter	BLM-GRSG RMP/EIS-00129	ACECs and RNAs
Simplot	BLM-GRSG RMP/EIS-00130	ACECs and RNAs, FLPMA, Habitat Boundary/Habitat Management Area Designations
Smith, Cristina	BLM-GRSG RMP/EIS-00075	ACECs and RNAs
Smith, Oliver	BLM-GRSG RMP/EIS-00048	ACECs and RNAs

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
State of Idaho	BLM-GRSG RMP/EIS-00220	Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), ACECs and RNAs, Range of Alternatives, Editorial Comments, Habitat Boundary/Habitat Management Area Designations, Nonenergy Leasable minerals, Travel and Transportation, Habitat Objectives, Mitigation, Greater Sage-grouse, Disturbance Cap, Fluid Minerals, Renewable Energy, Predation, Livestock Grazing, Idaho, Adaptive Management, Direct/Indirect Impacts, General Consultation (e.g., SHPO, etc.), Best available information-baseline data, Wild Horse and Burro Management, Wildland Fire Ecology and Management
State of Montana	BLM-GRSG RMP/EIS-00224	Best available information-baseline data, Range of Alternatives, Fluid Minerals, Renewable Energy, Predation
State of Utah, Public Lands Policy Coordinating Office	BLM-GRSG RMP/EIS-00034	ACECs and RNAs, Utah, FLPMA, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Adaptive Management, Predation, General Consultation (e.g., SHPO, etc.), Mitigation, Habitat Boundary/Habitat Management Area Designations, Livestock Grazing, Socioeconomics, Editorial Comments, Vegetation, Direct/Indirect Impacts, Range of Alternatives, Greater Sage-grouse, Disturbance Cap, Fluid Minerals, Lands and Realty, Wild Horse and Burro Management, Air Resources and Climate Change, Alternatives, Fish and Wildlife, Renewable Energy, Nonenergy leasable minerals, Mineral (salable) Materials, Soil Resources, Water Resources, Cultural Resources, Tribal Interests, Lands with Wilderness Characteristics, Recreation and Visitor Services, Cumulative Impacts, Locatable Minerals, Travel and Transportation
Stolz Family et al	BLM-GRSG RMP/EIS-00136	Range of Alternatives, Fluid Minerals, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Habitat Boundary/Habitat Management Area Designations, Mitigation, Disturbance Cap
Sublette County, Wyoming	BLM-GRSG RMP/EIS-00004	Livestock Grazing, Range of Alternatives
Sweetwater Royalties	BLM-GRSG RMP/EIS-00177	Range of Alternatives, Fluid Minerals, Adaptive Management, ACECs and RNAs, Lands and Realty, Socioeconomics, FLPMA
The Cloud Foundation	BLM-GRSG RMP/EIS-00214	Wild Horse and Burro Management, Livestock Grazing, General Consultation (e.g., SHPO, etc.)
The Pew Charitable Trusts	BLM-GRSG RMP/EIS-00127	Best available information-baseline data, ACECs and RNAs, Habitat Boundary/Habitat Management Area Designations, Mitigation, Fluid Minerals, Disturbance Cap, Lands and Realty, Livestock Grazing, Air Resources and Climate Change, Adaptive Management, Oregon

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
The Wildlife Society	BLM-GRSG RMP/EIS-00173	Predation, Air Resources and Climate Change, Mitigation, Renewable Energy, Livestock Grazing, Wild Horse and Burro Management, Best available information-baseline data, Mitigation
Thompson, Philip	BLM-GRSG RMP/EIS-00113	GIS data and analysis
Tree Top Ranches	BLM-GRSG RMP/EIS-00217	Livestock Grazing, ACECs and RNAs, Greater Sage-grouse
Trout Unlimited, Nevada	BLM-GRSG RMP/EIS-00212	ACECs and RNAs
Turner, Cheryl	BLM-GRSG RMP/EIS-00069	Wild Horse and Burro Management
U.S. Fish and Wildlife	BLM-GRSG RMP/EIS-00219	Habitat Boundary/Habitat Management Area Designations, Disturbance Cap, Mitigation, Lands and Realty, Renewable Energy, Livestock Grazing
U.S. Fish and Wildlife Service	BLM-GRSG RMP/EIS-00183	Purpose and Need, Habitat Boundary/Habitat Management Area Designations, GIS data and analysis, Greater Sage-grouse, Mitigation, Other Laws, Disturbance Cap, Adaptive Management, Renewable Energy, Locatable Minerals, Fluid Minerals, Lands and Realty, Predation, Livestock Grazing, ACECs and RNAs, Best available information-baseline data, Range of Alternatives
Upper Missouri Water Keeper	BLM-GRSG RMP/EIS-00233	Fluid Minerals
UR-Energy	BLM-GRSG RMP/EIS-00209	ACECs and RNAs, General Consultation (e.g., SHPO, etc.), Other Laws
Utah Farm Bureau Federation	BLM-GRSG RMP/EIS-00194	ACECs and RNAs, Purpose and Need, Livestock Grazing, Predation, Wild Horse and Burro Management, Water Resources
Voigt, Bill	BLM-GRSG RMP/EIS-00071	ACECs and RNAs
Wayne County	BLM-GRSG RMP/EIS-00216	Predation, General Consultation (e.g., SHPO, etc.)
Western Energy Alliance	BLM-GRSG RMP/EIS-00011	Comment Period Extension Request, Best available information-baseline data, Other Laws, Purpose and Need, FLPMA, General Consultation (e.g., SHPO, etc.), Fluid Minerals, Mitigation, Greater Sage-grouse, Habitat Objectives, Disturbance Cap, Adaptive Management, GIS data and analysis, ACECs and RNAs, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), NEPA (National Environmental Policy Act), Range of Alternatives, Wyoming, Utah, Lands and Realty, Habitat Boundary/Habitat Management Area Designations, ESA - (Consultation)
Western Landowners Alliance	BLM-GRSG RMP/EIS-00017	Livestock Grazing, Wild Horse and Burro Management, Adaptive Management, General Consultation (e.g., SHPO, etc.)

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
Western Watersheds Project	BLM-GRSG RMP/EIS-00094	Best available information-baseline data, ACECs and RNAs, NEPA (National Environmental Policy Act), Cumulative Impacts, Other Laws, FLPMA, Habitat Objectives, Greater Sage-grouse, Range of alternatives, Habitat Boundary/Habitat Management Area Designations, Disturbance Cap, Reasonably Foreseeable Development Scenario (RFD), Livestock Grazing, Vegetation, Soil Resources, Wild Horse and Burro Management, Locatable Minerals, Mitigation, Fluid Minerals, Air Resources and Climate Change, Renewable Energy, Adaptive Management, Monitoring, Direct/Indirect Impacts, Nevada/California, ESA - (Consultation)
Weston County Natural Resource District	BLM-GRSG RMP/EIS-00084	Habitat Boundary/Habitat Management Area Designations, ACECs and RNAs
White Pine County, Nevada	BLM-GRSG RMP/EIS-00167	Comment Period Extension Request, ACECs and RNAs, Fish and Wildlife, Purpose and Need, GIS data and analysis, Adaptive Management, Habitat Boundary/Habitat Management Area Designations, Predation, NEPA (National Environmental Policy Act), Other Laws, General Consultation (e.g., SHPO, etc.), Best available information-baseline data, Range of Alternatives, Mitigation, Nevada/California, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Renewable Energy, Livestock Grazing, Wild Horse and Burro Management, Greater Sage-grouse, Habitat Objectives, Wildland Fire Ecology and Management, Reasonably Foreseeable Development Scenario (RFD), Socioeconomics, Cumulative Impacts, Mitigation
Wild Horse Education	BLM-GRSG RMP/EIS-00010	Wild Horse and Burro Management, Livestock Grazing, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.)
Wild Montana	BLM-GRSG RMP/EIS-00087	Best available information-baseline data, Locatable Minerals, Habitat Boundary/Habitat Management Area Designations, ACECs and RNAs, Vegetation, Range of Alternatives, Montana
WildLands Defense	BLM-GRSG RMP/EIS-00027	ACECs and RNAs, Livestock Grazing, Best available information-baseline data, Soil Resources, Greater Sage-grouse, Air Resources and Climate Change, Vegetation, Fish and Wildlife, Cumulative Impacts, Water Resources, General Consultation (e.g., SHPO, etc.), Socioeconomics, ESA - (Consultation), Habitat Objectives
Williams, Laurel	BLM-GRSG RMP/EIS-00199	Best available information-baseline data
Windle, Randy	BLM-GRSG RMP/EIS-00108	Livestock Grazing
Women's Mining Coalition	BLM-GRSG RMP/EIS-00190	Locatable Minerals, Direct/Indirect Impacts, Range of Alternatives, FLPMA, Mitigation, NEPA (National Environmental Policy Act), Socioeconomics, Purpose and Need
Wong-Kone, Diane	BLM-GRSG RMP/EIS-00163	Fish and Wildlife, Range of alternatives

Organization(s)/ Commentor(s)	Correspondence ID Number	Topic(s) Addressed in Correspondence
Wyoming Association of Conservation Districts	BLM-GRSG RMP/EIS-00185	Purpose and Need, General Consultation (e.g., SHPO, etc.), Greater Sage-grouse, Lands and Realty, Direct/Indirect Impacts, Best available information-baseline data, Habitat Boundary/Habitat Management Area Designations, ACECs and RNAs, Predation
Wyoming County Commissioners Association	BLM-GRSG RMP/EIS-00125	Best available information-baseline data, General Consultation (e.g., SHPO, etc.), Range of Alternatives, Lands and Realty, Socioeconomics, Cumulative Impacts, Reasonably Foreseeable Development Scenario (RFD), Fluid Minerals, ACECs and RNAs, Wyoming, Disturbance Cap, Mineral (salable) Materials
Wyoming Farm Bureau Federation	BLM-GRSG RMP/EIS-00089	ACECs and RNAs, Wildland Fire Ecology and Management, Adaptive Management
Wyoming Mining Association	BLM-GRSG RMP/EIS-00165	Best available information-baseline data, Habitat Boundary/Habitat Management Area Designations, FLPMA, Locatable Minerals, Nonenergy Leasable Minerals, Socioeconomics, Coal, ACECs and RNAs, Other Laws, NEPA (National Environmental Policy Act), Range of Alternatives, Lands and Realty, Adaptive Management, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.)
Wyoming Outdoor Council	BLM-GRSG RMP/EIS-00114	ACECs and RNAs, General Consultation (e.g., SHPO, etc.)
Wyoming Renewable Resources LLC	BLM-GRSG RMP/EIS-00106	Lands and Realty, Greater Sage-grouse, Purpose and Need, Best available information-baseline data, Mitigation, Editorial Comments (ex: Missing periods, possessives, acronyms, etc.), Range of Alternatives, Adaptive Management
Wyoming Stock Growers Association	BLM-GRSG RMP/EIS-00099	Livestock Grazing, Other Laws, ACECs and RNAs
Wyoming Wilderness Association	BLM-GRSG RMP/EIS-00147	Best available information-baseline data, ACECs and RNAs, Tribal Interests
Yellowstone to Uintas Connection	BLM-GRSG RMP/EIS-00137	Best available information-baseline data, Livestock Grazing, Soil Resources, Greater Sage-grouse, Air Resources and Climate Change, Vegetation, Fish and Wildlife, Cumulative Impacts, Range of Alternatives, Water Resources, General Consultation (e.g., SHPO, etc.), Socioeconomics, Habitat Objectives, ESA - (Consultation)
Yturriondobeitia, Jaime	BLM-GRSG RMP/EIS-00051	Habitat Objectives, Best available information-baseline data
Yturriondobeitia, Richard	BLM-GRSG RMP/EIS-00079	Livestock Grazing, Best available information-baseline data

Appendix 23

Consistency with State and Local Land Use Plans

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Appendix 23. Consistency with State and Local Land Use Plans

As required in Section 202(9) of the FLPMA, as amended, and BLM's RMP regulations at 43 CFR 1610.3-2 BLM RMPs must be consistent with officially approved or adopted resource-related plans of other Federal, State, local, and Tribal governments and policies and programs contained therein, to the extent that they are consistent with the purposes, policies, and programs of Federal laws and regulations applicable to public lands. This appendix details known inconsistencies between the Proposed RMPA and Federal, State, local, and Tribal plans.

23.1 FEDERAL PLANS

23.1.1 U.S. Forest Service

In September 2015, the BLM and USFS signed three Records of Decision and Approved RMPA/Land Management Plan Amendments, which amended 98 BLM and USFS land use plans to include goals, objectives, and management allocations and actions for managing greater sage-grouse (GRSG) habitat on BLM-administered Public Lands and USFS lands in ten Western states (California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, and Wyoming) (BLM, 2015a and 2015b; USFS, 2015). The USFS has not amended this rangewide direction, so the September 2015 *Greater Sage-grouse Record of Decision for Idaho and Southwest Montana, Nevada, and Utah, and Land Management Plan Amendments for the Ashley National Forest, Beaverhead-Deerlodge National Forest, Boise National Forest, Caribou National Forest, Challis National Forest, Curlew National Grassland, Dixie National Forest, Fishlake National Forest, Humboldt National Forest, Manti-La Sal National Forest, Salmon National Forest, Sawtooth National Forest, Targhee National Forest, Toiyabe National Forest, Uinta National Forest, Wasatch-Cache National Forest* continues to guide management of USFS lands with GRSG habitat.

Since the Proposed RMPA includes targeted amendments to planning direction established in the coordinated planning effort in 2015, management direction will no longer be consistent across the two agencies. Most notably, BLM's updated alignment of habitat management area boundaries and targeted allocations and management direction identified in the Proposed RMPA is inconsistent with the USFS' September 2015 Land Management Plan Amendments.

23.2 STATE, LOCAL, AND TRIBAL PLANS

23.2.1 Colorado

The BLM has considered the following state and local plans related to management of greater sage-grouse and GRSG habitat in Colorado.

State Plans

- Colorado Greater Sage-Grouse Conservation Plan (CPW 2008a)
- Greater Sage Grouse Stewardship Action Plan (SAP) (State Land Board 2016, renewed 2020)
- Middle Park Greater Sage-Grouse Conservation Plan (CPW 2000)
- Northern Eagle and Southern Routt Greater Sage-Grouse Conservation Plan (CPW 2004)
- North Park Greater Sage-Grouse Conservation Plan (CPW 2001)
- Parachute-Piceance-Roan Plateau Conservation Plan (CPW 2008b) Greater Sage-Grouse
- Parachute-Piceance-Roan Plateau Greater Sage-Grouse Work Group (CPW 2008c)

County Land Use Plans

- Eagle County Comprehensive Plan (Eagle County 2005)
- Garfield County Comprehensive Plan 2030
- Garfield County Land Use and Development Code (Garfield County 2008, revised 2023)
- Garfield County Greater Sage-Grouse Conservation Plan (Garfield County, amended 2021)
- Grand County Master Plan (Grand County 2011)
- Jackson County Master Plan (Jackson County 1998)
- Larimer County Master Plan (Larimer County 1997)
- Mesa County Master Plan (Mesa County 2023)
- Moffat County Land Use Plan (Moffat County 2001)
- Rio Blanco Land and Natural Resources Plan and Policies (Rio Blanco County 2022)
- Routt County Master Plan (Routt County 2022)
- Summit County Countywide Comprehensive Plan (Summit County 2009)

Inconsistencies with State Plans, Policies, and Procedures

Colorado Greater Sage-Grouse Conservation Plan

In 2008, the State of Colorado published the Colorado Greater Sage-Grouse Conservation Plan (CCP) which built on local conservation plans developed by local working groups. The CCP contains voluntary management guidelines that may be applied across land ownerships and many land uses (Colorado Greater Sage-grouse Steering Committee, 2008). The CCP includes guidelines for managing conversion to agriculture, use of the Conservation Reserve Program, and other aspects beyond the BLM's jurisdiction. Implementation of the CCP guidelines is not mandatory.

In 2015, Colorado's governor issued Executive Order 2015-004 to strengthen the CCP. Under the order, the state oil and gas permitting agency would evaluate its existing wildlife siting rules for potential improvement and consult with Colorado Parks and Wildlife when considering actions that impact GRSG or GRSG habitat. The order also prioritized the completion of the Colorado Habitat Exchange, a voluntary compensatory mitigation program. The Colorado Habitat Exchange has not been fully implemented largely due to changing market conditions that devalued the credit/debit system. There are no other statewide mitigation exchanges or banks currently in place.

Although the CCP guidelines are not mandatory, the guidelines were pivotal in developing each iteration of the BLM CO GRSG plans, including this Proposed RMPA. Several aspects of the State's plan and the BLM's Proposed RMPA are conceptually consistent, though each plan uses different wording. Known inconsistencies between the BLM's Proposed RMPA and the *Colorado Greater Sage-Grouse Conservation Plan* include the following:

- The CCP recommends various avoidance protocols within 4-miles of leks. Due to the updated habitat management area (HMA) mapping that has occurred since publication of the CCP and BLM's use of the HMAs for allocations, there are some areas within 4-miles of a lek that are not mapped as habitat and do not have BLM management applied.
- The CCP provides GRSG Habitat Structural Guidelines. The BLM Proposed RMPA provides habitat indicators, which are similar to the Habitat Structural Guidelines but provide some updates based on new information and as coordinated with Colorado Parks and Wildlife and the Colorado Department of Agriculture.

Oil and gas operations in Colorado, regardless of ownership, are subject to the rules and regulations overseen by the Colorado Energy & Carbon Management Commission (ECMC, formerly Oil and Gas Conservation Commission). In 2019, Colorado Senate Bill 19-181 was signed into law, amending the Oil and Gas Conservation Act. SB 19-181 ensures that oil and gas development including flowline operations in Colorado are regulated in a manner that protects public health, safety, welfare, the environment, and wildlife resources (§34-60-101 et seq.). Subsequent approved rulemaking for SB 19-181 included substantial updates to the 300 Series (consultations), 400 Series (Noise & Lighting Requirements), and 1200 Series regulations, which dictate the protection of wildlife resources. The 1200 Series regulations require wildlife mitigation plans for new or amended oil and gas locations, or for previously permitted locations that would cause the density of oil and gas locations to exceed 1 per square mile in PHMA. The wildlife mitigation plans must have written concurrence from CPW. New ground disturbance within 1 mile of GRSG lek sites, among other high priority habitats, is precluded except under certain circumstances outlined in the regulations. Any direct and/or indirect impacts resulting from development triggers compensatory mitigation requirements (monetary fees or operator-completed projects) which are intended to provide a conservation benefit for the population(s) impacted. Mitigation under the SB 19-181 is enforceable by ECMC but is limited to oil and gas development and flowline operations.

1200 Series Regulations

Several aspects of the 1200 series regulations and the BLM's Proposed are conceptually consistent, though are implemented through the respective agency regulatory authorities. Known inconsistencies between the BLM's Proposed RMPA and the *1200 Series regulations* include the following:

- ECMC precludes surface occupancy within 1 mile of all occupied leks, regardless of habitat management area designation within the buffer. The BLM Proposed RMPA precludes surface occupancy (No Surface Occupancy stipulation) in all of PHMA. The acreage of BLM NSO is 1,083,500 compared to 540,400 acres of NSO under the 1200 series regulations.
- ECMC tracks density (1 facility per 640 acres) on a per-project basis, whereas the BLM tracks by management zone.

State trust land represents approximately 10 percent of the GRSG habitat in Colorado. In 2016 the State Land Board issued the Greater Sage Grouse Stewardship Action Plan (SAP) for an original term of 4 years and re-issued the SAP in 2020 for an additional 5 years. The SAP describes the current uses of the state trust lands, the quality of these lands for GRSG habitat, sets prescriptions for both surface and mineral ownership, and clarifies GRSG habitat mitigation and adaptive management (Colorado State Land Board, 2016). Some management actions described in the SAP are required to hold leases on state trust lands, such as a set of required and voluntary grazing best management practices. In coordination with CPW, the State Land Board applies stipulations to fluid mineral leases including no surface occupancy in PHMA, no surface occupancy within 2 miles of a lek in GHMA, and timing limitations in all designated habitat. The State Land Board also applies the 3 percent disturbance cap and the average of one facility per 640-acre density cap by management zone, as described in the BLM 2015 ARMPA.

Greater Sage Grouse Stewardship Action Plan

The SAP incorporated many management practices of the 2015 GRSG ARMPA and is conceptually consistent with much of the BLM Proposed RMPA. Known inconsistencies between the BLM's Proposed RMPA and the *Greater Sage Grouse Stewardship Action Plan* include the following:

- The BLM Proposed RMPA applies controlled surface use stipulations in GHMA within 1-mile of PHMA and within 1-mile of occupied leks occurring in GHMA whereas the State Land Board applies a no surface occupancy stipulation within 2 miles of a lek in GHMA (which was consistent with the BLM 2015 ARMPA).
- The State Land Board applies timing limitations within All Designated Habitat, whereas the BLM Proposed RMPAonly applies timing limitations within PHMA and GHMA.
- The State Land Board applies the adaptive management triggers established in the 2015 GRSG ARMPA. The BLM Proposed RMPA adaptive management process differs from that in the 2015 GRSG ARMPA, but both processes rely on trend information from Colorado Parks and Wildlife.
- The State Land Board applies a "net conservation gain" standard for mitigation.

Inconsistencies with County Plans, Policies, and Procedures

Most of the counties that have GRSG populations address wildlife and wildlife habitat concerns within broad planning documents, such as county master plans (Eagle County Comprehensive Plan 2005, Garfield County Comprehensive Plan 2030, Grand County Master Plan 2011, Jackson County Master Plan 1998, Larimer County Master Plan 1997, Mesa County Master Plan 2023, Moffat County Land Use Plan 2001, Rio Blanco Land and Natural Resources Plan and Policies 2022, Routt County Master Plan 2022, Summit County Countywide Comprehensive Plan 2009). Some counties have incorporated wildlife management or even GRSG specifically into planning documents such as subdivision, development, or zoning regulations. Several plans require coordination with CPW to avoid and/or mitigate adverse impacts to wildlife habitat. While verbiage differs, the intent to avoid, minimize, mitigate, and restore land uses is consistent between county plans and the BLM Proposed RMPA. Plans also mention the importance of best available, credible scientific information.

Known inconsistencies between the BLM's Proposed RMP Amendment and *County Plans* include the following:

- Rio Blanco County Land and Natural Resources Plan and Policies 2022's policy direction states that management plans should not be created for a single species and should be consistent with multiple use mandates. The BLM Proposed RMPA is a species-specific proposed amendment to 77 of BLM's RMPs. The RMPs that are being amended address the wide spectrum of resource and resource uses BLM is responsible for managing in accordance with FLPMA.
- Rio Blanco County Land and Natural Resources Plan and Policies 2022's policy direction states that management of GRSG should be according to the Colorado Greater Sage-grouse Conservation Plan (CCP), or local plans where they exist. As the CCP provides guidelines for management but does not have a regulatory framework beyond State of Colorado lands (Executive Order 2015-004) this would not provide the assurance of management relied upon in the US Fish and Wildlife Services decision not to list the species.
- Garfield County Comprehensive Plan's policy direction would apply a 0.6-mile lek buffer of no surface occupancy for fluid mineral development. The BLM Proposed RMP Amendment incorporates no surface occupancy stipulations in PHMA and ECMC incorporates a 1-mile buffer of no surface occupancy.

- Garfield County plan which was signed prior to the 2015 GRSG ARMPA uses the habitat categories suitable, seasonal habitats, temporarily disturbed, and unoccupied seasonal habitats. Suitable habitat is most closely related to PHMA in definition. The Garfield County Comprehensive Plan was updated in 2021 to incorporate the HMA maps adopted by BLM (DOI-BLM-CO-0000-2020-0003-CX), though it is unclear if the county plan also adopted the habitat designations or if the plan uses "suitable habitat" in lieu of PHMA.

23.2.2 Idaho

Inconsistencies with State Plans, Policies, and Procedures

In 2015, Idaho's governor issued Executive Order 2015-04 to adopt Idaho's Sage-grouse Management Plan (2015 Idaho Plan) as the State's official policy for sage-grouse management in Idaho. This was updated and amended in 2022 with Executive Order 2022-03 and adopted the updated plan, Idaho 2021 Sage-grouse Management Plan (2021 Idaho Plan) and directed all executive agencies, to the extent consistent with existing state law, for relevant permits and policies, to adopt the updated 2021 Idaho Sage-grouse Management Plan. The State of Idaho Executive Order 2022-03 also directed that the 2021 Idaho Sage-steppe Mitigation Principles be used to provide guidance and recommendations on mitigation and use of the Habitat Quantification Tool consistent with the Memorandum of Agreement between the State of Idaho and BLM Idaho on matters pertaining to sage-grouse conservation.

With Executive Order 2022-03, the State of Idaho also adopted the Idaho State Board of Land Commissioner's Greater Sage-grouse Conservation Plan for State endowment lands. The 2021 Idaho Plan provides policy direction and recommendations for sage-grouse conservation and management on lands administered by the BLM and USFS, and for other actions with a federal nexus in Idaho's Sage-grouse Management Area which identified four Conservation Areas and three tiers of Habitat Management Areas in Idaho, i.e. PHMA, IHMA, and GHMA. The 2021 Sage-grouse Management Plan provides guidance for federally managed lands and State Endowment Lands. However, for State Endowment Lands, restrictions and decisions in the 2021 Idaho Plan would not apply unless otherwise decided by the Idaho Board of Land Commissioners.

Although guidance in the 2021 Idaho Plan is not mandatory for BLM, collaborative work between the State of Idaho and their stakeholders as well as the State of Idaho and BLM Idaho were pivotal in developing each iteration of the BLM ID GRSG plans, including the Proposed RMPA. Several aspects of the State's plan and the BLM's Proposed RMPA are conceptually consistent, such as goals and objectives to conserve and manage sage-grouse habitats, populations, and connectivity, though each plan uses different wording. Known inconsistencies between the BLM's RMPA and the 2021 Idaho Sage-Grouse Management Plan are:

- The 2021 Idaho Plan has management objectives to maintain sage-grouse populations and conserve, enhance and restore habitats in PHMA and IHMA but in GHMA the management focus is on multiple-use management. In contrast, one of the objectives of the BLM Proposed RMPA is to maintain habitat conditions in GHMA to support GRSG populations.
- The BLM Proposed RMPA mostly includes HMA as submitted by the State of Idaho in September 2023 for Alternative 5, except for polygons of GHMA (totaling approximately 50,00 acres) which under the Proposed RMPA would be IHMA because of documented connectivity between PHMA patches.
- The 2021 Idaho Plan has a table of indicators and desired condition for sage-grouse habitat, similar to the BLM Proposed RMP Amendment Habitat Objectives Table. However, the 2021 Idaho Plan

has a desired condition of 'adequate nesting cover' for perennial grass height while the BLM Proposed RMPA has a desired condition for perennial grass height of ≥ 7".

- Generally speaking, there are some management differences between the 2021 Idaho Plan and the BLM Proposed RMPA.
  - The 2021 Idaho Plan identifies PHMA as avoidance for utility scale wind and solar while the BLM Proposed RMPA identifies these areas as exclusion;
  - The 2021 Idaho Plan has reduced lek buffer distances in IHMA compared with PHMA for different types of anthropogenic disturbance whereas the BLM Proposed RMPA applies the same lek buffers for IHMA and PHMA ;
  - The 2021 Idaho Plan includes buffer exception criteria for projects within IHMA while the BLM proposed RMPA does not include exception criteria;
  - The 2021 Idaho Plan applies BMPs for infrastructure construction in GHMA rather than RDFs, as in the BLM RMPA;
  - The 2021 Idaho Plan identifies lek buffer distances which vary by HMA type (PHMA, IHMA, and GHMA) while the BLM Proposed RMPA uses the same lek buffer distances in all types of HMA;
  - The 2021 Idaho Plan does not include seasonal restrictions for anthropogenic disturbance in nesting and wintering habitat as in the BLM Proposed RMPA.
  - The 2021 Idaho Plan exempts operation and routine maintenance activities of utility companies from restrictions while the BLM RMPA does not include such an exemption.

The State of Idaho stated that the additional protections proposed for areas within PHMA- referred to as PHMA with limited exceptions- is inconsistent with their 2021 Idaho Plan's three tier habitat management area (PHMA, IHMA and GHMA) approach. The additional protections proposed for a subset of PHMA does not conflict with Idaho's three-tiered approach. In Idaho, the BLM proposes these additional protections to conserve habitat supporting an important population of GRSG shared between the States of Idaho and Nevada from potential renewable energy and rights of way development threats.

Inconsistencies with County Plans, Policies, and Procedures

In 2013, many counties with GRSG populations developed Sage Grouse Management Plans (Camas County, Custer County, Gooding County, Lincoln County, and Owyhee County) in addition to County Comprehensive Management Plans which include wildlife management and, in some cases, GRSG specific management.

These County Sage Grouse Management Plans supplemented local working group plans which were first developed as a result of the 1997 Idaho Department of Fish and Game first statewide sage-grouse conservation plan and further refined in accordance with subsequent State of Idaho EOs and plans.

In 2006, the Idaho Sage-grouse Advisory Committee (ISAC) published the Conservation Plan for the Greater Sage-Grouse in Idaho. It built the framework guidance, tools, and other resources for the Sage-grouse Local Working Groups (LWGs) to develop plans and maintain statewide consistency. The framework identified and prioritized local threats and identified appropriate conservation measures. Implementation of the conservation measures from the 2006 Conservation Plan for Greater Sage-grouse in Idaho was not mandatory.

Several Idaho counties provided comments on the Draft RMPA/EIS, though only a few included comments related to consistency with county Plans. Those comments noted inconsistencies with the management of Alternative 3, as well as consideration of ACECs under either Alternatives 3 or 6. The components of these

alternatives that were identified as inconsistent with county plans were not taken forward into the Proposed RMPA. The BLM has therefore not identified any inconsistencies with county plans.

23.2.3 Montana/Dakotas

There are many planning documents, strategies, or policies that guide management activities that affect public lands. Many of the state plans directly impact or otherwise affect BLM-administered public lands, agreements, or other partnership involvement opportunities. In addition to the BLM's cooperating agency relationship with several state agencies, ongoing coordination and communication will take place to ensure consistency in implementation. State and county plans most pertinent to the planning area are listed below.

North Dakota

- North Dakota Economic Development Strategic Plan: 2010-2020 (2010)
- State of North Dakota Multi-Hazard Mitigation Plan (2013)
- Management Plan and Conservation Strategies for GRSG in North Dakota (2014)
- Management Plan and Conservation Strategies for Greater Sage-Grouse in North Dakota (NDGFD 2014)
- North Dakota State Wildlife Action Plan (2015)

Montana

- Management Plan and Conservation Strategies for Sage Grouse in Montana-Final (2005)
- State of Montana Executive Order 10-2014: Executive Order Creating the Montana Sage Grouse Oversight Team and the Montana Sage Grouse Habitat Conservation Program
- State of Montana Executive Order 12-2015: Executive Order Amending and Providing for Implementation of the Montana Sage Grouse Conservation Strategy
- State of Montana Executive Order 21-2015: Executive Order 12/2015 *ERRATUM*
- Montana Greater Sage-Grouse Stewardship Act (2015)
- Montana Weed Management Plan (MWMP 2008)
- Conservation Plan for Black-tailed and White-tailed Prairie Dogs in Montana (2002)
- Montana Bald Eagle Management Plan (Second edition) (1994)
- Montana Bald Eagle Management Guidelines: An Addendum to Montana Bald Eagle Management Plan (2010)
- Montana Nonpoint Source Management Plan (2007)
- Montana Statewide Comprehensive Outdoor Recreation Plan 2008 to 2012 (2008)
- Montana State Wildlife Action Plan (2015)

South Dakota

- South Dakota Wildlife Action Plan (2015)
- South Dakota Department of Game, Fish, and Parks: Management of Sage-Grouse in South Dakota (2022)
- South Dakota Greater Sage Grouse Action Plan, 2022-2026
- South Dakota Statewide Forest Resource Strategy and Assessment (June 2010)

South Dakota Game, Fish and Parks develops and periodically updates management plans for various species. These plans are available at http://gfp.sd.gov/wildlife/management/plans/default.aspx.

County Plans

- Blaine County Master Plan (2017)
- Dawson County/Glendive Growth Policy (2022)
- The Chinook-Blaine County Comprehensive Plan (Chinook-Blaine Co. 1979)
- Fallon County Growth Policy (2015)
- Chouteau County Growth Policy Plan (2017)
- Growth Policy for Richland County (2015)
- Hill County Growth Policy - Preliminary
- Prairie County, Montana Growth Policy (2006)
- Phillips County Growth Policy 2013-2017
- Garfield County Policies (2010)
- The Valley County Resource Use Plan (Valley Co. 2006)
- Powder River County Growth Policy and Land Use Plan (2019 update)
- The Comprehensive Economic Development Strategy (North Central MT EDDI 2006)
- Custer County Growth Policy (2023)
- Big Horn County Growth Policy (2014)
- Sheridan County Growth Policy (2013)
- McCone County Comprehensive Economic Development Strategy Plan (2024)
- Richland County Community Wildfire Protection and Pre-Disaster Mitigation Plan (2005)
- Carter County Resource Use Plan (2006)
- Rosebud County Wildfire Protection Plan (2004)
- Dawson County Community Wildfire Protection and Pre-Disaster Mitigation Plan (2005)
- Final Carter County Community Wildfire Protection Plan (2005)
- Wibaux County Community Wildfire Protection and Pre-Disaster Mitigation Plan (2005)
- Custer County Community Wildfire Protection Plan (2005)
- McCone County Community Wildfire Protection and Pre-Disaster Mitigation Plan (2005)
- Treasure County Pre-Disaster Mitigation Plan Community Wildfire Protection Plan (2005)
- Prairie County Community Wildfire Protection and Pre-Disaster Mitigation Plan (2005)
- Community Wildfire Protection and Pre-Disaster Mitigation Plan, Fallon County (2005)
- Rosebud County Growth Policy (2013)
- Chouteau County Growth Policy (Chouteau County 2011b)
- Comprehensive Economic Development Strategy, North Central Montana Economic Development District, Inc. (EDDI 2006)
- Harding County – completed November 2006
- Pre-Disaster Mitigation Plans (Cascade County 2011; Fergus County 2007; Judith Basin County 2007; Pondera County 2011; Petroleum County and Town of Winnett 2008; Teton County 2013)
- Community Wildfire Protection Plans (Cascade County 2008; Chouteau County 2007; Meagher County 2008; Pondera County 2007; Teton County 2011)
- Wildland-Urban Interface Wildfire Mitigation Plans (Fergus County 2004; Judith Basin County 2004; Petroleum County 2004)
- Fergus County Land Use Policy, Revised June 2021
- Multi-Hazard Mitigation Plan 2010-2015 (Chouteau County 2010)
- Carbon County Montana Growth Policy (2020)

- Park County (2017)
- Cody Comprehensive Plan (1997)
- Stillwater County Growth Policy (2018)
- Bowman County Comprehensive Plan (2013)
- Beaverhead Growth Policy 2022
- Big Horn County, Wyoming, Community Assessment
- Yellowstone County Growth Policy – combined with Billings (Draft 2008)
- Deer Lodge Growth Policy December 12, 2005
- Gallatin Growth Policy April 15, 2021
- Madison Growth Policy September 2006
- Roosevelt County Growth Plan 2021
- Butte County Government Coordinating Ordinance for Actions Affecting Land and Natural Resources Use (Butte County 1995)
- Cascade County Growy Policy Update 2014
- Butte County – completed May 2007
- Custer County – completed October 2023
- Williams County Comprehensive Plan (2012)

Inconsistencies with State Plans, Policies, and Procedures

Montana Executive Orders and State Procedures

The Governor of the State of Montana issued Executive Order (EO) 10-2014, EO 12-2015 and EO 21-2015. The EOs, in addition to, the Montana Greater Sage-Grouse Stewardship Act of 2015, established the Montana Sage Grouse Oversight Team (MSGOT) and the Montana Sage Grouse Habitat Conservation Program. The combined state procedures, outline a number of conservation strategies for Montana state agencies to follow for land uses and activities in sage-grouse habitat. The State conservation efforts are complementary to the conservation measures proposed in the Proposed RMPA/FEIS and, when combined, will provide conservation efforts across land ownership boundaries.

The BLM's purpose and need is consistent with the goal of the Management Plan and Conservation Strategies for Greater Sage-Grouse in North Dakota (NDGFD 2014) which is to provide for long-term conservation and enhancement of sagebrush steppe/mixed-grass prairie habitats in North Dakota in a manner that will support a self-sustaining GRSG population, a diversity and abundance of other wildlife species, and human uses. This Proposed RMPA/Final EIS also addresses many of the threats and conservation strategies identified in the NDGFD GRSG Management Plan, with the exception of, items such as conversion of private lands to cropland, harvest management, and weather.

The South Dakota Sage-Grouse plan identifies core sage-grouse use areas in western South Dakota. This management plan is designed to provide biological information about sage-grouse, identifies factors that influence sage-grouse in South Dakota, and guides future management direction and actions by establishing objectives to:

- Maintain or increase/improve the existing status and range of sage/steppe habitat in SD
- Annually monitor sage-grouse population status and distribution;
- Use results from lek counts and inference from past hunting seasons to guide recommendations for the annual hunting season;

- Develop a public outreach and educational plan that informs the public, landowners, stakeholders, and wildlife/conservation agencies on sage grouse management and the issues of highest concern;
- Support local, interstate and interagency sage-grouse research projects and collaborative conservation planning efforts; and
- Document disease outbreaks and develop management responses.

The South Dakota Wildlife Action Plan was last updated in 2015 and is revised every 10 years. State wildlife agencies receive federal funding for rare species work. In exchange, each state drafted a plan to address the needs of all fish and wildlife species, with priority on species of greatest conservation need. The South Dakota Wildlife Action Plan guides the state agency's priorities, but more importantly, serves as a framework for potential cooperators to work together to benefit wildlife and healthy habitats. While much of the focus of this plan is to work to avoid future endangered species listings, plans also help maintain common species in the face of known and likely future challenges. An important component of a state Wildlife Action Plan is a list of species of greatest conservation need. The species list is intended to represent declining species and species that can help indicate the effectiveness of habitat management and conservation. The list is not intended to include all rare species. Lists of South Dakota rare species that are found on or near BLM-administered lands are found in the Special Status Species section of Chapter 3. The South Dakota Wildlife Action plan is available at http://gfp.sd.gov/wildlife/management/plans/species-list.aspx.

South Dakota's forest resource strategy provides a long-term, comprehensive, coordinated strategy for investing state, federal, and partner resources. The purpose of this strategy is to provide a comprehensive management plan for priority areas identified in the assessment. The resource strategy details threats, strategies, existing resources, needs, and partners. The threats and strategies described here were assembled with input from the South Dakota Forest Stewardship Coordinating Committee and the Community Forestry Advisory Council.

Known inconsistencies between the BLM and state sage-grouse management exist in both mapping of habitat and habitat types, as well as management approaches. Overall, the BLM used core sage-grouse areas identified by each of the three states and general habitat from Montana as a starting point to identify HMAs. BLM designated Priority and General HMAs, along with three unique HMA types. (PHMA, GHMA, and UHMA). Primarily PHMA is equivalent to the state identified core areas. Two main differences exist, first small adjustments were made during the planning process based on cooperating agency and public input to identify PHMA in some areas. Second, the BLM designated some core areas as other HMA types, where there were ongoing or imminent impacts to these high-quality habitats to emphasize the long-term restoration needs. The objectives for these areas include restoring habitat in order to provide the ability for establishing or enhancing GRSG populations. Specific areas of difference include:

- The Saco Hills area southeast of Malta is included as PHMA by the BLM but is general habitat in the State of Montana approach.
- An area north of the UMRBNM is identified as PHMA by the BLM but is general habitat in the State of Montana approach.
- The Cedar Creek anticline (on the ND Border) is a core area in the State of Montana habitat mapping approach, but has been identified as part of the unique Little Missouri HMA.

- A portion in south Carter County (on the Wyoming border) is a core area in the State of Montana habitat mapping approach, but has been identified as part of the unique South Carter HMA due to ongoing bentonite development in the area.
- In the SW portion of the state (Dillon Field Office) refinements of PHMA from recent research and monitoring efforts created differences with the state core areas.

In Montana the EO general habitat was used as a starting point to identify GHMA, and individual plans worked with local experts and stakeholders to refine these areas as needed. Additional inconsistencies were identified beyond the PHMA vs. GHMA areas above. Namely some areas of GHMA are larger than general habitat based on new bird use information (e.g., Carbon County), while others have reduced GHMA vs. Montana general habitat (especially in the HiLine). Due to the unique behavior of GRSG in silver sage habitat (in the Havre, Malta, and Glasgow Field Offices under the HiLine RMP) the BLM mapped and designated Connectivity habitat (CHMA). These areas included state connectivity habitat as well as additional areas that may also provide for GRSG movement between known populations (areas identified as general habitat by Montana).

To identify general habitat in North and South Dakota the BLM used the current occupied range, along with local vegetation mapping and biologists' opinion, to account for areas where there is limited evidence of breeding habitat but known seasonal or sporadic use by GRSG.

While no known inconsistencies between BLM and state core areas were identified from North or South Dakota, the BLM did not call the North Dakota core are PHMA. Due to the unique habitat found on the periphery of the GRSG range in North Dakota, and to acknowledge the connection to habitat in Montana, the ND core area was included as part of the Little Missouri HMA. The LMHMA allows for better consistency with state management direction, objectives pertinent to challenges of the area, and cross-boundary coordination, relative to PHMA.

In this planning effort, PHMA was expanded in South Dakota because the SD Game, Fish and Parks (SDGFP) recently adjusted core areas for sage-grouse based on newer research. South Dakota GFP recommended the core areas be considered for special management emphasis. Sage-grouse Priority Habitat Management Areas (PHMAs) in the Proposed were expanded to match the SDGFP core areas.

The Proposed RMPA adjusted NSO stipulations, seasonal restrictions, disturbance caps and renewable energy restrictions to best align with EO 12-2015 to facilitate a uniform approach across all land ownerships.

Consistency reviews were limited to areas where the State plans provide management direction for uses/areas where the BLM has management authority. There are aspects of the State plans that are out of the BLM's jurisdiction, such as recommendations related to hunting, predator control, agricultural conversions and other management of state and privately-managed lands. Similarly, BLM's Proposed RMPA may have conservation measures unique to BLM management that are not contained in the State plans, such as leasing processes, habitat indicators, application of disturbance caps, and vegetation objectives. The GRSG approach is implemented through respective agency regulatory authorities. Even though there may be differences in specific management direction and regulatory approach, the overarching goals align. Other aspects of the State plans and the BLM's Proposed RMPA are conceptually consistent, though each plan may use different wording or use of planning terminology (such as "corridors", "exclusion" and specific HMA types).

Inconsistencies with County Plans, Policies, and Procedures

There are numerous planning documents, strategies, or policies that guide county management plans and policies. Many of these policies affect BLM-administered public lands, agreements, or other partnership involvement opportunities. In addition to the BLM's cooperating agency relationship with several counties, ongoing coordination and communication will take place to ensure consistency as appropriate.

Numerous counties in the planning area have approved Growth Plans or policies that guides and direct a county's land use planning tools in regard to subdivision regulations, park plans, infrastructure plans, transportation plans, trail plans, natural resource plans, public facility plans and housing plans. Some federal and state grants require a county to have a Growth Policy to guide development of infrastructure and public facilities in accordance with Section 76-1-605(1), MCA. Some County Growth Policies can be used as a local planning tool for purposes of establishing coordination or cooperating agency status with a federal land management agency, pursuant to Section 76-1-607, MCA which was adopted by the Montana Legislature in 2013. One county Growth Plan encourages federal and state agencies to manage wildlife populations taking into consideration of local economics, heritage, cultures, and private property rights and supports no net loss of livestock grazing AUM's for any permit due to increasing wildlife population and habitats policy which would not be consistent with Alternative 3. However, growth policies are not a regulatory document and do not confer authority to regulate land uses that are not otherwise specifically authorized by law or regulations.

Within the Montana/Dakotas planning area, there are also a number of Community Wildfire Protection Plans (CWPP) that influence how land is managed on federal and state lands for wildfire risk reduction and map/identify hazards and offer wildfire risk mitigation strategies.

In their consistency evaluation of the range of alternatives for the Draft RMPA/EIS, as well as in cooperating agency comments on the review of the Administrative and Draft LUPA/EIS, the majority of the responding counties noted that county plans were least consistent with Alternative 3 and portions of management actions, specifically ACECs described under Alternative 6. Some counties have ordinances related to federal land use planning and federal actions regarding natural resource management. However, there are no known direct inconsistencies between the BLM's Proposed RMPA and any county plans, policies, or procedures.

Inconsistencies with Tribal Plans, Policies, and Procedures

There are numerous treaties, Tribal constitutions, planning documents, strategies, or policies that guide the exercise of treaty rights, land uses, and development of planning documents that protect opportunities for traditional cultural practices and guide coordination with federal agencies. Many of these policies affect BLM-administered public lands and management, government-to-government relationships, agreements, co-stewardship opportunities or other partnerships.

Tribal natural resources management and environmental programs and policies focus on all aspects of natural resources (i.e., hydrology/water, soils, grasslands, forests, agriculture, fish/wildlife etc.) as they pertain to Indigenous peoples, tribal natural resources management, and traditional ecological knowledge.

This planning effort aligns with overarching goals and Tribal ordinances to protect and preserve wildlife and natural resources. The Fort Peck Tribes have identified management specific to maintain or increase populations of Greater Sage-Grouse. In 2015, The Crow Tribe enacted a bill entitled "Cooperative Conservation Plan for Greater Sage-Grouse on the Crow Nation". The bill establishes a plan that recognizes the importance of preservation and conservation of Greater Sage-Grouse and sets conservation objectives

in coordination with federal agencies The Fort Belknap Indian Community also identifies specific actions related to Greater Sage-Grouse management. Those actions include in part:

- Create an electronic database for sage grouse and sharp-tailed grouse breeding ground information;
- Monitor all Greater sage grouse leks (dance grounds) and every two years;
- Coordinate with Montana Fish, Wildlife, and Parks on status of Greater sage grouse in north central Montana;
- Develop a comprehensive assessment of suitable nesting and brood rearing habitat; and work to minimize or mitigate fragmentation or deterioration of upland game bird habitats.

There are no known inconsistencies with Tribal plans policies and procedures resulting from this Proposed RMPA. No actions have been identified that may adversely affect rights of Tribal nations that have been reserved through treaties, statutes or Executive Orders.

23.2.4 Nevada/California

The BLM has considered the following state and local plans related to management of greater sage-grouse and GRSG habitat in Nevada and California:

State Plans

- 2019 Nevada Greater Sage-grouse Conservation Plan

County Land Use Plans

California

- Lassen County General Plan (2000)
- Modoc County General Plan (1988)
- Plumas County 2035 General Plan (2013)
- Sierra County General Plan (2012)

Nevada

- Churchill County Master Plan (2020)
- County Code of Elko County, Nevada (Ord 2023-11, passed 8/16/1023)
- Elko County Sage Grouse Management and Conservation Strategy Plan (2012)
- Stewardship Alliance of Northeast Elko County: SANE Sagebrush Ecosystem Conservation Plan (2014)
- Eureka County Master Plan (2010)
- Humboldt County Public Land Resource Management Policy Plan: Greater Sage Grouse (02/07/2022)
- Lander County Policy Plan for Federally Administered Lands (2005)
- Lincoln County Public Lands Policy Plan (2010)
- Lyon County Comprehensive Master Plan (2020)
- Mineral County Master Plan (2022)
- Nye County Comprehensive Master Plan (2011)
- Pershing County Master Plan (2012)
- Storey County Master Plan (2016)
- Washoe County Master Plan: Land Use and Transportation element (2020)
- White Pine County Public Lands Policy Plan (2007)

Inconsistencies with State Plans, Policies, and Procedures

The State of Nevada finalized the 2014 Nevada Greater Sage-grouse Conservation Plan Sagebrush Ecosystem Program State of Nevada in October 1, 2014. They designed their plan to "eliminate the threats facing [GRSG] while balancing the economic and social needs of the residents of Nevada through the use of 'avoid, minimize and mitigate' with additional offsite mitigation being accomplished by the use of the Nevada Conservation Credit System". In 2019, the State of Nevada updated the Nevada Greater Sage-Grouse Conservation Plan. The goals of the 2019 plan include stopping population decline and habitat loss, implementing habitat management and restoration, and developing conservation strategies. The 2019 plan aimed to update sage-grouse and sagebrush management strategies to align with new science and rapid changes to sagebrush ecosystems.

There are many aspects of the State's plan and the BLM's Proposed RMPA that are conceptually consistent, though each plan uses different wording.

There are aspects of the State's plan that are out of the BLM's jurisdiction, such as the recommendation for management dealing with predator control and hunting. However, they are not identified as inconsistencies because the BLM does not permit hunting or predator control. Inconsistencies will be limited to areas where the State's plan provides management direction for uses/areas for which the BLM has jurisdiction.

Known inconsistencies between the BLM's Proposed RMPA and the Conservation Plan for Greater Sage-Grouse in Nevada include the following:

- The State of Nevada does not identify specific resource allocations, such as open or closed for mineral materials or exclusion, avoidance, or open for ROWs. Rather the State of Nevada's plan applies the concept of 'Avoid, Minimize, Mitigate' to reduce the threat of anthropogenic disturbances. The BLM Proposed RMP Amendment does identify specific allocations for each appropriate resource as a method to reduce the threats to GRSG.
- The BLM's Proposed RMPA identifies a disturbance cap of 3 percent with exceptions. The Authorized Officer may grant an exception to the disturbance cap at the HAF fine scale if the project meets criteria associated with the project-scale assessment (including requirements for exceptions and conditions), is in compliance with the Nevada Greater Sage-grouse Conservation Plan and Conservation Credit System (CCS) as required by Nevada regulation (Nevada Revised Statutes (NRS) Chapter 232.16 and Nevada Administrative Code (NAC) 232.162-232.480), and the offsetting compensatory mitigation (or credits per the Nevada CCS Manual) occur within the HAF fine scale where the project occurs.

  The CCS was developed to meet regulatory requirements established by NRS Chapter 232.162 to fulfill compensatory mitigation requirements for anthropogenic disturbances and to achieve a net conservation gain to Greater Sage-grouse (GRSG) habitat on public lands in Nevada. The use of the CCS to offset impacts to GRSG became mandatory in Nevada with the adoption of NAC 232.400-232.480 in 2019.
- The Nevada State plan does not have a disturbance cap.
- The BLM's Proposed RMPA includes strategies to be implemented to manage livestock grazing in a manner that minimize the risk of improper livestock grazing. While the State's plan identifies Livestock Grazing Conservation Goal, Objective, and Management Actions (refer to State's plan 7.5 Livestock Grazing), those actions are largely voluntary, while the BLM plan does require changes to be made if an area is not meeting land health standards. The specific changes would be determined

at the implementation level and consistent with BLM's livestock grazing regulations (43 CFR Part 4180.2(e)(9)).

Inconsistencies with County Plans, Policies, and Procedures

In their consistency evaluation of the range of alternatives for the Draft RMPA/EIS and in subsequent comments on the public review of the Draft RMPA/EIS, Counties noted that Alternatives from the Draft RMPA/EIS are inconsistent with county plans, primarily because BLM is not adopting in full the State of Nevada's Greater Sage-grouse Conservation Plan (2019) and that it is perceived that BLM's proposed management would restrict resource uses such as minerals and infrastructure development and would introduce the potential for road or grazing closures. The Proposed RMPA/Final EIS discloses that the preservation of valid existing rights is a planning criterion and all the programs acknowledge those rights. The Proposed RMPA would preserve valid existing rights but future solar, wind, fluid mineral, saleable mineral, and rights of way development will likely be affected in areas identified as Priority Habitat Management Areas (PHMA) and areas within PHMA with limited exceptions. Development could also be restricted for some uses in General Habitat Management Areas (GHMA) and Other Habitat Management Areas (OHMA).

Counties with adopted county land use plans identified additional inconsistencies with the BLM's alternatives that are procedural in nature. Several counties have land use planning documents that require all federal actions comply with local law. The Proposed RMPA is inconsistent with these types of local county policies.

Inconsistencies with Tribal Plans, Policies, and Procedures

The BLM invited the Alturas Rancheria, Battle Mountain Band of the Te-Moak Tribe, Big Pine Paiute Tribe of the Owens Valley, Bishop Paiute Tribe, Cedarville Indian Rancheria, Duckwater Shoshone Tribe, Elko Band of the Te-Moak Tribe, Ely Shoshone, Fort Bidwell Tribe, Fort McDermitt Paiute and Shoshone Tribes, Klamath Tribes, Lovelock Paiute Tribe, Modoc Nation, Pit River Tribe, Paiute-Shoshone Tribe of the Fallon Reservation and Colony, Pyramid Lake Paiute Tribe, Reno-Sparks Indian Colony, South Fork Band of the Te-Moak Tribe, Summit Lake Paiute Tribe, Susanville Indian Rancheria, Timbisha Shoshone Tribe, Utu Utu Gwaitu Paiute Tribe of the Benton Reservation, Walker River Paiute Tribe, Washoe Tribe of Nevada and California, Wells Band of the Te-Moak Tribe, Winnemucca Indian Colony, Yerington Paiute Tribe, and the Yomba Shoshone Tribe to enter into formal government to government consultation and also invited these Tribes to become formal Cooperating Agencies. The following Tribes entered into formal Government-to-Government consultation: Battle Mountain Band of the Te-Moak Tribe, Duckwater Shoshone Tribe, Lovelock Paiute Tribe, Modoc Nation, Reno-Sparks Indian Colony, Summit Lake Paiute Tribe, Timbisha Shoshone Tribe, Walker River Paiute Tribe, Yerington Paiute Tribe, and the Yomba Shoshone Tribe. None of the Tribes became cooperating agencies. During the February 14, 2024 Government-to-Government consultation meeting with the Tribes, they expressed concern over some issues (e.g. vegetation treatments that removed Pinyon and Juniper trees). The BLM is not aware of any inconsistencies between the Proposed RMP Amendment and Tribal plans.

23.2.5 Oregon

Inconsistencies with State Plans, Policies, and Procedures

The BLM consistently met with and received comments from the Oregon Department of Fish and Wildlife (ODFW), a formal cooperating agency in the planning process, to discuss the Oregon's Greater Sage-grouse Plan and its consistency with the RMP Amendment. During their review of the Draft EIS, ODFW identified numerous inconsistencies with the Preferred Alternative and other alternatives in the Draft EIS. The BLM

coordinated closely with ODFW on the development of the Proposed RMPA and has resolved all of the known inconsistencies, with these exceptions:

- The State of Oregon finalized the Greater Sage-Grouse Conservation Assessment and Strategy for Oregon (or "CAAS") in 2011. As part of updating the CAAS, ODFW recently updated their mapping of core and low-density sage-grouse habitat in Oregon. This was completed and accepted by the Oregon Fish and Wildlife Commission in December 2023. The BLM has used the Oregon core habitat to identify new PHMA (refer to Appendix 3). The Oregon low density habitat is used in addition to Habitat Assessment Framework (HAF) mapped seasonal habitats to identify new GHMA. As was the case in the BLM's 2015 and 2019 planning, there is a small area in Grant County identified by the State of Oregon as sage-grouse habitat that is outside of the BLM sage-grouse planning area.
- BLM is adopting the WAFWA lek count guidelines and status definitions (refer to Appendix 4), which all states have technically agreed to, but ODFW has not yet implemented, A delay in switching lek counting methods may impact BLM Oregon's adaptive management calculations.

Inconsistencies with County Plans, Policies, and Procedures

Deschutes, Harney, Lake, Malheur, and Umatilla Counties are formal cooperating agencies. The BLM received comments from Baker County on the Draft EIS which identified Areas of Critical Environmental Concern (ACECs) as inconsistent with their county plan. The BLM did not propose any ACECs for designation in Oregon in the Draft EIS alternatives and is not proposing any ACECs for designation in the Proposed RMP Amendment. No other consistency issues were raised by any other county including the formal, cooperating agency counties. The BLM is not aware of any inconsistencies between the Proposed RMP Amendment and any county plan.

Inconsistencies with Tribal Plans, Policies, and Procedures

The BLM invited the Burns Paiute Tribe, Confederated Tribes and Bands of the Yakama Nation, Confederated Tribes of the Colville Reservation, Confederated Tribes of the Umatilla Indian Reservation, Confederated Tribes of the Warm Springs Reservation, Fort Bidwell Indian Community of the Fort Bidwell Reservation of California, Klamath Tribes, Modoc Nation, Spokane Tribe of the Spokane Reservation, and Fort McDermitt Paiute and Shoshone Tribes of the Fort McDermitt Indian Reservation to enter into formal government to government consultation and also invited these Tribes to become formal Cooperating Agencies. None of the Tribes entered into formal government to government consultation and none became cooperating agencies. The BLM did not receive any comments from the Tribes during the development of the Draft EIS or on the Draft EIS. The BLM is not aware of any inconsistencies between the Proposed RMPA and Tribal plans.

23.2.6 Utah

State, local, and Tribal plans and strategies associated with management of GRSG populations and their habitats include the following:

- **State of Utah Resource Management Plan** (adopted in 2018, updated in 2024) - The State Resource Management Plan is a legislatively approved planning document that highlights the State's goals, objectives, and policies for each resource section.
- **State of Utah Administrative Code – R-634-003 – Compensatory Mitigation Program (2018)**
- **State of Utah Executive Order 2015/002 – Implementing the Utah Conservation Plan for Greater Sage-Grouse (2015)**

- **Conservation Plan for Greater Sage-Grouse in Utah** (adopted in 2019) – The goal of this Plan is to protect, maintain and increase sage-grouse populations and habitats within Sage-Grouse Management Areas (SGMAs). The State's goal was to be accomplished by meeting the two primary objectives, which are 1) to maintain and increase GRSG populations statewide, and within each SGMA and 2) to maintain, protect and increase sage-grouse seasonal habitats within SGMAs.

In 2015 the Utah Legislature adopted HB 323 requiring each Utah County to develop a Resource Management Plan as part of the county's general plan. These documents were intended to be used to define the county's policy, goals, and objectives for managing natural resources on public lands (Utah Code 63L-6-103) for the BLM to consider in planning processes that affect the use of public lands[1].

- Beaver County Utah Resource Management Plan (2017, as amended)
- Box Elder County Resource Management Plan (2017)
- Cache County Resource Management Plan (adopted 2017, amended in 2023)
- Carbon County Resource Management Plan, an Addendum to the Carbon County General Plan (2017)
- Daggett County General Plan (2022)
- Duchesne County General Plan & Resource Management Plan (2022)
- Emery County General Plan, as amended, Emery County, Utah (1996)
- Garfield County, Utah, General Management Plan Resource Management Section (2019)
- Grand County Resource Management Plan (2017)
- Iron County General Plan (2009), as amended by the Iron County Greater Sage-Grouse Resource Management Plan (2017)
- Juab County General Plan (2023)
- Kane County, Utah, Resource Management Plan (2017, as amended)
- Morgan County Utah Resource Management Plan (2017)
- Millard County Resource Management Plan (2017)
- Piute County Resource Management Plan (2016)
- Rich County Resource Management Plan (Adopted 2017, updated 2022)
- Sanpete County Resource Management Plan, an Addendum to the General Plan (2017)
- Sevier County Resource Management Plan 2017 General Plan Update (Updated 2022)
- Summit County Resource Management Plan (2017)
- Tooele County Resource Management Plan (2017)
- Uintah County Resource Management Plan (2017)
- Utah County Resource Management Plan (2017)
- Wasatch County Public Lands Resource Management Plan (2017)
- Wayne County Public Lands Resource Management Plan (2017)
- Western Weber County Resource Management Plan (2017)

The Ute Indian Tribe—Uintah and Ouray Reservation is the only Tribe that has provided the BLM a GRSG management document for consideration. Adopted by ordinance in May 2013, the Greater Sage-Grouse Conservation Ordinance was developed to preclude a listing under the Endangered Species Act while protecting the economic well-being of the tribe. The ordinance includes requirements for oil and gas and

[1] These plans are available at: https://utah-resource-management-planning-plpco.hub.arcgis.com/pages/county-management-plans

other surface-disturbing operations to minimize direct impacts on leks during breeding and nesting season for the conservation and preservation of GRSG within the boundaries of the Uintah and Ouray Reservation.

Inconsistencies with State Plans, Policies, and Procedures

The State of Utah finalized the *Utah Conservation Plan for Greater Sage-Grouse* in January 2019 with a goal to "protect, maintain and increase sage-grouse populations and habitats within Sage-Grouse Management Areas (SGMAs)." The State's officially adopted plan outlines the following objectives to meet the goal as stated above:

- Maintain and increase sage-grouse populations statewide, and within each SGMA.
- Maintain, protect and increase sage-grouse seasonal habitats within SGMAs.

The State's plan also identifies strategies to address localized threats to sage-grouse populations in Utah (State of Utah, 2019). The State of Utah is currently in the process of updating their greater sage-grouse (GRSG) plan; consistent with the BLM's planning regulations this evaluation focuses on the officially approved or adopted resource-related plans (43 CFR 1610.3-2(b)).

Several aspects of the State's GRSG plan and the BLM's Proposed RMP Amendment are conceptually consistent, though each plan uses different wording based on statutory and regulatory authorities. For example, while the BLM and state each seek to avoid impacts as the first strategy in the mitigation hierarchy, the BLM applies the avoidance measures using the various allocations and action associated with the different land uses (e.g., no surface occupancy for oil and gas, disturbance cap, avoidance for rights-of-way, etc.). Such differences in planning language are not identified as inconsistencies where there is a shared intent/outcome.

There are also aspects of the State's plan that are outside of BLM's jurisdiction, such as recommendation for management of private, local government, Trust Land Administration, and state lands and language dealing with predator control. Though these concepts are absent from the BLM's Proposed RMP Amendment, they are not identified as inconsistencies because the BLM cannot prescribe management on private, local government, Trust Lands and state lands, and does not have the authority to permit hunting or predator control. Inconsistencies will be limited to areas where the State's plan provides management direction for uses/areas the BLM has jurisdiction.

Known inconsistencies between the BLM's Proposed RMP Amendment and the 2019 *Utah Conservation Plan for Greater Sage-Grouse* include the following:

- There are several inconsistencies between the habitat management areas in the State's plan and the BLM's Proposed RMP Amendment.
  - While nearly 94% of the BLM's PHMA are within a State SGMA, the BLM's Proposed RMP Amendment includes portions of the following areas as PHMA outside the State's SGMAs: West Tavaputs and Anthro Mountain portions of the Carbon area, the SE portion of the Sheeprocks area (Tintic area), and small extensions in the Halfway Hollow portion of the Uinta area and on the west side of the Rich area.
  - The BLM's Proposed RMP Amendment includes some areas as GHMA that the State's plan doesn't include in any SGMAs: several portions of the Uinta area south of Highway 40, areas contiguous to but north of the Ibapah SGMA, high mountain valleys on the southwest side of the Rich area, and the habitat associated with the South Slope of the Uintas. The Proposed RMP Amendment acknowledges habitat in these areas and would apply the minimal management associated with GHMA, where the BLM has surface or mineral management jurisdiction.

  - The BLM's Proposed RMP Amendment also identifies areas as GHMA-Connectivity that the State's plan doesn't include. While nearly 98% of these areas are in an SGMA, the state doesn't include this concept in their SGMA approach of habitat, non-habitat, and opportunity areas.
  - While the Proposed RMP Amendment includes some HMA type on over 89% of the State's SGMAs, some portions of the SGMAs do not include any Proposed RMP Amendment HMA types. These areas are associated with vegetation types not conducive to being managed as GRSG habitat.
- The BLM's Proposed RMP Amendment places fewer conservation measures on GHMA than PHMA, but still has more conservation measures for these areas than the state's plan. The State's current GRSG plan notes that "Sage-grouse habitats outside the SGMAs are not required for long-term conservation of the species. Much of this habitat has already been heavily disturbed by human and natural causes, and it is not suitable for enhancement or improvement. Therefore, sage-grouse populations in these areas are not considered essential to perpetuate the species in Utah, and no specific management actions for this habitat are recommended." As such, BLM management of areas outside the State's SGMAs is inconsistent with their current approved plan. However, the State is in the process of updating their plan and has been coordinating with the BLM as the HMA boundaries have been reconsidered as part of this planning effort.
- The State's principle conservation measure for habitat in SGMAs is to avoid the action. This is conceptually consistent with the BLM's Proposed RMPA allocations (e.g., lands and realty actions are avoided; fluid minerals are managed as NSO, with two exceptions; mineral materials are managed as closed unless expansion of existing sites or new free-use site). The State's plan notes that if avoidance is not possible, minimization and mitigation would occur. However, in many instances if avoidance was not possible the BLM's Proposed RMP Amendment would preclude such actions (e.g., only two exceptions for fluid minerals; no new mineral material sites that are not free-use; no new non-energy leasable mineral leases, exception for wind/solar ROWs if specific conditions are not met).
- Both the BLM Proposed RMP Amendment and State plan include mitigation strategies in which avoidance of disturbing actions are the first step, followed by minimization, then compensatory mitigation if permanent disturbance to GRSG habitats cannot be avoided. Under the State's plan any necessary compensatory mitigation is encouraged to offset habitat loss but is voluntary for the applicant/permittee. Under the BLM's Proposed RMPA, mitigation is required to achieve, at a minimum, a no net loss of habitat. However, the BLM Proposed RMPA provides for using the State tools for compensatory mitigation, so long as it achieves the BLM's plans mitigation standard.
- Both the BLM Proposed RMP Amendment and State plan have a 3% disturbance cap; the state changed their 2013 plan to increase consistency with the BLM approach so the processes align on BLM and non-BLM administered lands. However, the BLM's cap is 3 percent of total disturbance, while the State's cap is 3% of new disturbance based on a 2013 baseline.
- The BLM's Proposed RMP Amendment includes strategies to be implemented to manage livestock grazing in a manner that minimize the risk of improper livestock grazing. While the State's plan identifies Grazing Practices for Greater Sage-Grouse Conservation (refer to State's plan Conservation Strategies #7), those actions are largely voluntary, while the BLM plan does require changes to be made if an area is not meeting land health standards – though the specific changes would be determined at the implementation level.
- Both the BLM Proposed RMP Amendment and the State's plan include adaptive management strategies. Each tracks different indicators for when a potential change in management may be

needed. While this is an inconsistency, both plans also include the option to consider other data sources to identify when management changes may be needed and rely on interagency groups to determine the cause of the declines and recommend potential changes in management.

Inconsistencies with County Plans, Policies, and Procedures

Several Utah counties provided comments on the Draft RMPA/EIS, though only a few included comments related to consistency with county plans. Most frequently those comments noted inconsistencies with the management of Alternative 3, as well as consideration of ACECs under either Alternatives 3 or 6. The BLM is only required to identify known inconsistencies with the Proposed RMP Amendment, and there are no ACECs considered in the Proposed RMPA.

One county noted in their comment that the livestock grazing management action RM-7 (regarding permit voluntary relinquishment) was inconsistent with state and county plans. The commentor noted action was stated as potentially inconsistency because the action (RM-7) would "call for reallocation and reauthorization of grazing permits that have been voluntarily relinquished." The BLM does not find this inconsistent because the action does not call for reallocation and reauthorization, but only requires the AO to "consider whether to offer the permit for re-authorization" or to "consider conversion of the allotment to a reserve common allotment…" Consideration of uses associated with potential future voluntary uses does not commit or decide to change the nature of the use.

Another county comment noted that the BLM needs to be consistent with the resource management plans developed by the State of Utah and the counties in Utah. However, no counties notified the BLM, in writing, of an apparent inconsistency beyond those noted above (refer to 43 CFR 1610.3.2(c)).

Inconsistencies with Tribal Plans, Policies, and Procedures

The Ute Indian Tribe—Uintah and Ouray Reservation in the only Tribe that has specifically identified a plan related to GRSG management. Adopted by ordinance in May 2013, the GRSG Conservation Ordinance was developed to preclude listing of GRSG while protecting the economic well-being of the Tribe. The rules specify requirements that oil and gas operators must follow to minimize direct impacts to suitable habitat and eliminate direct impacts to individual birds during the nesting and mating season. Known inconsistencies between the BLM's Proposed RMP Amendment and the Ute Indian Tribe GRSG Conservation Ordinance include the following:

- The BLM Proposed RMP Amendment includes management that addresses GRSG threats beyond fluid mineral leasing and development (e.g., non-energy leasable minerals, mineral materials, transmission lines and pipelines, and improper livestock grazing).
- The BLM Proposed RMP Amendment's management for fluid mineral includes more restrictions (e.g., NSO in all PHMA and disturbance caps).

23.2.7 Wyoming

The BLM has considered the following state and local plans related to management of greater sage-grouse and GRSG habitat in Wyoming.

State Plans

- Wyoming Greater Sage-Grouse Core Area Protection Executive Order 2019-3
- Bates Hole/Shirley Basin Sage-Grouse Conservation Plan (2014)
- Big Horn Basin Sage-Grouse Conservation Plan (2014)
- Northeast Wyoming Sage-Grouse Conservation Plan (2014)

- South-Central Sage-Grouse Conservation Plan (2014)
- Southwest Sage-Grouse Conservation Plan (2014)
- Upper Green River Basin Sage-Grouse Conservation Plan (2014)
- Upper Snake River Basin Sage-Grouse Conservation Plan (2014)
- Wind River/Sweetwater River Sage-Grouse Conservation Plan (2014)

County Land Use Plans

- Albany County Natural Resource Land Use Plan (2022)
- Big Horn County Natural Resource Management Plan (2020)
- Campbell County Natural Resource Land Use Plan (2022)
- Carbon County Natural Resource Management Plan (2021)
- Converse County Natural Resource Management Plan (2022)
- Crook County Natural Resource Management Plan (2020)
- Fremont County Natural Resource Management Plan (2021)
- Hot Springs County Natural Resource Management Plan (2022)
- Johnson County Natural Resource Management Plan (2020)
- Lincoln County Natural Resource Management Plan (2021)
- Natrona County Development Plan, Chapter 7 Update (2021)
- Niobrara County Natural Resource Management Plan (2021)
- Park County Natural Resource Management Plan (2021)
- Sheridan County Comprehensive Plan (2020)
- Sublette County Federal & State Land Use Policy (2021)
- Sweetwater County Federal Lands and Resources Plan (2022)
- Teton County Comprehensive Plan (2020)
- Uinta County Land Use Plan (2023)
- Washakie County Natural Resource Management Plan (2020)
- Weston County Natural Resource Management Plan (2022)

Inconsistencies with State Plans, Policies, and Procedures

Sage Grouse Executive Order 2019-3

Wyoming manages GRSG through Executive Order. The Executive Order establishes a conservation framework implemented at the scale of the State. Governor Freudenthal signed the first Greater Sage-Grouse Core Area Protection Executive Order (SGEO) in 2008 (SGEO 2008-2) which he updated in 2010 (SGEO 2010-4). Each successive administration has updated and signed a new SGEO (Governor Mead SGEO 2011-5 and 2015-4; Governor Gordon SGEO 2019-3). The SGEO details an approach to prioritize the maintenance and enhancement of GRSG habitats and populations inside Core Population Areas, Connectivity Areas, and Winter Concentration Areas with the goal of maintaining habitat and minimizing future disturbance in these designated areas by limiting surface disturbance and by locating proposed disturbances within already disturbed or naturally unsuitable locations.

The Sage-grouse Implementation Team (SGIT) was formed in 2007 to serve as the oversight team developing and implementing the SGEO. The SGIT is comprised of 24 representatives by statute (WY-9-19-101): not less than 2 members from agriculture, mining, oil and gas, and conservation/sportsmen and not less than 1 member from county government, wind generation and transmission, Wyoming Game and Fish Department, Wyoming Department of Agriculture, Wyoming Department of Environmental Quality, Wyoming Wildlife

and Natural Resource Trust, Wyoming Oil and Gas Commission, Wyoming State Lands, Wyoming Senate, and Wyoming House, with cooperation and participation by BLM, USFWS, and USFS. SGIT members were appointed originally by Governor Freudenthal. Replacements and individuals to represent emerging stakeholders (for example, wind energy development) are identified and appointed by the current administration. The SGIT was legislatively codified by the State of Wyoming in 2014. The governance structure of the SGIT is at the discretion of the Governor.

The SGEOs in effect at time of planning were critical in developing each iteration of the BLM WY GRSG plans, including SGEO 2019-3 in the Proposed RMP Amendment. Most of SGEO 2019-3 and the BLM's Proposed RMP Amendment are conceptually consistent, though wording differs in situations. Known inconsistencies between BLM's Proposed RMP Amendment and SGEO 2019-3 include:

- Core area maps in SGEO 2019-3 differ from PHMA in BLM's Proposed RMP Amendment. The HMAs adopted by the BLM inthe Proposed RMP Amendment match the current State of Wyoming draft (03/22/2024) revised core areas (the State's proposed core area revisions can be found here Sage-Grouse Executive Order | Wyoming Game & Fish Department).
- The BLM's Proposed RMP Amendment includes approximately 273,000 acres of BLM surface and/or mineral estate in Southwest Wyoming (The Golden Triangle) where increased protections include No Surface Occupancy (NSO) stipulations for new fluid mineral leases. SGEO 2019-3 allows surface occupancy in this area with density and surface disturbance restrictions.
- Adaptive management metrics, quantification approaches, and threshold levels differ in the BLM's Proposed RMP Amendment compared to those established in SGEO 2019-3 Appendix I. Since SGEO 2019-3 went into effect the State has modified their adaptive management approach to identifying anomalies in GRSG population trends. The BLM Proposed RMPA establishes that the State's adaptive management analyses must be considered by the BLM when determining if GRSG habitat and population adaptive management thresholds have been met.

Regional Sage-Grouse Conservation Plans

As established in SGEO 2019-3, Local Sage-Grouse Working Groups (LWG) in Wyoming are responsible for developing and facilitating the implementation of local conservation plans for the benefit of GRSG and their habitats. By charter, LWG members are expected to communicate and engage with state and federal agencies, landowners, and other interested parties to identify issues affecting GRSG in their LWG region and prioritize management actions that address those issues.

- No inconsistencies between BLM's Proposed RMPA and the eight regional Conservation Plans developed by the LWGs in Wyoming were identified.

Inconsistencies with County Plans, Policies, and Procedures

County planning and policy documents, including Natural Resource Management Plans, Development Plans, Comprehensive Plans, and Land Use Plans, are documents prepared and adopted by County governments that federal agencies are required to review and consider when making decisions that may affect the local area. County plans establish local policies relating to the management of federal and public land at the County level and reflect the local government's position on federal decisions concerning those lands. Wyoming's Counties participated as Cooperating Agencies and were consulted and coordinated within the current GRSG planning effort.

BLM reviewed pertinent Plans of all the Counties in Wyoming that included PHMA in BLM's Proposed RMP Amendment. This included all Counties in the State except Goshen, Laramie, and Platte Counties. Many of

the Wyoming County Plans reviewed establish that Counties oppose developing management plans for single-species management. Although the BLM Proposed RMP Amendment is a land use plan amendment developed specifically for the management of GRSG habitats, management established in BLM's Proposed RMP Amendment will influence many species of wildlife in Wyoming that use GRSG habitats. Known inconsistencies between BLM's Proposed RMP Amendment and the 20 County Natural Resource Management and Land Use Plans, Policies, and Procedures reviewed include:

- Many of the County Plans establish opposition to changes in management area designations including the expansions or reductions of PHMA. The BLM Proposed RMP Amendment modifies the boundaries of PHMA to match the State's core areas as proposed for revision. Most of the County Plans establish support for Wyoming's sage-grouse core area strategy and support for establishing PHMA the same as the GRSG core areas identified by the State.

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